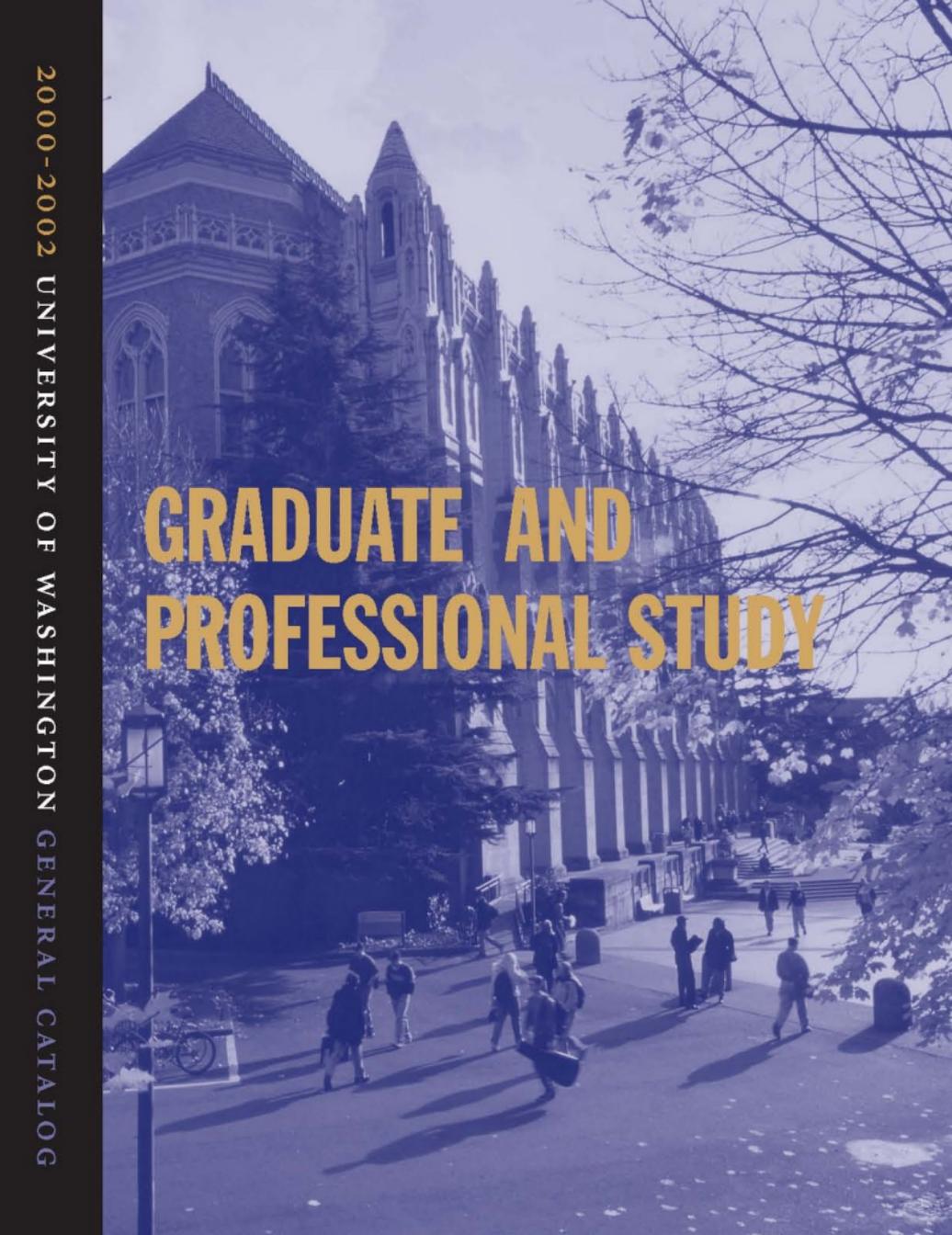


2000-2002 UNIVERSITY OF WASHINGTON GENERAL CATALOG



# GRADUATE AND PROFESSIONAL STUDY

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# UNIVERSITY OF WASHINGTON

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GENERAL CATALOG 2000-2002

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GRADUATE AND PROFESSIONAL STUDY

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UNIVERSITY ADMINISTRATION

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## **University Administration**

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# THE UNIVERSITY OF WASHINGTON

[www.washington.edu/home/about.html](http://www.washington.edu/home/about.html)

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Founded in 1861, the University of Washington is the oldest state-assisted institution of higher education on the Pacific coast. From its original site on a 10-acre tract of wooded wilderness that is now located in downtown Seattle, the campus has grown to comprise 703 acres of trees, landscape, and buildings. Located between the shores of Lake Washington and Lake Union, it is in a residential section of the city that long has been considered one of the most attractive in the nation.

Enrollment at the University in autumn quarter 1999 was 34,450, of which 25,638 were undergraduates and the balance were in professional and graduate programs. Almost 90 percent of the undergraduates enter as freshmen from Washington high schools or as transfer students from Washington community colleges or other colleges and universities in the state. The grade-point average for the regularly admitted freshman class entering in autumn quarter 1998 was 3.63. In 1999, the full-time teaching faculty of the University numbered 3,015 members.

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## Mission Statement

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Founded 4 November 1861, the University of Washington is one of the oldest state-supported institutions of higher education on the Pacific coast. The University is comprised of three campuses: the Seattle campus is made up of sixteen schools and colleges whose faculty offer educational opportunities to students ranging from first-year undergraduates through doctoral-level candidates; the Bothell and Tacoma campuses, each developing a distinctive identity and undergoing rapid growth, offer diverse programs to upper-division undergraduates and to graduate students.

The primary mission of the University of Washington is the preservation, advancement, and dissemination of knowledge. The University preserves knowledge through its libraries and collections, its courses, and the scholarship of its faculty. It advances new knowledge through many forms of research, inquiry, and discussion; and disseminates it through the classroom and the laboratory, scholarly exchanges, creative practice, international education, and public service. As one of the nation's outstanding teaching and research institutions, the University is committed to maintaining an environment for objectivity and imaginative inquiry and for the original scholarship and research that ensure the production of new knowledge in the free exchange of diverse facts, theories, and ideas.

To promote their capacity to make humane and informed decisions, the University fosters an environment in which its students can develop mature and independent judgment and an appreciation of the range and diversity of human achievement. The University cultivates in its students both critical thinking and the effective articulation of that thinking.

As an integral part of a large and diverse community, the university seeks broad representation of and encourages sustained participation in that community by its students, its faculty, and its staff. It serves both non-traditional and traditional students. Through its three-campus system and through educational outreach, evening degree and distance learning programs, it extends educational opportunities to many who would not otherwise have access to them.

The academic core of the University of Washington is its College of Arts and Sciences; the teaching and research of the University's many professional schools provide essential complements to these programs in the arts, humanities, social sciences, and natural and mathematical sciences. Programs in law, medicine, forest resources, oceanography and fisheries, library science, and aeronautics are offered exclusively (in accord with state law) by the University of Washington. In addition, the University of Washington has assumed primary responsibility for the health science fields of dentistry and public health, and offers education and training in medicine for a multi-state region of the Pacific Northwest and Alaska. The schools and colleges of architecture and urban planning, business administration, education, engineering, nursing, pharmacy, public affairs, and social work have a long tradition of educating students for service to the region and the nation. These schools and colleges make indispensable contributions to the state and, with the rest of the university, share a long tradition of educating undergraduate and graduate students towards achieving an excellence that well serves the state, the region, and the nation.

Board of Regents  
February 1981; revised February 1998



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## President's Message

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*A university is a community of scholars and artists, a place where faculty and students communicate with each other to enrich human understanding. Universities have played an essential role in societies for hundreds of years, promoting learning and culture, generating new knowledge, and training professionals in specialized callings. The University of Washington is one of the finest universities in the world.*

*It is also an exciting place to be, with a lively interplay of teaching, research, and public service. Its contributions to the state, the nation, and the world will continue to grow as we face the challenges of the twenty-first century.*

*Richard L. McCormick*  
Richard L. McCormick, President

# ACADEMIC CALENDAR

## 2000-2001

### Summer Quarter 2000

Full-term and term a classes begin .... June 19  
 Independence Day holiday ..... July 4  
 Term a classes end ..... July 19  
 Term b classes begin ..... July 20  
 Full-term and term b classes end ... August 18

### Autumn Quarter 2000

Classes begin ..... September 25  
 Veterans Day holiday ..... November 11  
 Thanksgiving recess ..... November 23, 24  
 Last day of instruction ..... December 6  
 Final examinations ..... December 7-14

### Winter Quarter 2001

Classes begin ..... January 2  
 Martin Luther King, Jr.'s  
 Birthday holiday ..... January 15  
 Presidents Day holiday ..... February 19  
 Last day of instruction ..... March 9  
 Final examinations ..... March 12-16

### Spring Quarter 2001

Classes begin ..... March 26  
 Memorial Day holiday ..... May 28  
 Last day of instruction ..... June 1  
 Final examinations ..... June 4-8  
 Commencement ..... June 9

## 2001-2002

### Summer Quarter 2001

Full-term and term a classes begin .... June 18  
 Independence Day holiday ..... July 4  
 Term a classes end ..... July 18  
 Term b classes begin ..... July 19  
 Full-term and term b classes end ... August 17

### Autumn Quarter 2001

Classes begin ..... October 1  
 Veterans Day holiday ..... November 11  
 Thanksgiving recess ..... November 22, 23  
 Last day of instruction ..... December 12  
 Final examinations ..... December 13-20

### Winter Quarter 2002

Classes begin ..... January 7  
 Martin Luther King, Jr.'s  
 Birthday holiday ..... January 21  
 Presidents Day holiday ..... February 18  
 Last day of instruction ..... March 15  
 Final examinations ..... March 18-22

### Spring Quarter 2002

Classes begin ..... April 1  
 Memorial Day holiday ..... May 27  
 Last day of instruction ..... June 7  
 Final examinations ..... June 10-14  
 Commencement ..... June 15

For directory assistance, call the University switchboard, (206) 543-2100.

Address correspondence to:

University of Washington  
 (Name of office and box number)  
 Seattle, Washington 98195

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran. This policy applies to all programs and facilities including, but not limited to, admissions, educational programs, employment, and patient and hospital services.

Any discriminatory action can be a cause for disciplinary action. Discrimination is prohibited by Presidential Executive Order 11246 as amended; Washington State Governorial Executive Orders 89-01 and 93-07; Titles VI and VII of the Civil Rights Act of 1964; Washington State Law Against Discrimination RCW 49.60; Title IX of the Education Amendments of 1972; State of Washington Gender Equity in Higher Education Act of 1989; Sections 503 and 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990; Age Discrimination in Employment Act of 1967 as amended; Age Discrimination Act of 1975; Vietnam Era Veterans' Readjustment Act of 1972 as amended; other federal and state statutes, regulations; and University policy. Coordination of the compliance efforts of the University of Washington with respect to all of these laws and regulations is under the direction of the Assistant Provost for Equal Opportunity, Dr. Helen Remick, University of Washington, Equal Opportunity Office, Box 354560, 4045 Brooklyn Avenue Northeast, Seattle, WA 98195, (206) 685-3263/V or 543-6452/TTY.

Additional information concerning the equal opportunity and affirmative action policies and procedures, including complaint procedures, is in the Operations Manual, D46.1, D46.2, D46.3, and D46.4, and the UW Handbook, Vol. IV, p. 44.

Information on reasonable accommodation for students with disabilities is available from the following offices: for classroom and academic-related accommodation, call Disabled Student Services, (206) 543-8924/V, (206) 543-8925/TTY, or email at [uwdss@u.washington.edu](mailto:uwdss@u.washington.edu); for other non-academic related information and accommodation, call Disability Services Office, (206) 543-6450/V, (206) 543-6452/TTY, or email at [access@u.washington.edu](mailto:access@u.washington.edu).

Copies may be purchased from the University Book Store, 4326 University Way Northeast, Seattle, Washington 98105, (206) 634-3400.

## USING THE GENERAL CATALOG

The material in this catalog has been compiled and organized to provide the reader with a comprehensive overall view of the programs and courses at the University of Washington. It includes academic requirements and procedures necessary for admission and graduation. Information on programs, faculty, and courses is usually arranged in alphabetical order following departmental structure within each school or college.

Because curriculum revisions and program changes usually occur during the two-year period the *General Catalog* is in circulation, students should assume the responsibility of consulting the appropriate academic unit or adviser for more current or specific information. The *General Catalog* is updated regularly at the University's Web site ([www.washington.edu](http://www.washington.edu)). The quarterly *Time Schedule* gives information on courses offered, class hours, and classroom locations, and has the latest calendar dates, fees, and details on registration.

Contact information has been provided wherever possible. All phone numbers, unless noted, are in the 206 area code and are voice numbers. Unless noted, all addresses with @ are email addresses. Many programs and offices at the University can be found through the University's homepage at <http://www.washington.edu>.

All announcements in the *General Catalog* are subject to change without notice and do not constitute an agreement between the University of Washington and the student.



Dates in this calendar are subject to change without notice. A detailed calendar with the latest information on registration is printed in each issue of the quarterly *Time Schedule* and can be found online at [www.washington.edu/students/reg/calendar.html](http://www.washington.edu/students/reg/calendar.html)

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 331 Neurology  
 332 Obstetrics and Gynecology  
 334 Ophthalmology  
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 337 Pathology  
 340 Pediatrics  
 342 Pharmacology  
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 347 Psychiatry and Behavioral Sciences  
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**Vice Provost and Dean**

Marsha L. Landolt

**Associate Dean for Academic Programs**

John T. Slattery

**Associate Dean for Graduate Opportunities and Minority Achievement Program**

Johnnella E. Butler

**Associate Dean for Student Services and Fellowships**

Elizabeth L. Feetham

**Assistant Dean and Director, Center for Instructional Development and Research**

Jody D. Nyquist

**Director, Graduate Admissions**

Joan W. Abe

[www.grad.washington.edu](http://www.grad.washington.edu)

The University of Washington awarded its first graduate degree, a Master of Arts in classical languages, in 1885 and its first Doctor of Philosophy degree, in chemistry, in 1914. Since those beginnings, the University has conferred more than 65,000 master's degrees and 14,000 doctoral degrees, exclusive of medical, dental, and first legal doctorates.

Through its graduate programs, the University fulfills several functions vital to a healthy society: the advancement of human knowledge is facilitated through the development and conduct of scientific research; the education of scholars, teachers and a multitude of professionals in areas that cut across the academic spectrum insure that knowledge and information are communicated to the general public for the use and benefit of all. These functions ensure that some of the problems and needs confronting society are resolved.

To manage its developing graduate programs, the Graduate School was created as a temporary entity in 1899 and was permanently established in 1910. The purpose of the Graduate School is to define and support excellence in graduate education and the research and scholarly activities associated with it. Graduate study is guided by the Dean of the Graduate School and an ever-changing graduate faculty of more than 3,000 members who are selected for their interest in and concern for graduate education at the University of Washington. There are now more than 8,000 graduate students in residence working toward master's or doctoral degrees in 96 separate University programs. A growing number of interdisciplinary graduate degree and graduate certificate programs have been established through the efforts of interested faculty members.

Graduate School policy is enacted through an elected council of ten graduate-faculty members who are chosen from among the graduate-faculty population and who advise the Dean on matters of policy and procedure. Complementary to that input, each degree-offering unit within the University appoints a graduate program coordinator who serves as an important link between the unit and the Graduate School, advising students on questions concerning Graduate School and departmental degree requirements.

The Graduate School also has a number of responsibilities that relate to its primary ones, such as graduate program review, Graduate Opportunities and Minority Achievement Program, the administration of the Graduate School Fund and certain fellowship programs, as well as such central facilities as the University of Washington Press, and the Walker-Ames and the Jessie and John Danz distinguished visiting professorships.

The University is committed to providing greater opportunities for advanced study by women and members of ethnic minority groups. Within the Graduate School, the Graduate Opportunities and Minority Achievement Program actively solicits applications for admission, facilitates their review, and helps with various procedures related to the enrollment of minority graduate students. The division offers financial aid to students who need such help. In addition to a special appropriation of funds by the Washington State Legislature to encourage the recruitment and retention of ethnic minority students in areas of underrepresentation, the division administers several federal and private scholarship programs which provide financial aid and contribute to the overall environment of support for minority graduate students.



## Graduate Degree Programs

The Office of Academic Programs in the Graduate School contributes to the University's educational and research mission by conducting quality assessment of proposed and continuing education programs at the graduate and undergraduate level as well as research institutes and centers. Through program review, it ensures academic program quality, including all aspects of an academic unit, and promotes communication among academic units throughout the three-campus system. The principle mechanism by which this is achieved is through a process of peer review. Reviews of degree programs are conducted on a ten-year cycle, or at predetermined shorter intervals. For further information, see Graduate School Memorandum No. 7: Periodic Review of Existing Degree Programs at [www.grad.washington.edu](http://www.grad.washington.edu) and the schedule of program reviews at [www.grad.washington.edu/Acad/Academicprograms.htm](http://www.grad.washington.edu/Acad/Academicprograms.htm), or contact the Office of Academic Programs in the Graduate School at (206) 685-3519.

College of Architecture and Urban Planning	
Architecture	M.Arch.
Construction Management	M.S.C.M.
Landscape Architecture	M.L.A.
Urban Design and Planning	M.U.P.
College of Arts and Sciences	
Anthropology	M.A., Ph.D.
Applied Mathematics	M.S., Ph.D.
Art	M.F.A.
Art History	M.A., Ph.D.
Asian Languages and Literature	M.A., Ph.D.
Astronomy	M.S., Ph.D.
Atmospheric Sciences	M.S., Ph.D.
Botany	M.S., Ph.D.
Chemistry	M.S., Ph.D.
Classics	M.A., Ph.D.
Communications	M.A., M.C., Ph.D.
Comparative Literature	M.A., Ph.D.
Dance	M.F.A.
Drama	M.F.A., Ph.D.
Economics	M.A., Ph.D.
English	M.A., M.A.T., M.F.A., Ph.D.
Genetics	M.S., Ph.D.
Geography	M.A., Ph.D.
Geological Sciences	M.S., Ph.D.
Geophysics	M.S., Ph.D.
Germanics	M.A., Ph.D.
History	M.A., Ph.D.
International Studies	M.A.I.S.
(includes China Studies; the Comparative Religion Program; International Studies; Japan Studies; Korea Studies; Middle Eastern Studies; Russian, East European, and Central Asian Studies; and South Asian Studies)	
Linguistics	M.A., Ph.D.
Mathematics	M.A., M.S., Ph.D.
Music	M.A., M.M., D.M.A., Ph.D.
Near Eastern Languages and Civilization	M.A.
Philosophy	M.A., Ph.D.
Physics	M.S., Ph.D.
Political Science	M.A., Ph.D.
Psychology	M.S., Ph.D.
Romance Languages and Literature	M.A., Ph.D.
Scandinavian Studies	M.A., Ph.D.
Slavic Languages and Literature	M.A., Ph.D.
Sociology	M.A., Ph.D.
Speech and Hearing Sciences	M.S., Ph.D.
Speech Communication	M.A., Ph.D.
Statistics	M.S., Ph.D.
Women's Studies	M.A., Ph.D.
Zoology	M.S., Ph.D.
Graduate School of Business Administration	
Accounting	M.B.A., Ph.D.
	M.P.Acc.
School of Dentistry	
Oral Biology	M.S.D.
	M.S., Ph.D.
College of Education	
	M.Ed., M.I.T., Ed.D., Ph.D.
College of Engineering	
Aeronautics and Astronautics	M.S., M.S.E.
Chemical Engineering	M.A.E., M.S.A.A., Ph.D.
Civil Engineering	M.S.Ch.E., M.S.E., Ph.D.
	M.S., M.S.Civ.E., M.S.E., Ph.D.
Computer Science and Engineering	M.S., Ph.D.
Electrical Engineering	M.S.E.E., Ph.D.
Materials Science and Engineering	M.S., M.S.M.S.E., Ph.D.
Mechanical Engineering	M.S.E., M.S.M.E., Ph.D.
Technical Communication	M.S.



College of Engineering and School of Medicine	
Bioengineering	M.S., M.S.E., Ph.D.
College of Forest Resources	
	M.F.R., M.S., Ph.D.
Graduate School	
Library and Information Science	M.L.I.S.
Interdisciplinary Degree Programs	
Biology Teaching	M.A.T.
Health Services Administration	M.H.A.
Molecular and Cellular Biology	Ph.D.
Museology	M.A.
Near and Middle Eastern Studies	Ph.D.
Neurobiology and Behavior	Ph.D.
Nutritional Sciences	M.S., Ph.D.
Quantitative Ecology and Resource Management	M.S., Ph.D.
Special Individual Program	Ph.D.
Urban Design and Planning	Ph.D.
School of Law	
	LL.M., Ph.D.
School of Medicine	
Biochemistry	M.S., Ph.D.
Biological Structure	M.S., Ph.D.
Immunology	M.S., Ph.D.
Laboratory Medicine	M.S.
Medical History and Ethics	M.A.
Microbiology	M.S., Ph.D.
Molecular Biotechnology	Ph.D.
Pathology	M.S., Ph.D.
Pharmacology	M.S., Ph.D.
Physiology and Biophysics	M.S., Ph.D.
Rehabilitation Medicine	M.O.T., M.P.T., M.R.M., M.S.
School of Nursing	
	M.N., M.S., Ph.D.
College of Ocean and Fishery Sciences	
Fisheries	M.S., Ph.D.
Marine Affairs	M.M.A.
Oceanography	M.S., Ph.D.
School of Pharmacy	
Medicinal Chemistry	M.S., Ph.D.
Pharmaceutics	M.S., Ph.D.
Pharmacy	M.S., Ph.D.
Evans School of Public Affairs	
	M.P.A.
School of Public Health and Community Medicine	
Biostatistics	M.S., Ph.D.
Environmental Health	M.S., Ph.D.
Epidemiology	M.P.H., M.S., Ph.D.
Health Services	M.S., M.P.H., Ph.D.
Pathobiology	M.S., Ph.D.
School of Social Work	
	M.S.W., Ph.D.
Because the following professional doctoral degrees offered by the University are not considered to be graduate degrees, they are not administered through the Graduate School.	
School of Dentistry	D.D.S.
School of Law	J.D.
School of Medicine	M.D.
School of Pharmacy	Pharm.D.



## Graduate Admissions

The Office of Graduate Admissions  
200 Gerberding, Box 351245  
University of Washington  
Seattle, WA 98195-1245  
(206) 543-5929; FAX (206) 543-8798  
uwgrad2@grad.washington.edu (U.S. citizens and residents) or  
intlgrad@u.washington.edu (international)

Additional program information is available on the World Wide Web at [www.grad.washington.edu](http://www.grad.washington.edu).

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam-era veteran in accordance with University policy and applicable federal and state statutes and regulations.

Application to the UW through the Office of Graduate Admissions is available for three types of students. It is important to understand the distinctions between the categories.

- A **graduate student** is a person working toward a master's or doctoral degree or earning a school administrator's credential. Students must be admitted to this status in order to earn a degree. The Application for Admission to the Graduate School is obtained from the program to which you wish to apply.
- A **visiting graduate student** is a person who plans to transfer a limited number of graduate credits earned at the UW to another institution where he or she is actively pursuing a graduate degree. Admission is based in part on availability of resources. Visiting graduate applicants must have been admitted to another recognized graduate school, be currently pursuing a graduate degree there, and be in good standing. A Certificate of Status signed by the home institution is required. The Application and Certificate should be obtained directly from the Office of Graduate Admissions at the address above. Individual departments may require additional materials, such as transcripts, GRE/GMAT scores, a statement of purpose, or a list of desired course work.
- Some graduate programs have chosen to offer admission to **graduate nonmatriculated students**. These students are not presently seeking a graduate degree but may take a maximum of 12 credits earned in this category that may be applied to degree requirements should they later be accepted into a graduate program. Applicants should meet minimum Graduate School admission requirements but *admission as a graduate nonmatriculated student does not imply admission to a graduate degree program*. The Application to Graduate Nonmatriculated Status must be obtained from the program to which you wish to apply. Official sealed transcripts from all collegiate institutions previously attended must be sent to the Graduate Nonmatriculated Office, Box 351245, University of Washington, Seattle, WA 98195-1245. (Refer to Graduate School Memorandum No. 37 for further information.)

Admission to the UW is necessarily a selective process. The prospective student must hold a baccalaureate degree from an accredited college or university in this country or an equivalent degree from a foreign institution. The student's record should be a strong one with an average grade of "B" or a 3.00 grade-point, or better. The primary criterion and the priority for admission of new applicants into a

graduate program is the applicant's ability, as decided by the appropriate faculty, to complete the graduate program expeditiously with a high level of achievement. One aspect of meeting this criterion is the matching of interests between applicants and faculty. Additional factors may be used in developing a pool of qualified applicants for admission to the Graduate School. Weights given these and other factors vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:

1. Priority for admission of applicants into a graduate degree program based upon the applicant's apparent ability, as determined by the University, to complete the program with a high level of achievement.
2. No practice may discriminate against an individual because of race, color, creed, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran.
3. Sustained efforts shall be made to recruit qualified applicants who are members of groups that are underrepresented in certain disciplines.
4. All applicants to a degree-offering unit shall be processed through the same set of procedures to assure that all applicants are evaluated on their individual merits.
5. Tests and criteria for admission should relate to the actual requirements of the graduate program. Reasonable accommodation for testing conditions may be made to compensate for relevant disabilities.
6. Additional factors may be used in developing a pool of qualified applicants for admission to the Graduate School. Weights given these and other factors may vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:
  - a. Grades earned, especially for subjects in or closely related to the field of the applicant's proposed graduate work.
  - b. Scores on the Graduate Record Examination (GRE) Verbal, Quantitative, and Analytical Tests, on the GRE Advanced Test, on other tests related to the applicant's field, and on other aptitude tests which may be required.
  - c. Personal interviews of the applicant by the department admissions committee.
  - d. The career objectives of the applicant and the extent to which the graduate degree program may be expected to prepare the applicant for those objectives.
  - e. Written and oral recommendations from persons who are qualified to evaluate the applicant's academic record and promise.
  - f. The applicant's degree objective (i.e., master's degree, doctoral degree, or a master's followed by a doctoral degree).
  - g. Activities or accomplishments; educational goals; prior employment experience; living experiences, such as growing up in a disadvantaged or unusual environment; special talents.
  - h. Academic accomplishments in light of the applicant's life experiences and special circumstances. These experiences and circumstances may include, but are not limited to disabilities, low family income, first generation to attend college, need to work during college, disadvantaged social or educational environment, difficult personal and family situation or circumstances, and refugee status or veteran status.

Importance given to these factors will vary among degree programs.

Most Graduate School admissions are for summer or autumn quarters. Admissions for winter and spring quarters may be severely restricted due to considerations of space. The following are graduate admissions closing dates. *It is important to remember that individual departments often have much earlier deadlines which supersede those listed below, particularly for autumn quarter.*

- Autumn Quarter—July 1
- Winter Quarter—November 1
- Spring Quarter—February 1
- Summer Quarter—May 15

Each academic program at the UW has a graduate program coordinator who is responsible for providing advice, guidance, and assistance to applicants as well as to students working toward graduate degrees. Prospective graduate students are urged to contact the graduate program coordinator in their program of interest for information about any aspect of graduate study, including research, curriculum, faculty, and financial support in the form of teaching and research assistantships, grants, and scholarships. Information about graduate programs is available at [www.grad.washington.edu](http://www.grad.washington.edu).

**Admission Process**

The application forms for both graduate and graduate nonmatriculated status must be obtained directly from the department. Visiting graduate applications are available from the Office of Graduate Admissions. *It is very important to submit all application documents in time to meet departmental deadlines as these will supersede graduate admissions deadlines.*

**Required Examinations**

The Graduate Record Examination (GRE) is required for admission as a graduate student except in the following circumstances:

- Applicants to Art, Dance, Drama, and to the Master of Music and Doctor of Musical Arts degree in Music.
- Applicants holding earned doctorates (such as Ph.D., D.D.S., M.D., Ed.D., J.D.) from accredited U.S. institutions.
- Applicants to the M.B.A., M.P.Acc., or Ph.D. degrees in the School of Business Administration, who must submit scores from the Graduate Management Admission Test (GMAT).

Scores must be received directly from the Educational Testing Service.

For further information you may write to:  
 Graduate Record Examinations  
 Educational Testing Service  
 P.O. Box 6000  
 Princeton, NJ 08541-6000  
 (609) 771-7670 or (510) 654-1200  
 gre-info@ets.org  
 www.gre.org

**International Applicants**

Email inquiries from international applicants should be sent to [intlgrad@u.washington.edu](mailto:intlgrad@u.washington.edu). You may also refer to the World Wide Web at [www.grad.washington.edu](http://www.grad.washington.edu) for further information.

In addition to the other requirements for all applicants, a minimum score of 500 on the Test of English as a Foreign Language (TOEFL) or 173 on the computer-based test (TOEFLC) must be presented by applicants who are not citizens of the United States unless they meet one of the following exceptions:

- Citizens of Australia, Canada, Ireland, New Zealand, or the United Kingdom.
- Applicants holding bachelor's or advanced degrees from accredited institutions in the United States or in one of the countries listed above.

Applicants offered admission with TOEFL scores between 500 (173 TOEFLC) and 580 (237 TOEFLC) must fulfill an English as a Second Language (ESL) requirement before a graduate degree will be conferred by the University of Washington.

With the exception of citizens of the countries listed above, all international and immigrant status applicants who intend to apply for teaching assistantships must also take the Test of Spoken English (TSE).

Due to the time required for evaluation of applications, overseas applicants for autumn quarter are strongly encouraged to submit the application and transcripts to the Office of Graduate Admissions no later than the prior November 1. Applications received after this date will be processed as soon as possible but significant delays may result.

**Registration**

After successful applicants have been offered admission, the Registration Office sends a request for a \$100 Enrollment Confirmation Deposit to indicate the intent to register. This nonrefundable deposit will apply toward the first quarter's tuition.

The University provides registration services through STAR (Student Telephone Assisted Registration), a touch-tone telephone registration system.

Once admitted, graduate students are expected to maintain registered or on-leave status until the degree is conferred. (See section on Continuous Enrollment.)

**Financial Aid for Graduate Students**

Students applying for fellowships, traineeships, and assistantships or associateships must make certain that complete transcripts and other credentials are on file by February 15 (earlier submission of applications and supporting documents is urged by all departments and required by some). Awards and

appointments are usually made about April 1. Application forms may be obtained by writing to the graduate program coordinator of the appropriate department.

**Fellowships, Traineeships, and Scholarships**

A limited number of fellowships, traineeships, and scholarships is available through individual departments to outstanding students in fields of study leading to advanced degrees. Application forms may be obtained from the graduate program coordinators in the departments.

The Graduate School and the University of Washington Libraries have collaborated to provide the Grants and Funding Information Services (GFIS) for University of Washington graduate students (and faculty) who are seeking any type of general research funding for use at the University of Washington. GFIS promotes awareness of external funding information resources by providing drop-in educational consultations, maintaining a print collection for grant seekers, and offering quarterly seminars highlighting Web-based grant-seeking tools. GFIS works with students and faculty to devise a search strategy, helping to focus efforts and locate available resources. GFIS also will demonstrate searching on several online databases and how to use its print collection of funding resource books so that students can perform future searches based on changing funding needs. GFIS also maintains resources to assist in the proposal-writing process, including grant-writing handbooks and links to online resources.

To set up a consultation, email [gfis@u.washington.edu](mailto:gfis@u.washington.edu), call (206) 616-3084, or submit a research profile using GFIS's online form. For funding seminar schedules, check the Web at [www.lib.washington.edu/gfis/gsis.html](http://www.lib.washington.edu/gfis/gsis.html).

**Graduate Student Service Appointments**

The University provides for the appointment of many graduate students as teaching, research, and staff assistants; predoctoral associates; predoctoral instructors; and predoctoral lecturers. Approximately 3,000 such appointments were made during the past year.

The University's policy regarding these appointments is set forth in detail in Executive Order 28. Copies of this statement are available from the graduate program coordinator or the Graduate School, or can be obtained from the Graduate School Web site at [www.grad.washington.edu/fellow/executor28.htm](http://www.grad.washington.edu/fellow/executor28.htm). Some of the information is provided below.

Appointments are granted only to graduate students who have carefully defined educational goals and who exhibit the highest intellectual competence and attainment. Succeeding appointments may be made if the student maintains high scholarship and continues to make satisfactory progress toward the degree.

Graduate appointments are granted to graduate students only. An initial appointment may be offered to a student before being admitted formally to the Graduate School, but the appointment is contingent upon admission to graduate status before the beginning of the appointment.

**2000-2002 Graduate Student Service Appointments**

Students holding these appointments for at least 20 hours per week and for at least five of the six pay periods of an academic quarter will receive a waiver of the resident operating fee (ROF) portion of "tuition and fees" as well as a waiver for the \$40 per quarter technology fee. Appointees who are not state residents are treated as residents for tuition purposes during the term of the appointment. Appointees are required to pay approximately \$143 tuition per quarter.

All appointees who are eligible for the ROF waiver also receive paid graduate appointee health insurance. See [www.grad.washington.edu/Insurance/insurance.htm](http://www.grad.washington.edu/Insurance/insurance.htm) for details.

Salary for Half-Time Service  
 (20 hours per week)

Effective July 1, 1999 – June 30, 2000

Title	Monthly salary	Academic year (9 months) salary
Teaching Assistant	\$1,160	\$10,440
Predocctoral Teaching Associate I	1,243	11,187
Predocctoral Teaching Associate II	1,339	12,051
Predocctoral Instructor*	1,339	12,051
Predocctoral Lecturer*	1,339	12,051
Research Assistant	1,160	10,440
Predocctoral Research Associate I	1,243	11,187
Predocctoral Research Associate II	1,339	12,051
Predocctoral Researcher*	1,339	12,051
Staff Assistant	1,160	10,440
Predocctoral Staff Associate I	1,243	11,187
Predocctoral Staff Associate II	1,339	12,051

\* Minimum



Graduate students appointed to the beginning level of graduate teaching appointments are not permitted to be in overall charge of a course, but are given an appropriate degree of responsibility and supervision of laboratory or classroom work so that they may be introduced to teaching activities gradually and effectively. Student appointees may also serve as assistants in research activities for which a faculty member is responsible.

Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: Predoctoral Instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; Predoctoral Lecturer, for a mature and competent graduate student who, though he or she need not be a Candidate, has had exceptional previous teaching or other professional experience; and Predoctoral Researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 1999-2000 academic year these appointments carry a minimum stipend of \$1,339 per month (half-time) with no designated maximum so that the stipend may be adjusted to a level appropriate to the appointee's experience and his or her teaching and research responsibilities.

International students with teaching appointments (Teaching Assistant, Predoctoral Teaching Associate I and II, Predoctoral Instructor, Predoctoral Lecturer) must meet a spoken-English requirement before they may be given classroom duties.

An additional series of appointments titled Graduate Staff Assistant and Predoctoral Staff Associates I and II is provided for University service activities that are not appropriately described as teaching or research but are closely related to the student's field of advanced study. Appointments of specific graduate students to these positions may not be made until after the position itself has been specifically approved.

Students who hold any of the above appointments are required to render 20 hours of service per week to the University. The appointments may be on a nine-month basis and ordinarily cover the period from September 16 through June 15. Some of these appointments may be extended to 11 or 12 months. Graduate student appointments do not provide for paid vacations or sick leave. Students who accept these University service appointments normally confine their employment to such appointments.

A graduate student service appointee must register for, and carry throughout each quarter except summer quarter, a minimum of 10 credits in formal courses or in research, thesis, or dissertation work. These credits must be in courses that are applicable toward an advanced degree. For summer quarter, the requirement is at least 3 credits.

### Work Study Graduate Assistantships

Graduate students who are eligible for the need-based college work-study program may qualify for work study graduate assistantships in teaching or research. Students must submit financial aid applications to the Office of Student Financial Aid by the February 28 deadline to be considered for these positions. Information is available from the Office of Student Financial Aid.

### Employment Opportunities

The campus offers other job opportunities for graduate students. Students may apply directly to the chair of the department in which they hope to work or to the Student Employment Office. Students seeking part-time employment must be enrolled and on campus before they may obtain jobs.

Advisory positions in University residence halls paying room and board are available for single graduate students, both men and women. Additional information may be obtained from the Director of Residence Halls Programs, 301 Schmitz Hall.

Spouses of students also may apply for regular full- and part-time University employment. These positions cover a wide range of occupations and offer pay comparable to the prevailing salaries in the community. Some carry such fringe benefits as vacations, sick leave, and opportunities to enroll in University courses. Inquiries may be directed to the Staff Employment Office, 1320 Northeast Campus Parkway.

### Loans

Long-term educational loans are available to graduate students through the Federal Perkins Student Loan, the Federal Direct Stafford Loan, and the Federal Direct Unsubsidized Stafford Loan programs. An application form for these programs (the Free Application for Federal Student Aid, or FAFSA) is available in the office of Student Financial Aid, Box 355880, 105 Schmitz Hall, (206) 685-9395, or from the U.S. Department of Education Web site at [www.ed.gov/offices/OPE/express.html](http://www.ed.gov/offices/OPE/express.html). The Office of Student Financial Aid may also be reached by email ([osfa@u.washington.edu](mailto:osfa@u.washington.edu)) or on the Web at [www.washington.edu/students/osfa/](http://www.washington.edu/students/osfa/). The application deadline is February 28 for the following autumn quarter.

*Students should meet the application deadline even if they have not yet been admitted to the Graduate School.*

The Federal Perkins Student Loan and the subsidized Federal Direct Stafford Loan are awarded to students who demonstrate financial need. Students who do not qualify for need-based assistance may qualify for Federal Direct Unsubsidized Stafford Loans. For more detailed information on these loan programs, visit the Office of Student Financial Aid Web site at [www.washington.edu/students/osfa/](http://www.washington.edu/students/osfa/).

Short-term emergency loan funds also are available through the Office of Student Financial Aid. Several different types of short-term loans are possible. More information is available from the Office of Student Financial Aid, Short-Term Loans, 172 Schmitz Hall, (206) 685-1282. The Graduate School also has a short-term emergency loan available. For more information, call (206) 543-5900.

### Graduate Opportunities and Minority Achievement Program

The Graduate Opportunities and Minority Achievement Program (GOMAP) works to develop and maintain a diverse and welcoming climate from which all students may benefit. As part of its duties, GOMAP oversees the Graduate School Fund for Excellence and Innovation (see Special Programs and Facilities) and assists University of Washington graduate programs in developing and maintaining efforts

designed to increase the enrollment of students from ethnic minority groups that have been historically underrepresented in graduate programs.

Recognizing that financial aid in the form of scholarships, grants, and fellowships is important in achieving and maintaining diversity, the GOMAP administers a variety of need- and merit-based fellowships. Merit-based awards are generally made through the nomination and support of the department in which the student is enrolled. Need-based awards are based upon an evaluation of the student's need as established by the Free Application for Federal Student Aid (FAFSA) and the Office of Student Financial Aid. Students who have varied cultural experiences or educationally or economically disadvantaged backgrounds and who will therefore contribute to the intellectual and social enrichment of the University, are encouraged to apply. Students must be U.S. citizens or permanent residents to be eligible.

Financial assistance from individual departments may also be available. Students should apply directly to the chair of their department. Students are also encouraged to make use of the University's Grants and Funding Information Service located in Suzzallo Library.

Further information on fellowships administered by GOMAP may be obtained by writing to the University of Washington, Graduate School, Graduate Opportunities and Minority Achievement Program, Box 351240, Seattle WA 98195-1240, or emailing gomap@u.washington.edu.

All awards are contingent upon the student's admission to the UW Graduate School.

## Graduate Degree Policies

Usually focused on a specific field of knowledge, graduate study is conducted through a variety of means, including lectures, seminars, independent advanced study, special reading courses, internships, and participation in research. Graduate programs leading to the Master of Arts, Master of Science, or Doctor of Philosophy degrees emphasize the development of the student's ability for independent scholarly work and the creation of new knowledge through research. Practice-oriented programs, which ordinarily lead to the degree of master or doctor in a particular professional field, emphasize preparation of the student for professional practice at the frontiers of existing knowledge.

Many master's and all doctoral programs culminate in the presentation of a thesis or dissertation conveying the results of the independent study and research carried out by the student. A master's thesis contributes to knowledge, reviews or critiques the state of knowledge in a field, creates a new design or composition, or represents some other appropriate kind of independent contribution. A doctoral dissertation must set forth a significant contribution to knowledge or understanding in the student's field, be presented in scholarly form, and demonstrate that the student is competent to engage independently in the pursuit of solutions to important problems. The student must defend the doctoral dissertation in a Final Examination conducted by a faculty committee and open to all other graduate-faculty members. A member of the graduate faculty from some other discipline participates as an official representative of the entire graduate faculty in all aspects of the student's program, including various major evaluations such as the General Examination and Final Examination.

### Graduate Program Coordinator

The graduate student's initial work at the University is guided by the graduate program coordinator in his or her field. The coordinator must be a senior tenured member of the graduate faculty and is the official representative of the academic unit that offers the graduate degree program. The graduate program coordinator maintains familiarity with policies and procedures of the Graduate School and provides overall coordination of graduate activities within the unit.

### Graduate Courses

Graduate courses are intended for, and ordinarily restricted to, either students enrolled in the Graduate School or graduate nonmatriculated students, and are given numbers from 500 through 800. Some courses at the 300 and 400 levels are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the supervisory committee, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only. Courses at the 300 level are not included in the calculation of grade-point average (GPA) and will not apply toward the minimum Graduate School requirement of 18 graded credits for the master's or doctoral degree. Approved 400-level courses are accepted as part of the major as well as minor or supporting fields. Courses numbered 498 and entitled Special Topics or Special Projects normally are not applicable to a graduate degree program if addressed primarily to introductory content and undergraduate students. Undergraduate research (499) is not accepted as part of the graduate program. Graduate School Memorandum No. 36 offers additional information on graduate courses. With the exception of summer quarter, students are limited to a maximum of 10 credits per quarter of any combination of courses numbered 600, 700, or 800.

### Repeating Courses

Graduate students may repeat any course. Both the first and second grades are included in the cumulative GPA. Subsequent grades are not included, but appear on the permanent record. The number of credits earned in the course apply toward degree requirements only once.

### Grading System for Graduate Students

In reporting grades for graduate students, units that offer graduate degrees use the system described herein. Grades are entered as numbers, the possible values beginning at 4.0 and decreasing by one-tenth increments until 1.7 is reached. Grades below 1.7 are recorded as 0.0 by the Registrar. A minimum grade of 2.7 is required in each course that is counted toward a graduate degree. A minimum GPA of 3.00 is required for graduation.

Correspondence between number grades and letter grades is as follows:

Numeric grade-point equivalent	Letter grade	Numeric grade-point equivalent	Letter grade
4.0	A	2.8	B-
3.9		2.7	
3.8	A-	2.6	
3.7		2.5	
3.6		2.4	C+
3.5		2.3	
3.4	B+	2.2	
3.3		2.1	
3.2		2.0	C
3.1		1.9	
3.0	B	1.8	
2.9		1.7	
		1.6-0.0	E

The following letter grades also may be used:

*I Incomplete.* An incomplete may be given only when the student has been in attendance and has done satisfactory work to within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control.

To obtain credit for the course, a student must successfully complete the work and the instructor must submit a grade. In no case may an incomplete be converted into a passing grade after a lapse of two years or more. An incomplete received by a graduate student does not automatically convert to a grade of 0.0 but will remain a permanent part of the student's record.

*N No grade.* Used only for hyphenated courses and courses numbered 600 (Independent Study or Research), 601 (Internship), 700 (Master's Thesis), 750 (Internship), or 800 (Doctoral Dissertation). An *N* grade indicates that satisfactory progress is being made, but evaluation depends on completion of the research, thesis, internship, or dissertation, at which time the instructor or supervisory committee chair should change the *N* grade(s) to one reflecting the final evaluation.

*S/NS Satisfactory/not satisfactory.* A graduate student, with the approval of the graduate program coordinator or supervisory committee chair, may elect to be graded *S/NS* in any numerically graded course for which he or she is eligible. If a student does not so elect, then the student is graded on a numerical basis. If approval is granted, the student must elect the *S/NS* option either when registering or no later than the end of the seventh week of the quarter.

*CR/NC Credit/no credit.* With the approval of the faculty in the academic unit, any course may be designated for grading on the credit/no-credit basis by notice in the appropriate *Time Schedule*. For such courses, the instructor submits a grade of *CR* or *NC* to be recorded by the Registrar's Office for each student in the course at the end of the quarter. All courses numbered 600, 601, 700, 750, and 800 may be graded with a decimal grade, *CR/NC*, or *N* at the instructor's option.

*W Course withdrawal.*

*HW Hardship withdrawal.* Refer to the University of Washington *Time Schedule* for procedures and dates, or visit the Web at [www.washington.edu/students/reg/wdoffleave.html#Q3](http://www.washington.edu/students/reg/wdoffleave.html#Q3).

Of the minimum number of credits required for a graduate degree, a graduate student must show numerical grades in at least 18 quarter hours of course work taken at the UW. These numerical grades may be earned in approved 400-level courses and 500-level courses.

The student may petition the Dean of the Graduate School to modify the procedures described above. The petition should be accompanied by comments and recommendations from the graduate program coordinator.

## Scholarship

A cumulative GPA of 3.00 or above is required to receive a degree from the Graduate School. A graduate student's GPA is calculated entirely on the basis of numeric grades in 400- and 500-level courses. The grades of *S*, *NS*, *CR*, *NC*, and *N* are excluded, as are all grades in courses numbered 600, 601, 700, 750, and 800, and in courses at the 100, 200, and 300 levels.

Failure to maintain a 3.00 GPA, either cumulative or for a given quarter, constitutes low scholarship and may lead to a change-in-status action by the Graduate School. Failure to maintain satisfactory performance and progress toward a degree may also result in a change-in-status action by the Graduate School.

(See Graduate School Memorandum No. 16 for additional information.)

## Withdrawal Policy

Refer to the University of Washington *Time Schedule* for procedures and dates, or look on the Web at [www.washington.edu/students/reg/wdoffleave.html](http://www.washington.edu/students/reg/wdoffleave.html)

## Language Competency Requirements and Examinations

Competence in one or more languages in addition to English is desirable for all fields of advanced study and is often required, especially in the scholarly and research-oriented programs leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy.

Requirements for foreign-language competence are established by the graduate faculty in the unit offering the graduate program. Language competence in certain languages other than English (i.e., languages that may have special significance to the field) may be specified as helpful or desirable or may be required. Students should consult the graduate program coordinator for information and advice about desirable or required competence in foreign languages.

When appropriate, students are urged to establish foreign-language competence as undergraduates before entering the Graduate School or as early as possible in their graduate careers. The University's language-competence requirements in French, German, and Spanish may be satisfied by successful completion of the standardized examinations given by the Educational Assessment Office. Other foreign language examinations are also given at the UW.

It is assumed that citizens of certain English-speaking countries who are admitted to the Graduate School are competent in the English language; citizens of non-English-speaking countries must demonstrate a satisfactory command of English, both for admission and for appointment as teaching assistants.

Refer to Graduate School Memorandum No. 8, *English Language Competence for Admission to the Graduate School* ([www.grad.washington.edu/Acad/gsmemos/gsmemo08.htm](http://www.grad.washington.edu/Acad/gsmemos/gsmemo08.htm)) for more information.

## Enrollment Requirement

The enrollment requirement for the master's degree is 30 credits at the University of Washington

For the doctoral degree, the enrollment requirement is 90 credits, 60 of which must be taken at the University of Washington. With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment. Doctoral study requires an immersion in an academic field and its intellectual community. Degree-granting units may require a period of full-time or on-site study.

Only courses at the 400-, 500-, 600-, 700-, and 800-levels can be applied to enrollment or course credit in the major field for advanced degrees (please see Graduate Courses earlier in this section regarding courses numbered 498 and 499). Courses at the 300-level are not applicable to enrollment or course credit toward advanced degrees except when applied by permission of the graduate program coordinator or supervisory committee toward the graduate minor or supporting courses. Courses numbered below 300 are not applicable to enrollment or course credit for advanced degrees.

## Final Quarter Registration

A student must maintain registration as a full- or part-time graduate student at the University for the quarter the master's degree, the Candidate certificate, or the doctoral degree is conferred.

A student who does not complete all degree requirements by the last day of exam week must be registered for the following quarter.

## Continuous Enrollment and Official On-Leave Requirement

### Policy

To maintain graduate status, a student must be enrolled on a full-time, part-time, or On-Leave basis from the time of first enrollment in the Graduate School until completion of all requirements for the graduate degree. The student must be registered when applying for the master's degree, the passing of the master's final examination, or doctoral General or Final Examinations, the filing of the thesis or dissertation, and the receiving of the degree. Summer quarter On-Leave enrollment is automatic for all graduate students who were either registered or on-leave the prior spring quarter. Failure to maintain continuous enrollment constitutes evidence that the student has resigned from the Graduate School.

A student's petition for On-Leave status must be approved by the departmental graduate program coordinator or alternate and submitted to the Registration Office no later than the fifth day of the quarter. To be eligible for On-Leave status, the student must have registered for, and completed, at least one quarter at the UW and have been registered and completed the previous quarter, or have been officially On-Leave (except summer quarter). An On-Leave student is entitled to use the University Libraries and to sit for foreign-language competence examinations, but is not entitled to any of the other University privileges of a regularly enrolled and registered full- or part-time student. The student pays a nonrefundable fee to obtain On-Leave student status covering four successive academic quarters or any part thereof. An On-Leave student returning to the University on or before the termination of the period of the leave must file a Returning Student Reenrollment Application (available at 225 Schmitz) by the deadline stated on the form and register in the usual way as a full- or part-time student (see Graduate School Memorandum No. 9 for procedures). A student who returns before the termination of the On-Leave period and maintains registration for any part of a quarter cancels On-Leave status. Please note: Periods spent On-Leave are included as part of the maximum time periods allowed for completion of a graduate degree.

### Readmission

A student previously registered in the Graduate School who has failed to maintain graduate student status but who wishes to resume studies must file an application in person or by mail for readmission to the Graduate School by the regularly published closing dates. If the student is readmitted, registration will occur during the usual registration period. If the student has attended any other institution during the period when not registered at the UW, official transcripts in duplicate of the student's work must be submitted. An application for readmission carries no preference and is treated in the same manner as an application for initial admission, including the requirement of payment of the application fee.

The Graduate School normally allows six years to complete requirements for a master's degree and ten years for a doctoral degree. Periods spent On-Leave or out of status are included.

## Concurrent Degree Programs

### Formal Concurrent Degree Programs

Concurrent programs are defined as a pair of programs that may be taken at the UW by a postbaccalaureate student resulting in the satisfaction of the requirements for either two graduate degrees or a graduate and a professional degree. Rather than sequentially completing first one degree and then the other, the student's time and the University's resources may sometimes be conserved by providing arrangements that permit the student to proceed in a coordinated way toward completion of the degree objectives.

These specific programs have been formally approved and students are coded with the concurrent codes.

To earn two master's degrees, a student must complete two separate sets of minimum Graduate School degree requirements of 36 credits each for a total of 72 credits. If a program requires more than 36 credits for the master's degree, a graduate student, with prior approval of both graduate programs, may apply a maximum of 12 credits beyond 36 earned in one program toward the master's degree in the second program. Thus, the minimum number of additional credits for the second degree, with these 12 approved credits, is 24. Up to 12 credits earned toward a Ph.D. degree may be counted toward a master's degree in another program with the approval of both degree-granting units.

### Informal Concurrent Degree Programs

Students in these programs pursue two degrees from different departments simultaneously. These programs have not been approved as formal concurrent programs, but students complete the same requirements as in the formal concurrent programs.

Students choosing this option must complete an Informal Concurrent Degree Application, which may be obtained from the Graduate Student Services Office, 229 Gerberding Hall.

Graduate School Memorandum No. 35: Concurrent Degree Programs contains additional information and is available from the Academic Programs office in the Graduate School or may be found through the Graduate School homepage at [www.grad.washington.edu](http://www.grad.washington.edu).

## Master's Degree

### Summary of Requirements

It is the responsibility of each master's candidate to meet the following Graduate School minimum requirements:

- Under a thesis program, a minimum of 36 or more quarter credits (27 course credits and a minimum of 9 credits of thesis) must be earned. Under a non-thesis program, a minimum of 36 or more quarter credits of course work must be earned.
- At least 18 of the minimum 36 quarter credits for the master's degree must be for work numbered 500 and above. (In a thesis program, 9 of the 18 credits must be course credits and 9 may be for 700, Master's Thesis.)
- Numerical grades must be received in at least 18 quarter credits of course work taken at the UW. The Graduate School accepts numerical grades (a) in approved 400-level courses accepted as part of the major, and (b) in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
- A minimum of 30 credits must be earned at the University of Washington.
- In a thesis degree program, a thesis, approved by the supervisory committee, must be submitted to the Graduate School. A student must register for a minimum of 9 credits of thesis (700). With the exception of summer, students are limited to a maximum of 10 credits per quarter of thesis (700).
- A final master's examination, either oral or written, as determined by the student's supervisory committee, must be passed, if it is a departmental requirement.
- Any additional requirements imposed by the graduate program coordinator in the student's major department or by the student's supervisory committee must be satisfied. A master's degree student usually takes some work outside the major department. The graduate program coordinator in the major department or the student's supervisory committee determines the requirements for the minor or supporting courses.
- The graduate student must apply for the master's degree at the Graduate School within the first two weeks of the quarter in which he or she expects the degree to be conferred, in accordance with Application for the Master's Degree, as described below.
- The graduate student must maintain registration as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).
- All work for the master's degree must be completed within six years. This includes quarters spent On-Leave or out of status and applicable work transferred from other institutions (see detailed information under Transfer Credit).



- A student must satisfy the requirements for the degree that are in force at the time the degree is to be awarded.

### Second Master's Degree Requirement

A second master's degree may be earned at the UW by completing an additional separate set of requirements. Please refer to Concurrent Degree Programs earlier in this section and to Graduate School Memorandum No. 35 for more specific information.

### Transfer Credit

A student working toward the master's degree may petition the Dean of the Graduate School for permission to transfer to the UW the equivalent of a maximum of 6 quarter credits of *graduate-level* course work taken at another recognized graduate school. These credits may not have been used to satisfy requirements for another degree. The petition must include a written recommendation from the graduate program coordinator and an *official* transcript indicating completion of the course work. Transfer credits are not entered on the UW transcript.

Approved transfer credits are applied toward the total credit count for the master's degree only. (Transfer credits are not applicable toward a doctoral degree.) The 18 quarter credits of numerically graded course work, and the 18 quarter credits of 500-level-and-above course work may not be reduced by transfer credit.

UW students who are within 6 credits of completing their undergraduate degree and who have met the requirements for admission to the Graduate School may register the quarter immediately preceding admission to Graduate School for up to 6 credits in 500-level courses in addition to the last 6 credits they require of undergraduate work. The graduate program which has admitted the student must approve registration for the courses. The student, after admission to the Graduate School, must file a petition with the Dean of the Graduate School to transfer the 6 credits.

The student must also provide a letter from the Office of Graduation and Academic Records stating that these credits have not been applied toward his or her undergraduate degree.

Credit taken as a nonmatriculated student or postbaccalaureate student at the UW may not be transferred into a graduate program. Credit by either independent study through correspondence or advanced credit examinations is not transferable.

### Thesis Program

The master's thesis should be evidence of the graduate student's ability to carry out independent investigation and to present the results in clear and systematic form. Two copies of the thesis, normally written in the English language, along with the appropriate forms signed by the members of the supervisory committee from the student's graduate program, must be submitted to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are completed. The faculty in the graduate program may require that the student present an additional copy for its own use. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements. This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the thesis. The thesis must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School for consultation during the thesis preparation process.

*A \$25 binding fee is payable at 129 Schmitz Hall before the thesis is submitted to the Graduate School.*

### Non-thesis Programs

The faculty in some graduate programs have arranged programs of study for the master's degree that do not require the preparation of a thesis. These non-thesis programs normally include a more comprehensive plan of course work for more extensive examinations than are required in thesis programs, or they may include some approved research activity in lieu of a thesis.

### Final Examination for Master's Degree

As soon as is appropriate, the graduate faculty in the student's graduate program appoints a supervisory committee, consisting of two to four members. The chair and at least one-half of the total membership must be members of the graduate faculty (see Graduate School Memorandum No. 13). The committee chair arranges the time and place of the final examination, the results of which must be reported to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are met. At least two graduate-faculty members of the committee, including the chair, must sign the Master's Application (warrant). If the exam is not satisfactory, the committee may recommend to the Dean of the Graduate School that the student be allowed to take another examination after a further period of study.

### Application for Master's Degree

The student must apply for the master's degree at the Graduate School *within the first two weeks of the quarter in which he or she expects to complete degree requirements*. The filing of the application is the responsibility *solely of the student*. When the application is received, the student's record is reviewed in the Graduate School. All requirements for the degree must be met by the end of the current quarter if the application is to be approved. If this is not possible, the applicant is notified of deficiencies by the Graduate School. Once approved, the application is forwarded to the appropriate graduate program. Registration must be maintained for the entire quarter in which application for the degree is made. If a student should withdraw during the quarter, the application becomes void and a new one must be submitted at the appropriate time.

Master's degree applications are valid for *two consecutive quarters*, and if requirements for the degree are not completed during the quarter of the initial application, the student's application may be retained by the graduate program coordinator for the quarter *immediately* following (e.g., autumn to winter, winter to spring, spring to summer, summer to autumn) and returned to the Graduate School by the end of the second quarter. Thereafter, the application is void and the student must file a *new* application for the degree in the Graduate School during the first two weeks of the quarter in which work for the degree is to be completed.

Upon completion of departmental requirements, the master's degree application is signed by the supervisory committee and returned to the Graduate School. It must be received by the last day of the quarter (last day of exam week) if the degree is to be conferred that quarter. If all requirements are completed after this deadline, registration for the following quarter is required.

*The student and the graduate program coordinator should be thoroughly acquainted with the requirements for the particular degree.*

### Master of Arts for Teachers

Master's degree programs for experienced teachers, which focus upon the fields of knowledge normally taught in the common school and the community college, have been established at the University. These programs provide alternatives to the research-oriented Master of Arts and Master of Science degree programs, which emphasize particular fields of knowledge. Programs leading to the M.A.T. degree are offered in Biology Teaching and English.

## Doctoral Degree

The doctoral degree is by nature and tradition the highest certificate of membership in the academic community. As such, it is meant to indicate the presence of superior qualities of mind and intellectual interests and of high attainments in a chosen field. It is not conferred merely as a certificate to a prescribed course of study and research, no matter how long or how faithfully pursued. All requirements and regulations leading to the doctoral degree are devices whereby the student may demonstrate present capacities and future promise for scholarly work.

### Summary of Requirements

In order to qualify for the doctoral degree, it is the responsibility of the student to meet the following Graduate School *minimum* requirements:

1. Completion of a program of study and research as planned by the graduate program coordinator in the student's major department or college and the Supervisory Committee. Half of the total program, including dissertation credits, must be in courses numbered 500 and above. At least 18 credits of course work at the 500 level and above must be completed prior to scheduling the General Examination.
2. Presentation of 90 credits, 60 of which must be taken at the University of Washington.  
  
With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment.
3. Numerical grades must be received in at least 18 quarter credits of course work taken at the UW prior to scheduling the General Examination. The Graduate School accepts numerical grades in approved 400-level courses accepted as part of the major, and in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
4. Creditable passage of the General Examination. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.
5. Preparation of and acceptance by the Dean of the Graduate School of a dissertation that is a significant contribution to knowledge and clearly indicates training in research. Credit for the dissertation ordinarily should be at least one-third of the total credit. *The Candidate must register for a minimum of 27 credits of dissertation over a period of at least three quarters*. At least one quarter must come after the student passes the General Examination. With the exception of summer quarter, students are limited to a *maximum* of 10 credits per quarter of dissertation (800).

6. Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation and the field with which it is concerned. The General and Final Examinations cannot be scheduled during the same quarter. Registration as a graduate student is required the quarter the exam is taken and the degree is conferred.
7. Completion of all work for the doctoral degree within ten years. This includes quarters spent On-Leave or out of status as well as applicable work from the master's degree from the UW or a master's degree from another institution, if applied toward one year of resident study.
8. Registration maintained as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).
9. *A student must satisfy the requirements that are in force at the time the degree is to be awarded.*

### Appointment of Doctoral Supervisory Committee

A *Supervisory Committee* is appointed by the Dean of the Graduate School to guide and assist a graduate student working toward an advanced degree and is expected to evaluate the student's performance throughout the program. The supervisory committee should be appointed no later than four months prior to the General Examination. Appointment of the supervisory committee indicates that the graduate faculty in the student's field finds the student's background and achievement sufficient for admission into a program of doctoral study and research. "Preliminary" examinations, if required, should be completed prior to the request for appointment of the supervisory committee (see Graduate School Memorandum No. 13: Supervisory Committees for Graduate Students).

### Admission to Candidacy for Doctoral Degree

At the end of *two years of graduate study*, the chair of the supervisory committee may present to the Dean of the Graduate School, for approval, a Request for General Examination (signed by all supervisory committee members including the Graduate School Representative) permitting the student to take the General Examination for admission to candidacy for the doctoral degree. This means that, in the opinion of the committee, the student's background of study and preparation is sufficient to justify the undertaking of the examination. A warrant is issued to the department if the Graduate School requirements have been met. The Request for General Examination must be received at least three weeks prior to the proposed examination date. Written and other examinations prior to the oral are the responsibility of the graduate program and do not need Graduate School approval. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.

If the student's performance is judged by the supervisory committee to be satisfactory, the signed warrant certifying successful completion of the General Examination is filed in the Graduate School. If the General Examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit up to a maximum of two additional re-examinations, after a further period of study. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School.

Thereafter, the student is identified and designated as a *Candidate* for the appropriate doctoral degree and is awarded the Candidate's certificate. After achieving Candidate status, the student ordinarily devotes his or her time primarily to the completion of research, writing of the dissertation, and preparation for the Final Examination.

The Candidate's certificate and the doctoral degree may not be awarded in the same quarter.

### Candidate's Certificate

The Candidate's certificate gives formal recognition of the successful completion of a very significant step toward the doctoral degrees awarded through the Graduate School: Doctor of Philosophy, Doctor of Education, and Doctor of Musical Arts. Students who have passed the Graduate School General Examination and who have completed all requirements for the degree except the dissertation and the Final Examination are awarded the Candidate certificate.

### Dissertation and Final Examination

The Candidate must present a dissertation demonstrating original and independent investigation and achievement. The dissertation should reflect not only mastery of research techniques but also ability to select an important problem for investigation and to deal with it competently. Normally the dissertation is written in the English language. However, if there are circumstances that warrant the dissertation be written in a foreign language, approval must be received from the Dean of the Graduate School. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements.

This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the dissertation. The dissertation must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School, and students are encouraged to consult with them throughout the dissertation preparation process.

When the supervisory committee agrees that the doctoral Candidate is prepared to take the Final Examination, the Dean of the Graduate School should be informed of the decision and asked to designate a reading committee consisting of at least three voting members of the supervisory committee.

Once the reading committee is established officially with the Graduate School, a Request for Final Examination (signed by all members of the supervisory committee including the Graduate School Representative) is presented to the Graduate School three weeks prior to the Final Examination date, and if the Candidate has met all other requirements, a warrant authorizing the Final Examination is issued by the Graduate School. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations.

If the Final Examination is satisfactory, the supervisory committee signs the warrant and returns it to the Graduate School by the last day of the quarter in which the degree requirements are completed. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School. If the examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit a second examination after a period of additional study.

After the Final Examination, the doctoral Candidate has 60 days in which to submit the dissertation to the Graduate School. Registration as a graduate student is required the quarter the dissertation is submitted and the degree is conferred.

### Publication of Doctoral Dissertations

Part of the obligation of research is publication of the results, and in the case of doctoral research, this means microfilm publication of the dissertation and/or abstract. This is a Graduate School requirement in addition to any previous or planned publication of any or all of the dissertation and provides worldwide distribution of the work. The Candidate submits the publication agreement when the dissertation is presented to the Graduate School. Publication in microfilm does not preclude other forms of publication.

The following fees for microfilming the doctoral dissertation are paid at the Cashier's Office, 129 Schmitz Hall (all fees are subject to change): microfilming the entire dissertation, \$60; *optional* copyright fee (applicable only when the entire dissertation is microfilmed), \$45; or microfilming of only the abstract, \$60. *These fees are in addition to the \$25 binding fee.*

### Special Individual Ph.D. Program

The Graduate School maintains the Special Individual Ph.D. (SIPh.D.) Program for exceptionally able students whose objectives for study are of an interdisciplinary nature that cannot be met within one of the University units authorized to grant the Ph.D. degree. The program is intended for dissertation topics that require supervision from two or more of the disciplines in which the University offers the Ph.D. degree. It is not intended as a mechanism for offering the Ph.D. degree within units that do not have their own authorized Ph.D. programs.

A graduate student may apply to the SIPh.D. Program when he or she has completed the master's degree, or has been admitted to the Graduate School and has completed at least three quarters of full-time work at the UW, and has carefully planned an appropriate program of studies.

Proposals, including GRE scores, are due by December 15 of each year, and decisions on admission are made by May 31 of the following year. Graduate School Memorandum No. 25: Special Individual Ph.D. Programs (revised), contains additional information, proposal, and instructions and may be obtained from the Graduate School.

## Special Programs and Facilities

### Graduate School Support for Interdisciplinary Units and Graduate Student Recruitment

The objective of the *Graduate School Fund for Excellence and Innovation* (GSFEI) is to support the overall goals of graduate education and research through funding in the following areas: (1) program support for interdisciplinary units on campus, (2) graduate student recruitment support to all Ph.D.-degree granting units on campus, (3) honoraria and colloquia support for the dissemination of research, (4) matching support on proposals to establish research centers, (5) graduate student travel to present the results of research, (6) book publication subsidies for faculty, and (7) other uses that benefit graduate education and research on campus.

GSFEI revenues come from various sources that include (1) state funds provided in the University's biennial budget, (2) private donations, (3) institutional allowances provided with fellowships and traineeships, (4) patent, invention, and copyright royalties accruing to the University, and (5) various special, short-term and renewable awards from the President's and Provost's Offices for maintenance of certain unique needs.

GSFEI policies and procedures may be obtained from the Graduate School, 213 Gerberding, Box 351240, or requested by calling (206) 685-2628.

Related to its primary responsibilities for graduate education, the Graduate School has responsibility for the following programs:

### Special Professorships and Lectureships

The *Walker-Ames Fund* was established in the 1930s through a bequest from the estates of Maud Walker Ames and her husband, Edwin Gardner Ames. Its stated purpose is to enable the University of Washington "to guarantee to the state of Washington the scholarly and educational services of the most distinguished minds available in this and other countries."

Chaired by the Dean of the Graduate School, a committee of University faculty members considers nominations from their colleagues and makes recommendations to the President for the appointment to Walker-Ames Professorships of distinguished scholars of national and international reputation.

Since 1936, when the first Walker-Ames Visiting Professor was appointed, over 350 scholars and members of the profession have come to the University as temporary members of the faculty, enriching the intellectual life of the University community and the state.

The *Jessie and John Danz Fund* was established in 1961 by a gift and bequest from John Danz; an additional gift was made to the Danz fund in 1969 by his wife, Jessie Mohr Danz. The Danz fund is intended primarily to enable the University to bring to the campus each year two "distinguished scholars of national and international reputation who have concerned themselves with the impact of science and philosophy on man's perception of a rational universe."

Nominations and appointments for the Danz lectureships are made in the same manner as the Walker-Ames professorships. Since 1961 when the lectureship was established there have been 95 appointed lectureships. Other arrangements compatible with the Danz bequest (e.g., the publicizing of the Danz Lectures) may be made upon approval of the committees involved.

Questions pertaining to the Walker-Ames Fund and the Jessie and John Danz Fund may be directed to the Dean of the Graduate School.

In addition to regular academic offerings, the University maintains a wide range of programs and facilities that provide special opportunities for graduate study and research. The following units are administered by the Graduate School:

### Center for Law and Justice

Joseph G. Weis, Director  
117 and 119 Savery, Box 353340

The Center for Law and Justice is a multidisciplinary research center established in 1975. Its goals are to engage in research, to contribute to the education and training of students, to offer consultation, and to provide liaison to the community in the areas of law and justice. To achieve these goals the Center (1) appraises faculty members of research opportunities and assists in the development of proposals, (2) involves students from different disciplines in research training and education and sponsors biweekly colloquia, and (3) provides consultation to the criminal justice system and responds to the broader informational needs of the community.

### University of Washington Press

John P. Soden, Director  
1326 Fifth Avenue, Suite 555, Box 359120

The University of Washington Press, the book-publishing division of the University, has over a thousand titles in print, with special emphasis on art, anthropology, Asian-American studies, Asian studies, environmental studies, ethnology, history, international studies, and regional subjects. The Press publishes about 60 new books each year, including reprints and imports. Authors include both members of the University faculty and scholars outside the University. In addition to its own publishing program, the Press distributes art books and catalogues for numerous museums.

# Procedures and Fees

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration; the instruction in and the graduation from the University and its various divisions; and any other regulations affecting the student. The University also reserves the right to withdraw courses and programs at any time.

It is the University's expectation that all students follow University regulations and procedures as they are stated in the *General Catalog*. Appeals may be filed with the student's dean or with the Vice President for Student Affairs in nonacademic matters. Students are expected to observe the standards of conduct contained in the Student Conduct Code (WAC 478-120).

## Registration

 [www.washington.edu/students/reg/regelig.html](http://www.washington.edu/students/reg/regelig.html)

Detailed information and procedures pertaining to registration and withdrawal are outlined in the quarterly *Time Schedule*.

### Registration Period I

 [www.washington.edu/students/reg/addpolicy.html](http://www.washington.edu/students/reg/addpolicy.html)

Designed to accommodate currently registered matriculated students and students eligible to register under the Quarter Off Eligibility Policy, Registration Period I occurs during the latter half of the quarter preceding the quarter for which the student is registering. However, currently enrolled students register for autumn quarter during spring quarter.

### Registration Period II

Registration occurs after Registration Period I closes and is intended primarily to accommodate new and returning students. Continuing students who fail to register during Registration Period I may register during this period. Students who have not completed their initial registration by the end of this period (selection of student insurance, ASUW membership, optional charges, and mailing preference options) are charged a Late Registration Fee.

### Registration Period III

All students may register or make course changes during this period. Dropped courses do not appear on the transcript. Students are charged a Change of Registration service fee for registration changes made after Period III. One fee is charged for all changes occurring during the same day. A tuition forfeiture is charged for total credit reductions after Period III if applicable. See Fee Forfeiture section.

### Late Add Period

All students may register or make registration changes during this period. All added courses require an entry code or faculty number. A Change of Registration service fee is charged.

### Unrestricted Drop Period

 [www.washington.edu/students/reg/wdpolicy.html](http://www.washington.edu/students/reg/wdpolicy.html)

Courses dropped during this period will not appear on the transcript. A Change of Registration fee is charged.

### Late Course Drop Period (Annual Drop)

Students may drop one course each academic year (autumn through summer quarters) after the fourteenth calendar day of the quarter through the seventh week of the quarter. A course drop will be recorded on the transcript with a W followed by the number of the week of the drop (W3-W7). A Change of Registration service fee is charged.

## Credits Required for Full- or Half-Time Status Requirements

 [www.washington.edu/students/reg/regpol.html](http://www.washington.edu/students/reg/regpol.html)

Some agencies require that a student have full-time status to receive maximum benefits. To be classified as a full-time student by the University, a professional student must register for and complete at least 12 credits per quarter and a

graduate student must register for and complete at least 10 credits per quarter. To be classified as a half-time student by the University, a professional student must register for at least 6 credits per quarter and a graduate student must enroll for at least 5 credits per quarter.

## Restrictions on Attending Classes

 [www.washington.edu/students/reg/regpol.html](http://www.washington.edu/students/reg/regpol.html)

No person, other than a faculty member attending informally with the approval of the instructor, may attend a University course in which that person has not been registered.

An instructor may allow a student to attend his or her class only if the student's name is on the official class list from the Office of the Registrar. An unregistered student may attend through the fourteenth calendar day of the quarter if the student is on an official wait list for the course.

## Adding Courses/Permission Guidelines

 [www.washington.edu/students/reg/regopt.html](http://www.washington.edu/students/reg/regopt.html)

For reasons of public safety and instructional quality, it is important to limit course enrollment to the approved classroom capacity. The Office of the Registrar monitors course enrollment and accepts student registration in fully enrolled courses according to the following guidelines:

1. Through the second week of the quarter, departments may choose to overload courses up to 115% of the room capacity to offset anticipated student course drops and withdrawals as demonstrated by past registration activity.

Students must secure entry codes from instructors or departments to add closed courses. However, if enrollment is at 115% of room capacity, registration requests are denied. Students should be informed when receiving entry codes to overloaded courses that registration is not guaranteed if enrollment exceeds 115% of room capacity.

If centralized room-capacity records do not correctly reflect the actual seating capacity, notification should be made to the Room Assignments/Time Schedule Office in the Office of the Registrar.

2. Students may add courses during the Late Add Period or through the twenty-first calendar day of the quarter. Adds after the seventh calendar day of the quarter require an entry code or faculty number. Departments may also add students to departmental courses during this period through departmental registration screens. To add courses after this period, students must submit a faculty-approved Late Add Petition form to the Registration Office.
3. A course may not be changed to or from an audit registration after the first two weeks of the quarter. See below for transcript entry.

## Dropping a Course

 [www.washington.edu/students/reg/wdpolicy.html](http://www.washington.edu/students/reg/wdpolicy.html)

Students dropping a course during the first two weeks of a quarter shall have no entry on their permanent academic transcript. If all courses are dropped, then a complete withdrawal date is recorded on the transcript.

A course drop made during the third through the seventh weeks of the quarter is recorded on a student's transcript with a W grade and a number designating the week of the quarter in which the course drop was transacted. Only one drop after the fourteenth day of a quarter is permitted each academic year (autumn through summer quarter).

A student who does not officially drop a course through the registration system or the offering department is given a grade of 0.0.

Students receiving or applying for financial aid should check with the Office of Student Financial Aid, 105 Schmitz Hall, (206) 543-6101, before dropping a class because it may affect their eligibility.

Students receiving veterans' benefits should contact the Office of Special Services, 460 Schmitz Hall, when dropping courses.

## Complete Withdrawal from the University for a Registered Quarter

 [www.washington.edu/students/reg/wdoffleave.html](http://www.washington.edu/students/reg/wdoffleave.html)

Once registered, a student must officially withdraw if he or she later chooses not to attend the University for the registered quarter. Official withdrawal must be made by the fifth day of the quarter for the student to avoid further financial obligation (see Tuition, Fees, and Special Charges for refund information on withdrawals).

1. To withdraw from a quarter, students may complete a Withdrawal Card and submit it in person to the Registration Office, 225 Schmitz Hall, or write to the Registration Office, Box 355850, Seattle, WA 98195-5850. Withdrawal forms are available at advising offices and the Registration Office. An official withdrawal is effective the day it is received in the Registration Office, or if submitted by mail, the date of the postmark.
2. Students who drop the last course on their schedules will be considered withdrawn for the quarter. Students who drop courses beginning the eighth calendar day of the quarter are charged a Change of Registration service fee per day for any course drops.
3. Submission of a graduate On-Leave application does not constitute official withdrawal from the University.
4. Refer to the grading section in the Graduate School: Graduate Study section.
5. Students receiving veterans' benefits should immediately notify the Office of Special Services of withdrawal.
6. Students with a scholarship or loan awarded through the University should notify the Student Accounts and Scholarships Office or the Student Loan Office.
7. Students who withdraw due to conscription into the armed forces or who are called to active duty military service may be entitled to either a full refund of tuition and fees or academic credit, depending on when in the quarter official withdrawal occurs. Students should contact the Registration Office for complete information.

## Additional Information

### Address Change

 [www.washington.edu/students/reg/address.html](http://www.washington.edu/students/reg/address.html)

Students are responsible for notifying the Office of the Registrar when their address changes. Individual addresses may be viewed and updated through STAR Online, which can be accessed through the Student Guide on the UW homepage ([www.washington.edu](http://www.washington.edu)). Complete instructions for updating address records are listed. Students need to enter both their student number and private access code (PAC) to update their individual address record. A confirmation message will be sent to the student's email address. *The mailing of notices to the last address on record constitutes official notification.*

### Residence Classification Requirements

 [www.washington.edu/students/reg/residency.html](http://www.washington.edu/students/reg/residency.html)

Residence classification information is available from the Graduation and Academic Records Office, 264 Schmitz Hall.

### Student Identification Cards

 [www.washington.edu/students/reg/id.html](http://www.washington.edu/students/reg/id.html)

All new students should go to the Student ID Card Center, 229 Schmitz Hall, to be issued a permanent student identification card. Photo identification (such as a driver's license, state ID card, or passport) is required to obtain a student ID card. Returning students who have not retained a previous ID card should obtain a new one. A quarterly validation sticker is mailed with the registration confirmation to each registered student. The student ID card with attached validation sticker is used for a variety of campus services. It is the student's means of identifying his or her status as a student at the University.

Registered students whose ID cards have been lost or stolen can have them replaced at the Student ID Card Center. Students who request such replacement are charged a nonrefundable fee. Replacement of cards made invalid by changes in a student's name or rendered unusable by normal wear and tear is provided without charge upon return of the original card to the Student ID Card Center. Two pieces of identification (one with a photo) are required to obtain a replacement card.

Cards that have been tampered with or misused may be confiscated by the University agency or department involved, and the incident may be referred to the Office of the Vice President for Student Affairs for appropriate University action.

### Transcripts

 [www.washington.edu/students/reg/transcripts.html](http://www.washington.edu/students/reg/transcripts.html)

Official copies of student academic records at the UW must bear the official seal of the University, the signature of the Associate Registrar, and the date of issue.

### Transcript Fee

A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

### Transcripts from Other Schools

A transcript covering a student's previous secondary and college education that has been submitted to the University as a requirement for admission becomes part of the official file and is not returned to the student. Any student who desires transcripts of his or her course work undertaken elsewhere must order official transcripts from the institution. The University does not issue or certify copies of transcripts from other institutions.

### Veterans and Children of Totally Disabled Veterans and Personnel in the Armed Forces

Information on educational benefits and tuition reduction programs for veterans and their dependents is available from the Office of Special Services, 460 Schmitz Hall.

Veterans and members of the armed forces who apply for admission to the University are subject to the same minimum requirements as regular students and are expected to enroll in accordance with University requirements.

The University's academic programs of study are approved by the Washington State Higher Education Coordinating Board's State Approving Agency (HECB/SAA) for enrollment of persons eligible to receive educational benefits under Title 38 and Title 10 USC.

## Tuition, Fees, and Special Charges

### Estimated Expenses

The cost of a student's education at the University varies, the amount depending on his or her classification, status as resident or nonresident, and field of study. In computing college costs, a student should consider such additional expenses as insurance coverage, books, and laboratory supplies. Personal expenses (e.g., clothing, laundry, recreation, and transportation), which vary with each individual, as well as between-quarter expenses, should not be overlooked.

The following figures are prepared and updated each year by the Office of Student Financial Aid and reflect modest, but adequate, probable costs for students attending the University during the nine-month academic year. They should be used only as a guide in determining the year's expenses.

Books	\$ 777
Room and Board	8,319
Transportation	747
Miscellaneous personal expenses	2,043

Total	\$11,886
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This budget assumes room and board is paid for by the student.

	<i>Resident tuition and fees</i>	<i>Nonresident tuition and fees</i>
Business (MBA) students	5,853	14,574
Graduate students	5,739	14,277
Law students	6,210	15,321
Medical and dental students	9,528	24,078

Tuition and fees are subject to change.

### Enrollment Confirmation Deposit

 [depts.washington.edu/insp/first2.html](http://depts.washington.edu/insp/first2.html)

A new graduate student is required to confirm his or her intention to enroll by paying a nonrefundable \$100 Enrollment Confirmation Deposit (not required of students admitted summer quarter). The \$100 is applied toward tuition and fees assessed for the quarter for which the student is determined to be admissible and subsequently enrolls. A student who pays the fee for a given quarter but does not register in that quarter is not entitled to a refund except by petition in the situations listed below:

1. A new or returning matriculated student who is unable to obtain courses required for the completion of the degree or certificate program, or courses which are determined by an appropriate academic adviser to be acceptable alternate courses. A written verification from the appropriate academic adviser must be attached to this petition. Such requests for refund must be submitted by Friday of the second week of the quarter.

## PROCEDURES AND FEES

- A new or returning matriculated student who, after meeting with an appropriate academic adviser, determines that the program for which admission was granted differs substantially from what the student was led to expect based upon earlier available information. This petition for refund must be submitted before the student registers for courses and in no case later than the first day of the quarter for which admission has been granted. A written verification from the appropriate academic adviser must be included.
- A new or returning student who applies by the prescribed deadline for financial aid administered by the University's Office of Student Financial Aid, and who cannot be awarded financial aid adequate to his or her needs as determined by that office, and who is therefore unable to attend the University. This petition and a copy of the Notice of Award and Acceptance must be submitted no later than two weeks after receipt of notice of the financial aid award.
- A new or returning student who is unable to attend the University because of pregnancy, disability, or death, or because of being called involuntarily into the military service of the United States or into civil duty. Documentation is required.

### Fee Payment



[www.washington.edu/students/sfs/sao/ttnrates.html](http://www.washington.edu/students/sfs/sao/ttnrates.html)

An obligation to pay tuition and fees in U.S. dollars is incurred when a student registers. A fee statement is mailed to the student's address on file with the Office of the Registrar.

Payment of this obligation is due by Friday of the third week of the quarter. Nonpayment of tuition and fees by the due date results in (1) charge of \$10 to \$30 for late payment, if payment is received within the one-week late-payment period; (2) cancellation of registration, if payment is not made by the eighth Wednesday of the quarter. One-half of tuition is assessed when registration is canceled for nonpayment of tuition and fees. The Summer Quarter Bulletin and *Time Schedule* should be consulted for fees and fee payment schedule applicable to summer quarter only.

When the payment is not in conformance with the tuition and fee billing, specific instructions on how the payment is to be applied must accompany the payment. In the absence of instructions, the University makes a reasoned interpretation of the student's intent and accounts for the funds accordingly. The student number must be specified on all payments.

### Estimated Quarterly Tuition Rates Effective Autumn Quarter 2000



[www.washington.edu/students/sfs/sao/ttnrates.html](http://www.washington.edu/students/sfs/sao/ttnrates.html)

#### Graduate and Pharmacy Professional Programs<sup>1</sup>

	Technology Fee	Resident <sup>2</sup>	Nonresident <sup>2</sup>
2 credits (minimum)	\$10	\$547	\$1,359
3 credits	16	820	2,039
4 credits	22	1,093	2,719
5 credits	28	1,367	3,399
6 credits	34	1,640	4,079
7-18 credits	40	1,913	4,759
Additional fee per credit for more than 18 credits	NA	255	661

#### Law<sup>3</sup>

	Technology Fee	Resident <sup>2</sup>	Nonresident <sup>2</sup>
2 credits (minimum)	\$10	\$592	\$1,459
3 credits	16	888	2,188
4 credits	22	1,183	2,918
5 credits	28	1,479	3,648
6 credits	34	1,775	4,377
7-18 credits	40	2,070	5,107
Additional fee per credit for more than 18 credits <sup>4</sup>	NA	277	711

#### Master of Business Administration

	Technology Fee	Resident <sup>2</sup>	Nonresident <sup>2</sup>
2 credits (minimum)	\$10	\$558	\$1,388
3 credits	16	837	2,082
4 credits	22	1,115	2,776
5 credits	28	1,394	3,470
6 credits	34	1,673	4,164
7-18 credits	40	1,951	4,858
Additional fee per credit for more than 18 credits	NA	260	676

#### Medical and Dental<sup>5</sup>

	Technology Fee	Resident <sup>2</sup>	Nonresident <sup>2</sup>
2 credits (minimum)	\$7	\$488	\$1,236
3 credits	10	733	1,853
4 credits	13	977	2,470
5 credits	16	1,221	3,088
6 credits	19	1,466	3,705
7 credits	22	1,710	4,322
8 credits	25	1,954	4,940
9 credits	28	2,199	5,557
10 credits	31	2,443	6,174
11 credits	34	2,687	6,792
12 credits	37	2,932	7,409
13 or more credits	40	3,176	8,026

<sup>1</sup> Does not apply to the Doctor of Pharmacy program.

<sup>2</sup> Includes technology fee.

<sup>3</sup> For the purposes of assessing tuition, a law student is any student solely pursuing the Juris Doctor degree. Visiting law students will be considered law students for tuition purposes. Students solely pursuing graduate degrees in the School of Law—i.e., degrees other than the Juris Doctor degree—pay graduate tuition. A student concurrently pursuing the Juris Doctor degree and a graduate degree (concurrent law student) will be assessed the law tuition rate for all credits taken in a quarter when 6 or more credits are in School of Law courses. Concurrent law students, who have completed 135 credits for the Juris Doctor degree and are pursuing a graduate law degree, pay graduate tuition.

<sup>4</sup> Does not apply to law students exclusively in Juris Doctor program.

<sup>5</sup> A student concurrently pursuing a medical degree and a graduate degree will be assessed the medical tuition rate for all credits taken in a quarter when 6 or more credits are in School of Medicine courses.

Fees are subject to change without notice.

Tuition rates for resident and nonresident students apply to the academic year (autumn, winter, and spring quarters). Summer quarter tuition is listed in the *Summer Quarter Bulletin and Time Schedule*. Except for students in the Schools of Dentistry or Medicine, nonresident students are charged resident tuition during summer quarter.

Tuition charges are based on student classification, e.g., undergraduate, graduate, or professional, and not on course level. Students pursuing the Doctor of Pharmacy degree are charged graduate tuition.

Fees listed above do not apply to students registered through UW Extension. See the UW Extension Bulletin for their fee structure.

#### Special Course and Laboratory Fees

The amounts listed above cover normal University charges for course registration. Some courses, however, have extraordinary expenses associated with them, and in such cases the University may charge additional fees in amounts that approximate the added instructional or laboratory costs.

#### Other Fees

*Auditors:* There is no reduction in fees for auditors.

*Admission Application Fees:* Graduate, \$45; Medicine, Dentistry, \$35; Law, \$50. Former students returning in the same classification, \$35.

*On-Leave Registration Fee:* This fee of \$35, charged to graduate students only, provides for a maximum on-leave period of four successive academic quarters or any part thereof and is not refundable.

**Late Registration/Reregistration Fees:** A late registration service charge of \$25 is assessed when a student registers after the last scheduled day of Period II registration and through the tenth day of the quarter. Students registering after the tenth day pay a \$75 Late Registration Fee. A student who must reregister as a result of a cancellation for nonpayment of tuition must also pay a \$75 fee. Waiver or refund of the Late Registration Fee may be petitioned in the Registration Office. Waiver or refund of the \$75 reregistration fee may be petitioned in the Student Accounts and Cashiers Office.

**Change of Registration Service Fee:** A charge of \$20 is made for any number of add, drop, or change transactions processed during a given day beginning the eighth calendar day of the quarter.

**Transcript Fees:** A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

**Thesis and Dissertation Fees:** Publication binding fee, \$25; dissertation microfilming fee, \$60; abstract-only microfilming fee, \$60; optional copyright service fee, \$35.

**Replacement Fees:** Duplicate diploma, \$10; student identification card, \$5 (nonphoto), \$10 (photo).

**U-PASS Fee:** A U-PASS validation sticker is mailed quarterly with a student's registration confirmation. The U-PASS is valid on all Metro and Community Transit routes at all times and provides parking privileges to carpoolers, riding privileges to vanpool and Night Ride passengers, and merchant discounts. The quarterly fee of \$31 (subject to change) is included on the tuition bill. Students who do not wish to participate in the U-PASS program must return the validation sticker to the University by the tuition payment deadline. The sticker can be returned by mail in the return envelope provided, mailed with the tuition payment, or returned in person to the Student Accounts and Cashiers Office. For further information consult the quarterly *Time Schedule*.

All fees are subject to change without notice.

## Cancellation of Tuition

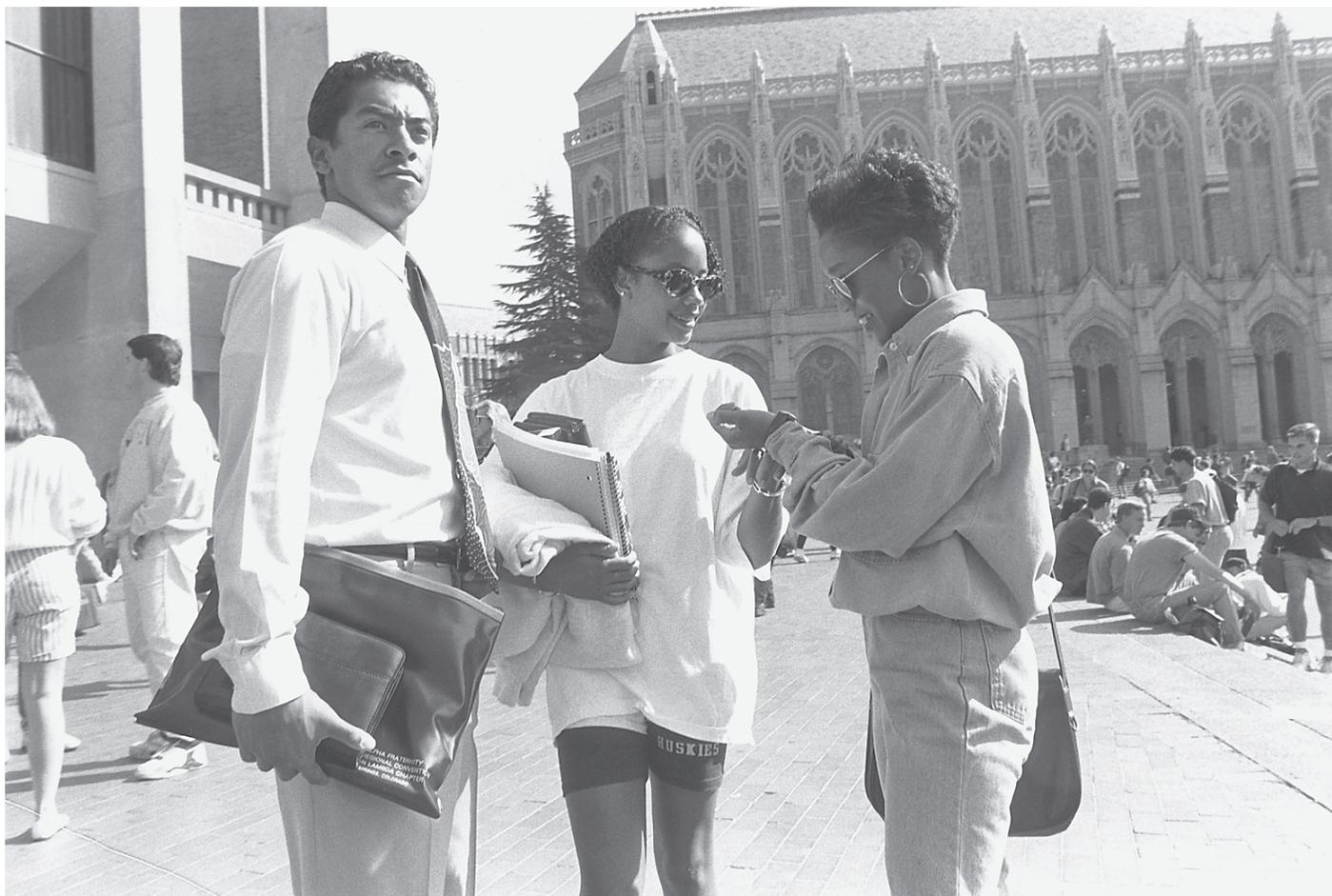
Registered students must pay full tuition and fees. Tuition may be canceled or reduced if a student makes an official withdrawal or drops a course during the period specified by state statute. Refunds are given when a cancellation or reduction results in an overpayment.

## Continuing Students

1. A student who withdraws on or before the seventh calendar day of the quarter does not pay tuition.
2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition.
3. A student who withdraws after the thirtieth calendar day must pay full tuition.

## New and Returning Students

1. A student who withdraws on or before the seventh calendar day forfeits the \$100 Enrollment Confirmation Deposit but does not pay the regular tuition.
2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.
3. A student who withdraws after the thirtieth calendar day of the quarter must pay full tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.



## PROCEDURES AND FEES

### Fee Forfeiture

A student who does not completely withdraw but drops one or more courses may be eligible for lower tuition, depending on the total number of credits remaining after the course drop and on the time period when the drop was made. Tuition for students making a course drop on or before the seventh calendar day of the quarter is determined by the total credits remaining. Tuition for students making a course drop after the seventh calendar day through the thirtieth calendar day of the quarter is computed on the total credits remaining plus one-half the difference between the old tuition and the new tuition. There is no cancellation or reduction in tuition for courses dropped after the thirtieth calendar day of the quarter.

### Fee Refund

When a fee payment is made by check, a waiting period is required before a refund can be authorized. An application for refund may be refused, unless it is made during the quarter in which the fees apply. A student who withdraws for disciplinary reasons forfeits all rights to refund or cancellation of any portion of his or her fees.

### Financial Obligations

The Comptroller is authorized to place a hold (administrative) on the records of any student who fails to pay amounts due the University.

Until this hold is cleared, the University (1) does not release the student's record or any information based upon the record, (2) does not prepare transcripts or certified statements, and (3) denies registration.

In cases of serious financial delinquency, the Comptroller, with the consent of the Associate Registrar, may order that a student's registration be canceled and that privileges of attendance be withdrawn.

Tuition and fees not paid by the end of the academic quarter are subject to an interest charge of 1% per month, or a fraction thereof (12% APR), beginning the month following the end of the quarter.

An administrative hold or cancellation also may occur when a student has not complied with other University rules, procedures, or obligations. The hold may be placed on the student's record by the authorized University office responsible for enforcement of the rule, procedure, or obligation involved. The student is not permitted to register for any subsequent quarter or to obtain a transcript of his or her record or a certified statement except on the written release of the office that placed the hold.

### Tuition Exemptions and Reductions



[www.washington.edu/students/reg/tuition\\_exempt.html](http://www.washington.edu/students/reg/tuition_exempt.html)

#### Faculty/Staff, Washington State Employee, and Washington National Guard Member Tuition Exemption Programs

Eligible faculty, staff, state employees, and Washington National Guard members admitted to the University may enroll for up to 6 credits each quarter under these tuition exemption programs. Because such students are registered on a space-available basis, they must register after other students. The quarterly *Time Schedule* lists registration dates when students enrolling under these exemption programs may register. Eligibility information may be obtained from either the Staff Training and Development Office, or the Registration Office.

#### "Access" Program for Older Adults



[www.washington.edu/students/reg/access.html](http://www.washington.edu/students/reg/access.html)

The UW allows Washington residents who are 60 years of age or older to audit certain courses on a space-available basis. Students who attend the University under the Access Program are limited to two courses per quarter. There is a nominal registration fee. As auditors, students do not receive credit, participate in discussions, complete laboratory work, or take examinations.

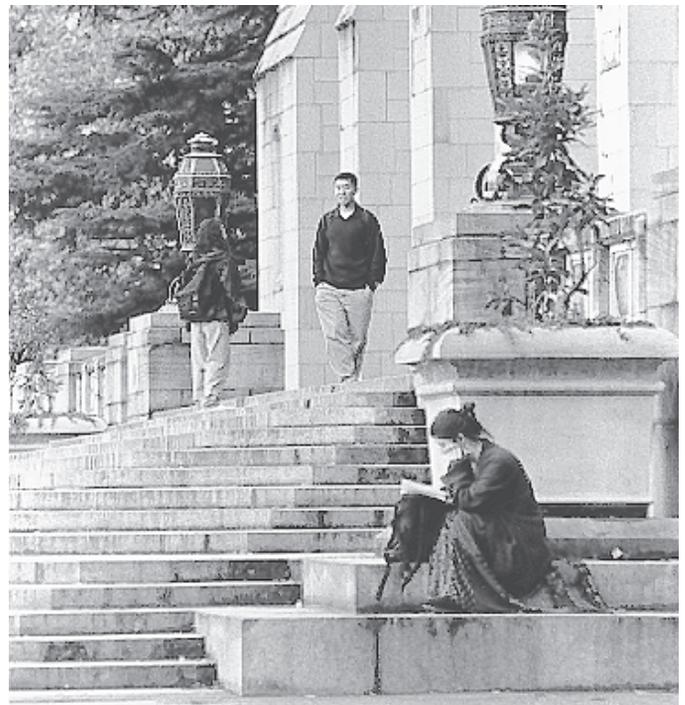
### Tuition Reductions

The following categories of students may be eligible for reduced tuition and fees. Students in these categories may contact the offices shown for information or to obtain an application. The reductions are established by legislative mandate and may be revoked by the legislature at any time.

### Category

### Contact Office

Active duty military assigned to Washington and their children and spouses	Office of Residency Classification, 264 Schmitz Hall, (206) 543-5932
American Indian students who meet specific eligibility requirements	Office of Special Services, 460 Schmitz Hall
Children of POWs or MIAs	Office of Special Services, 460 Schmitz Hall
Children of Washington law enforcement officers or firefighters who died or became totally disabled in the line of duty	Office of Special Services, 460 Schmitz Hall
UW faculty members and their children and spouses who are not Washington state residents	Academic Personnel Office, 85 Gerberding Hall, (206) 543-5630
Immigrants holding a refugee classification who have been in the United States less than one year	Office of Special Services, 460 Schmitz Hall
Senior citizens under the Access Program	Registration Office, (206) 543-8580
UW staff members and their children and spouses who are not Washington state residents	Office of Special Services, 460 Schmitz Hall
TAs/RAs with half-time appointments	Graduate School, 201 Gerberding Hall
Veterans who served in the Persian Gulf combat zone in 1991	Office of Special Services, 460 Schmitz Hall
Veterans who served in Southeast Asia during the period of August 5, 1964-May 7, 1975	Office of Special Services, 460 Schmitz Hall
Medical students in the WWAMI Program	School of Medicine, Office of Academic Affairs, A300 Health Sciences
Award recipients under the Washington State Scholars and Washington Award for Vocational Excellence (WAVE) programs	Office of Student Financial Aid, Outreach Services, 172 Schmitz Hall
Students participating in the WICHE Program	Student Accounts and Cashiers Office, 129 Schmitz Hall



## Academic Assessment

As part of an ongoing effort to ensure the quality of the education received by its students, the UW has instituted a comprehensive assessment program designed to measure student learning outcomes. This assessment program conforms with guidelines established by the state's Higher Education Coordinating Board. From time to time, students may be asked to participate in outcomes assessment by completing satisfaction surveys, sitting for achievement examinations, compiling portfolios of their academic work, or providing other academic performance indicators. The purpose of all such activities is to monitor the quality of the University's academic programs.

While it is a University requirement that students participate in these assessment activities when asked to do so, participants can be assured that assessment results will be treated in the strictest professional confidentiality. Whenever those results appear in University assessment reports or other public documents, they will be presented anonymously and in aggregate fashion.

## Academic Sessions

University instruction is offered during autumn, winter, and spring quarters, each lasting approximately 11 weeks. The 9-week summer quarter is divided into two 4 1/2-week terms.

## Accreditation

The University is accredited by the Northwest Association of Schools and Colleges and is a member of the Association of American Universities. Individual schools and colleges are members of the various accrediting associations in their respective fields. Currently enrolled or prospective students should contact the Office of the Registrar to review accreditation documents for the University and the respective department to review programmatic accreditation documents.

# Academic Programs

The University offers a wide range of undergraduate, graduate, and professional degree programs. In addition to these programs, the following educational opportunities are available.

## Certificate Programs

 [www.extension.washington.edu/extinfo/](http://www.extension.washington.edu/extinfo/)

UW Extension offers more than 80 specially designed credit and non-credit evening certificate programs of study in many areas, primarily to working adults. Some certificate programs address such personal-interest areas as film, writing, and sound production. Other programs focus on specific careers in business, industry, and technology, offering specialized training that supplements other education and work experience. Students are prepared to enter new fields or to grow professionally in areas ranging from accounting to computer programming to project management. All certificate programs and instructors have been approved by the appropriate academic units. Programs are designed by advisory boards consisting of leading professionals in the field and UW faculty. To accommodate working professionals, UW Extension schedules most classes to meet evenings or weekends. Several certificate programs are offered to students at a distance through various technologies. Course fees and admission requirements vary, and enrollment in all certificate programs is limited. More information may be obtained by consulting the quarterly UW Extension catalog, available by telephone, (206) 543-2320 or by UW Extension's Web site.

## Evening Classes

Opportunities for evening study at the University are varied to serve individual student interests and academic goals. For nonmatriculated (not formally admitted) students, UW Extension offers hundreds of evening credit courses and evening non-credit courses, which are described in the UW Extension section of this catalog.

## Evening Degree Program

 [www.evedegree.washington.edu/evedeg/](http://www.evedegree.washington.edu/evedeg/)

Students can complete a bachelor's or graduate degree in the evening through the University of Washington Evening Degree Program. A wide variety of courses are scheduled for the convenience of evening-degree students. Some programs use technology for the delivery of courses to make the degrees more accessible.

Evening Degree Program graduate-level programs include the Master of Science in Construction Management, the Master of Social Work (M.S.W.), the Master of Professional Accounting (M.P.Acc.), the Master of Public Administration (M.P.A.), Master of Business Administration (M.B.A.), the Master of Education (M.Ed.) and the Doctor of Education (Ed.D.) in educational leadership and policy studies with an emphasis in higher education, the Master of Applied Physics (M.S.), the Professional Master's in Computer Science and Engineering (M.S.), the Master of

Library and Information Sciences (M.L.S.), the External Doctor of Pharmacy Program (Pharm.D.), the Master of Health Administration (M.H.A.), and the Master of Medical Engineering (M.M.E.) which is offered by the Department of Bioengineering.

## Distance Learning Degree Programs

Degree programs available to students that incorporate distance learning technologies include the Master of Social Work (M.S.W.), the Professional Master's in Computer Science and Engineering (M.S.), the External Doctor of Pharmacy (Pharm.D.), the Master of Health Administration (M.H.A.), and the Education at a Distance for Growth and Excellence program for engineers (M.S.).

For more information on these programs call (206) 543-6160 or (206) 543-2320, or visit the Evening Degree Web site.

## Summer Quarter

 [www.summer.washington.edu/uwsql/](http://www.summer.washington.edu/uwsql/)

During summer quarter, more than two thousand courses in most major fields are available to graduate and undergraduate students pursuing degree programs on a year-round basis as well as to summer-only students seeking to broaden, intensify, or refresh subject-matter competence. Summer-only students can apply for admission as nonmatriculated students and can earn credits which may apply toward a degree at another college. This status also accommodates teachers and school administrators who take special-interest courses to earn additional university credits and postbaccalaureate students who do not desire formal admission to a graduate or second undergraduate program.

Credits earned during summer quarter are evaluated as residence credits and, with the exception of separate fee schedules for medical and dental students, summer quarter fees closely parallel those of the other quarters. Nonresidents and residents pay the same fees during the summer. A complete listing of summer-quarter courses is published in the Summer Quarter bulletin, available on request from the University of Washington, Office of Summer Quarter, Box 354224, Seattle, Washington 98195, (206) 543-2320 or 1-800-543-2320 or visit the summer-quarter Web site.

## UW Bothell and UW Tacoma

 [www.bothell.washington.edu](http://www.bothell.washington.edu)  
[www.tacoma.washington.edu](http://www.tacoma.washington.edu)

At its Bothell and Tacoma campuses, the University offers bachelor's and master's degree programs designed to provide additional educational opportunities for residents of the Puget Sound region. The campuses are located in Bothell, 15 miles to the north of the Seattle campus, and in Tacoma, 35 miles to the south. Undergraduate programs at Bothell and Tacoma are offered at the upper-division level, for students who have already completed the first two years (80 to 90 credits) of undergraduate study. The following degree programs are currently available at both campuses: Bachelor of Arts in Liberal Studies, Bachelor of Arts in Business Administration, Bachelor of Science in Nursing (designed for registered nurses),



Bachelor of Science in Computing and Software Systems, and Master of Education. In addition, a Teaching Certificate Program is available at both campuses for students preparing to teach at the K-8 grade levels. The Tacoma campus also offers Master of Nursing and Master of Social Work degree programs. The Bothell campus also offers a Master of Management degree focused on technology-oriented businesses. A Master of Arts in Public Policy and a Master of Science in Computing and Software Systems are planned to begin in autumn 2001. A Bachelor of Science in Environmental Sciences is currently being planned. Further information is provided in the University of Washington, Bothell and University of Washington, Tacoma sections of this catalog.

## Resources and Facilities

### Burke Museum



[www.washington.edu/burkemuseum/](http://www.washington.edu/burkemuseum/)

The Burke Museum of Natural History and Culture serves both the University and the public in its mission to encourage understanding of, and appreciation for, the natural and cultural heritage of Washington state, the Pacific Northwest, and the Pacific Rim. The Burke has three scientific divisions—anthropology, geology, and zoology—holding more than four million specimens. Collections of national and international ranking include Northwest Indian art, Northwest archaeology, vertebrate and invertebrate paleontology, mammals, and birds. Other noteworthy collections include Asian and Pacific ethnography, minerals and gems, paleobotany, arachnids, lepidoptera, and micropaleontology.

The collections are accessible for research by UW faculty, students, and visiting scientists. The museum's public galleries feature two long-term exhibits ("Life and Times of Washington State" and "Pacific Voices"), as well as a series of changing shows on Pacific-region cultures and natural history. Hours are 10 a.m. to 5 p.m. daily, except July 4th, Thanksgiving, December 25th, and January 1st. Admission is free to UW staff and students.

### Computing Resources



[www.washington.edu/computing/](http://www.washington.edu/computing/)  
[www.washington.edu/uwired/](http://www.washington.edu/uwired/)

The diverse computing and networking needs of instructional and research groups on campus are served by central organizations as well as individual schools, colleges, and departments. Together these provide a variety of computers, facilities, and support services to the UW community. An wide array of computing options and services is offered by Computing and Communications (C&C), the central UW organization for computing and networking, and by UWired, a collaborative effort to integrate information technology into teaching and learning.

Students, faculty, and staff members can create accounts on computers provided by C&C, which give them access to tools for teaching, learning, and research. They can use Internet resources and the World Wide Web, including servers where they can create Web pages. They can browse the UW course catalog and Time Schedule; use electronic mail; get news and campus events; research term papers; search library catalogs; and use software for statistics, graphics, programming, and text formatting. In addition, UW Internet Connectivity Kit software allows them to connect their own computer to the Internet, either from home (via a modem and a phone line) or from a residence hall or office (usually via Ethernet). To obtain the personal network identification (UW NetID), that provides access to these resources, see [www.washington.edu/computing/uwnetid/](http://www.washington.edu/computing/uwnetid/).

The University's largest drop-in labs are operated by UWired. These labs are more than just a place to check email and do word processing—they are information commons, co-located with other services to provide students with a rich set of resources required to enhance learning. The labs offer PC and Macintosh computers connected to the campus network, free workshops, student consultation, and computers with special adaptive equipment to assist people with motor, visual, hearing, or learning impairments. For hours, locations, and additional information please see [www.washington.edu/uwired/](http://www.washington.edu/uwired/).

UWired also operates the university's Center for Teaching, Learning and Technology, providing free assistance, workshops and one-on-one faculty consultation. The UWired Center is equipped with a variety of hardware and software to allow faculty to experiment with different technology options and receive assistance in using them effectively. In addition, resources are available for a small fee in the Locke Visualization Lab (located in the Health Sciences Center) to help faculty, staff, and students doing research to make visual representations of their work for scientific presentations, publications, teaching tools, or Web pages.

The UWired Center is also home to the development efforts behind Catalyst, a project to support innovation in teaching via the Web. Catalyst provides educators with the resources, ideas, tools, and information needed to make use of the Web in education and functions as a campus clearinghouse for new approaches to educational technology.

C&C provides other computing-associated services, such as telecommunications, UWTV cable channel 27, video production and videoconferencing, microcomputer and workstation support, training, administrative systems support, individual consulting, publications, and online documentation. For details about the computing resources available on campus through C&C (including how to get started and take advantage of low-cost training), see the Computing and Networking Web page. Other questions can be answered by sending email to [help@cac.washington.edu](mailto:help@cac.washington.edu) or calling C&C Information, (206) 543-5970.

### Ethnic Cultural Center and Theatre

The Ethnic Cultural Center and Theatre complex is a facility for student-organized events and activities. Twenty-two of the University's student organizations use the ECC/TC as their center of activity. The staff of the center offers students opportunities for the development of cultural, social, and student-government programs. The Ethnic Cultural Center/Theatre complex also maintains an outstanding theatre facility which provides opportunities for students interested in participating in or creating on-stage productions, symposia, and other events.

### Office of Educational Assessment



[www.washington.edu/oea/](http://www.washington.edu/oea/)

Testing and educational evaluative services for University departments and individual students are available at the Office of Educational Assessment. Of particular interest to prospective and entering students are the office's programs for admissions testing, including the Scholastic Assessment Test (SAT), and for placement testing in mathematics and foreign languages. Also, the Office administers a variety of tests for international students and others for whom English is not their native language. These tests are used for admission and English as a Second Language (ESL) placement or waiver. For the University student approaching graduation, the Office administers tests required for admission to graduate, law, medical, and other professional schools, as well as those tests often requested by prospective governmental or private employers. The Office is located at 453 Schmitz Hall.

### English As A Second Language Department



[www.edoutreach.washington.edu/esl/](http://www.edoutreach.washington.edu/esl/)

The English As A Second Language Department offers a variety of courses to help students improve their English and learn more about American culture. Additional information appears in the University Extension section of this catalog.

### Hall Health Primary Care Center



[depts.washington.edu/hhpccweb](http://depts.washington.edu/hhpccweb)

The University provides outpatient health and medical care for students, faculty, staff, and their families, and others through the Hall Health Primary Care Center. Located on campus, the Center is staffed by physicians and nurse practitioners affiliated with the UW Physicians group (UWP) and is accredited by the Accreditation Association for Ambulatory Health Care.

Services include immunizations, acute care, diagnosis and treatment of illness or injury, employee health, and health education.

The following specialties are represented: internal medicine, family practice, adolescent medicine, pediatrics and prenatal services, dermatology, allergy, minor out-patient surgery, family planning, gynecology, sports medicine, physical therapy, mental health, nutrition services, and travel medicine. Common conditions in other specialties also may be treated. The Health Education staff offer a variety of health-promotion services including providing learning resources, assistance with self-care, and educational programs.

All regularly enrolled UW students are eligible for health service

Dependents of students, faculty, and staff, and others are welcome at Hall Health Primary Care Center and are eligible for care on a fee-for-service basis.

Hall Health Primary Care Center physicians and other clinical providers participate in many managed-care plans and preferred provider organizations, including the Basic Health Plan, Healthy Options, and First Choice.

Student health insurance, available through the UW, *should not be confused* with services through Hall Health Center. A student may use Hall Health Center services without having student insurance. Occasionally, injuries and illnesses occur which may require extensive diagnostic lab tests, x-rays, medications, and

treatment in an emergency room, off-campus clinic, or hospital, and which may involve surgery, rehabilitation, or prolonged therapy. The student should protect himself or herself against such major medical expenses by obtaining student health insurance (if not covered by family health insurance or other health plans). This low-cost medical-surgical-hospital policy, designed to meet those specific needs, may be purchased at the time of registration.

Hall Health Primary Care Center is open five days a week, Monday through Friday, 8 a.m. to 5 p.m., except Tuesdays, when the clinics open at 9 a.m. Selected clinics may offer appointments before or after the usual hours.

Additional information may be obtained from Hall Health Primary Care Center, Box 354410, University of Washington, Seattle, WA 98195, (206) 685-1011, or from the Hall Health Web page ([depts.washington.edu/hhpcweb/](http://depts.washington.edu/hhpcweb/)).

## Henry Art Gallery



[www.henryart.org](http://www.henryart.org)

The Henry Art Gallery, the art museum of the University, brings to the campus and the community nationally noted special exhibitions of contemporary and historical work in all media. Its offerings include exhibitions, lectures, symposia, and an active publishing program. The University's permanent collection includes a large research collection of ethnic textiles and Western dress as well as a small but distinguished collection of European and American paintings, prints, drawings, photographs, and contemporary American ceramics and Japanese folk pottery.

The Henry completed a major expansion project in April 1997 that quadrupled the size of the museum. Renovation and expansion design was by internationally acclaimed architect Charles Gwathmey and resulted in increased access to exhibitions and collections for students, classes, and researchers.

The Henry Gallery Association offers membership to students, faculty members, and the community for the purpose of supporting the museum's programs. UW students are admitted free at all times. For details, please call the Henry at (206) 543-2281.

## Intercollegiate Athletics



[www.gohuskies.com](http://www.gohuskies.com)

The Department of Intercollegiate Athletics operates an integrated program for men and women. Intercollegiate competition is limited to full-time students.

There are twelve women's teams: cross-country, soccer, volleyball, gymnastics, basketball, swimming, indoor track, tennis, golf, softball, outdoor track and field, and crew. Women's competition is in the ten-team Pacific-10 Conference (Pac-10).

Eleven sports are offered for men's competition: baseball, basketball, crew, cross-country, football, golf, soccer, swimming, tennis, indoor track, and outdoor track and field. Men's teams compete on a full Pacific-10 Conference schedule, as well as with other institutions locally, regionally, and nationally. The University is a member of the National Collegiate Athletic Association.

Facilities available to intercollegiate athletic teams are Hec Edmundson Pavilion, Pavilion Addition, Husky Stadium, Husky Baseball Field, Husky Softball Field, Conibear Shellhouse and other crew facilities on Lake Washington at the eastern boundary of the campus, the Lloyd Nordstrom Tennis Center, Husky Soccer Field, and the Washington National golf course in Auburn.

## Office of International Programs and Exchanges



[depts.washington.edu/ipe/](http://depts.washington.edu/ipe/)

The Office of International Programs and Exchanges (IP&E) administers and cooperates in more than 80 international-study programs in Latin America, Europe, the Middle East, Africa, and Asia. Qualified undergraduate and graduate students are enrolled concurrently at the University and abroad, earning UW credit and maintaining residency and financial aid eligibility. Quarter, semester, and academic-year programs are offered. Opportunities for study include language and liberal arts courses, advanced language programs requiring two to three years of college-level language preparation, and specialized professional programs. The University also has more than 100 reciprocal exchange agreements with major research institutions abroad, including universities. These arrangements allow qualified UW students to enroll in regular courses at the foreign university while maintaining full UW standing.

Many overseas programs are supported by scholarships from private endowments. Additional scholarship support is available to undergraduate students and special consideration is given to underrepresented groups of students.

Program information and counseling are available from the Office of International Programs and Exchanges, 516 Schmitz Hall, Box 355815; (206) 543-9272; [ipe@u.washington.edu](mailto:ipe@u.washington.edu).

## Language Learning Center



[www.llc.washington.edu](http://www.llc.washington.edu)

The Language Learning Center (LLC), located in the daylight basement of Denny Hall, provides support and services to the university community for the teaching, learning, and researching of languages and cultures. Available services include audio-cassette listening/recording facilities; duplication of audio cassettes onto user cassettes; sale of pre-recorded audio cassettes; facilities for viewing video tape, CD-ROM, laserdisc, DVD, and satellite materials; and access to foreign telecasts via satellite. The LLC has a recording studio, international analogue video conversion equipment, and analogue to digital audio/video conversion equipment. The LLC also has several electronic classrooms equipped with audio, video, and cable television equipment. Instructors can reserve the electronic classrooms for speaking/listening practice, viewing of foreign video tapes and satellite programming, and informal conversation practice. Computer-Assisted Language Learning (CALL), digital multimedia, multi-lingual word processing, overhead computer projection, and Internet communications are available in the LLC computing lab. The LLC is expanding its service of providing online access to world language media.

## University Libraries



[www.lib.washington.edu](http://www.lib.washington.edu)

The University Libraries, with nearly six million volumes, consists of the Suzzallo and Allen Libraries, Odegaard Undergraduate Library, the Health Sciences Library and Information Center, East Asia Library, 15 branch libraries, and the UW Bothell and UW Tacoma Libraries. The University Libraries maintains nationally ranked collections in fisheries, forestry, East Asian languages and literature, Scandinavian studies, and Slavic and South Asian area studies. In addition to books and periodicals, the Libraries' holdings include archival materials and manuscripts, maps, newspapers, microforms, research reports, media materials, CD-ROMs, government publications, photographs, and architectural drawings.

The Libraries Information Gateway provides access, through a single World Wide Web location, to all the Libraries resources, print and electronic, as well as tools, services, and the ability to search a wide range of Internet resources. The Information Gateway is available in all UW Libraries, as well as through the Web at [www.lib.washington.edu](http://www.lib.washington.edu).

The UW Libraries Catalog provides bibliographic information, location, and circulation status for cataloged holdings of the Libraries, including branch libraries. The Libraries provides electronic access to a large and growing number of bibliographic databases, full-text resources, electronic journals, current news and information sources, government information, digital image collections, and environmental and statistical data sets such as those used in Geographic Information Systems (GIS).

The Suzzallo and Allen Libraries, a combined facility, house the major social sciences and humanities collections. The Suzzallo Library serves as the central acquisitions and processing unit of the campus libraries system and contains the interlibrary borrowing service, fee-based document delivery service (Library Express), fee-based research service (Research Express), and the public-service divisions of Government Publications, Map Collections, Microform and Newspaper Collections, Reference and Research Services, Periodicals, and International Studies (Near East, Slavic and Eastern Europe, South Asia, and Southeast Asia). Reference and research assistance is available during most library hours. The Allen Library houses the Natural Sciences Library, and Manuscripts, Special Collections, University Archives, which includes the Pacific Northwest Collection. The University Libraries' administrative offices are located also in Allen.

The Odegaard Undergraduate Library (OUGL) supports undergraduate teaching and learning through an extensive collection of books, periodicals, and media; collaborative learning spaces; specialized reference services; and general-access computing. The collection is interdisciplinary, with an emphasis on materials in the social sciences and the humanities. OUGL is the primary reserve unit for non-health-sciences classes. Media services and materials for course-related usage are provided in the University Libraries Media Center in OUGL. The UWired Commons is a 356-seat general-access computing facility in OUGL. OUGL librarians also offer classes on how to use the library, including computerized indexes and search strategies for term papers.

The Health Sciences Libraries (HSL) house the largest and most comprehensive collection of health-sciences materials in the Pacific Northwest at three locations: Health Sciences Library and Information Center, located in the Health Sciences Center; the Social Work library, located in the School of Social Work; and the K.K. Sherwood Library at Harborview Medical Center. HSL supports education, research, and patient care in the fields of dentistry, medicine, nursing, pharmacy, public health, and social work, as well as in the related behavioral, biological, and quantitative sciences. In addition to a print collection of 350,000 volumes, the libraries offer access to a wide range of non-print resources and provide extensive user services, including curriculum-based instructional support; interlibrary loan

services for health-sciences personnel, and document delivery services for affiliates and non-affiliates. HSL serves as headquarters for the National Network of Libraries of Medicine/Pacific Northwest Region (NN/LM PNR), with responsibility for promoting access to biomedical information resources in Alaska, Idaho, Montana, Oregon, and Washington. In partnership with the Health Sciences Center, HSL houses the Integrated Advanced Information Management System Program, the Research Funding Service, the Primate Information Center, the Bioinformatics Consultation Service, and the Health Services MicroLab.

The East Asia Library is one of the major resource centers of its kind in the United States and is an international leader in the provision and development of electronic services for its subject areas. The collections are especially strong in anthropology, archaeology, economics, history, art, languages, literature, law, music, political science, religion, and sociology with respect to the histories and cultures of China (including Taiwan and Hong Kong), Japan, Korea, Inner Asia, and Tibet.

### University Research Facilities

 [www.washington.edu/research/](http://www.washington.edu/research/)

In addition to the campus facilities described in this section, the University has numerous educational and cultural resource centers. Academic or research activities and facilities that are of general significance in all or many fields of knowledge throughout the University are listed in the Research section of this catalog; others are described in individual school or college sections.

### University Theatres

 [ascc.artsci.washington.edu/drama/season.html](http://ascc.artsci.washington.edu/drama/season.html)

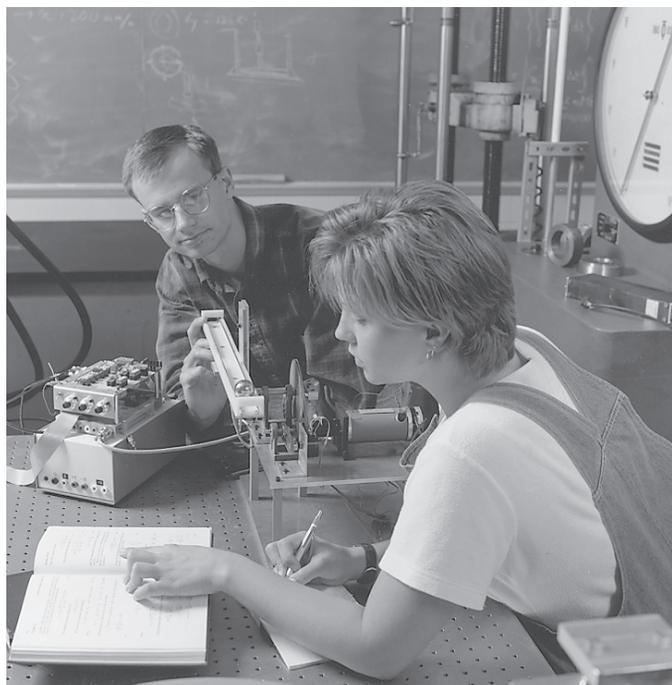
The School of Drama operates three theatres: the Playhouse, with a thrust stage; the Penthouse Theatre, the first theatre-in-the-round built in America; and Meany Studio Theatre, which seats 225. Faculty- and student-directed plays drawn from the full range of world dramatic literature are presented throughout the year.

The School also gives technical and design support to opera and dance productions of the School of Music and the Department of Dance.

### Women's Center

 [depts.washington.edu/womenctr/](http://depts.washington.edu/womenctr/)

The Women's Center, located in Imogen Cunningham Hall, promotes the advancement of women on the campus and in the community by offering a wide variety of non-credit workshops and classes including college success classes (GRE preparation courses, computer, and writing classes); career and financial classes; fitness, health, and creativity classes; the Noontime Lecture Series; and the Distinguished UW Women's Scholar Series. The Center provides services for women re-entering the University and houses a modest library with a job board and scholarship information.



## Housing and Food Service

 [www.washington.edu/hfs/](http://www.washington.edu/hfs/)

### University-Owned Housing

#### Residence Halls

The UW provides housing for about 4,500 students in seven residence halls. All are located within easy walking distance of classrooms and other campus facilities. Food service is available to residence hall students at locations throughout the campus through the use of the À La Carte Plus™ debit-card system. Students live in an environment of responsible freedom, and a residential-life staff enhances the University experience through a variety of educational, cultural, and social programs.

#### Single-Student Apartments

The University also has apartments available for single students, 20 years of age or older. Stevens Court provides four- and six-bedroom apartments that have private bedrooms, a common kitchen and living room, and bathrooms. The Commodore-Duchess Apartments have studio apartments for single students.

#### Family Housing

Convenient and economical apartment housing is available for about 450 student families.

For detailed information on housing or the Husky Card, visit the Housing and Food Services (HFS) Web site (above); email HFS at [hfsinfo@u.washington.edu](mailto:hfsinfo@u.washington.edu); write to the Student Services Office, Box 355842, Seattle, WA 98195-5842; or call (206) 543-4059.

#### Food Service

University Food Services operates dining facilities throughout the campus. The diverse schedules and dietary preferences of the campus community are accommodated by providing full meal service, à la carte menu items, and catering services, as well as convenient hours of operation.

Food may be purchased through the Husky Card program at all University Food Services facilities and two on-campus convenience stores. This program, available to the entire campus community, offers prepaid meal service through use of a debit card. The Husky Card (your UW ID card) provides the flexibility for purchase of food at many locations on campus. The card may also be used at the UW Bookstore and other UW facilities. For more information on the opening an account, call (206) 543-7222, or visit the HFS Web site at [www.washington.edu/hfs/](http://www.washington.edu/hfs/).

## Transportation and the U-PASS

 [www.washington.edu/upass/](http://www.washington.edu/upass/)

Walking and biking are the best ways to get to campus, but when you need another transportation method, use the U-PASS. The U-PASS program provides students with many benefits at a highly discounted price. With a U-PASS sticker, you get free rides on all regular Metro, Community Transit and Sound Transit routes throughout the region, free trips on the Night Ride shuttle, free parking when you drive with other U-PASS holders, discounted vanpool fares and discounts at many local merchants. In addition, the U-PASS funds bicycle improvements, including more secure racks and lockers. The U-PASS sticker is sent with registration confirmation materials before each quarter.

Having a U-PASS provides many alternatives, but some parking is available for those students that must drive. Two U-PASS holders in a car get free parking in the E1 lot (near the stadium) when they arrive between 7:00 and 10:00 a.m., and three U-PASS holders get free parking on the main campus. Other student parking is available for a daily fee in the E1 lot, which fills up quickly. A few parking permits are available from Parking Services to commuter students on a first-come, first-served basis the first day of each quarter.

For more information, visit the U-PASS Web site at [www.washington.edu/upass/](http://www.washington.edu/upass/) or contact the Transportation Office at [upass@u.washington.edu](mailto:upass@u.washington.edu) or (206) 543-0450.

# Student Services

## Office of the Vice President for Student Affairs

The Division of Student Affairs assists the University in fulfilling its academic mission by providing a broad range of services and programs designed to further the educational and personal development of students. The Division consists of ten units: Admissions and Records, Center for Career Services, Student Counseling Center, Disabled Student Services, Housing and Food Services, Recreational Sports Programs, Student Financial Aid, Student Publications, and Student Activities and Union Facilities.

Students are encouraged to contact the Office of the Vice President for Student Affairs, (206) 543-4972, 476 Schmitz Hall, for information concerning various aspects of extra-class life at the University.

### Center for Career Services

 [depts.washington.edu/careers/](http://depts.washington.edu/careers/)

The University's Center for Career Services, which includes a Minority Job Placement Program, offers career information and services to assist undergraduates, graduate students, and alumni (1) to make a viable connection between their academic backgrounds and their career or long-range employment objectives, (2) to develop effective job-seeking strategies, and (3) to find suitable employment upon leaving the University or to change employment thereafter.

A variety of programs are offered and include individual and group career counseling, career options and job-search seminars, online job listings, career-related internships, an career fairs, credential files, employer and alumni career panels, mock interviews, a résumé database, campus interviews, employer information, and student-employment listings. Students may also send questions to [ccscnslr@u.washington.edu](mailto:ccscnslr@u.washington.edu).

Students are encouraged to begin using the services of the Center early in their academic careers. This is best accomplished by visiting the Center at 134 Mary Gates Hall or calling (206) 543-0535 to make an appointment with a career counselor. The Center also maintains a Web site at [depts.washington.edu/careers/](http://depts.washington.edu/careers/).

### Childcare Program

 [www.washington.edu/students/ovpsa/cc/](http://www.washington.edu/students/ovpsa/cc/)

The Childcare Program provides eligible student-parents with direct financial assistance to purchase services at licensed childcare facilities in the Seattle-King County area. To apply, students must submit the Free Application for Federal Student Aid (FAFSA) to the designated processor by the end of February each year and a Childcare Request Application to the Childcare Office, 482 Schmitz Hall, before the end of May each year. Brochures describing the program are available at the Childcare Office, (206) 543-1041.

### Student Counseling Center

 [depts.washington.edu/scc/](http://depts.washington.edu/scc/)

All matriculated students at the University may make use of the services of the Student Counseling Center and its staff of psychologists and counselors to discuss educational progress, personal concerns, or career goals. Individual, couples, and group counseling is provided for a variety of issues including academic, career, personal, and social issues. Psychological tests, when necessary, are provided as part of the Center's counseling service. Workshops on special topics such as test anxiety, time management, test taking, note taking, and stress management are available. There is a small fee for services.

There is a \$10.00 fee for the first assessment appointment, which is provided to determine if the Student Counseling Center's services are appropriate. Treatment for substance abuse and long-term therapy is not provided. Individual appointments after the first visit currently cost \$26 each. Fees for participation in the group program range from \$60 to \$80. For students financially unable to pay the fee, efforts are made to find other options. The Center is located on the fourth floor of Schmitz Hall, (206) 543-1240. Additional information may be found at the Center's Web site.

### Disabled Student Services

The University is committed to ensuring facility and program access to students with either permanent or temporary disabilities through a variety of services and equipment. The Disabled Student Services (DSS) Office coordinates academic accommodations for enrolled students with documented disabilities. Accommodations are determined on a case-by-case basis and may include classroom relocation, sign language interpreters, recorded course materials, note taking, and priority registration. DSS also provides needs assessment, mediation, referrals, and advocacy as necessary and appropriate. Requests for accommodations or services must be arranged in advance and require documentation of the disability, verifying the need for such accommodation or service.

Technical and adaptive equipment is available through both DSS and Computing and Communications. Information about adaptive-technology computer software and equipment and their locations on campus may be obtained from DSS. Publications include *Access Guide for Persons with Disabilities*, (showing classroom access, elevator locations, ramps, parking, and restrooms), and the *Campus Mobility Route Map*, as well as other publications.

To the maximum extent possible, students with disabilities are integrated into the general student population and their problems are solved through the usual channels. Various other departments offer additional services: the Transportation Department provides free on-campus transportation with wheelchair lifts for students with mobility limitations through Dial-a-Ride, (206) 685-1511, and UW Night Ride, (206) 799-4151 after 6 p.m.

Additional information is available from Disabled Student Services, 448 Schmitz, Box 355839, (206) 543-8924 (Voice), (206) 543-8925 (TTY), [uwds@u.washington.edu](mailto:uwds@u.washington.edu).

### Student Health Insurance Program

 [www.washington.edu/students/ovpsa/insurance.html](http://www.washington.edu/students/ovpsa/insurance.html)

An accident and sickness insurance plan is available to matriculated University students (Seattle campus) and dependents on a voluntary basis. A student may enroll in the plan at the time of registration through the seventh calendar day of each quarter. The appropriate premium is paid by the quarterly tuition due date. Brochures describing the insurance eligibility, coverage, and costs are available at the Student Insurance Office, 469 Schmitz Hall, (206) 543-6202; Hall Health Primary Care Center; and the HUB.

The University also sponsors a field-trip accident insurance plan. Application forms may be requested from the Risk Management Office, 22 Gerberding Hall, Box 351276, (206) 543-3419.



## Insurance for Foreign Students

All students from foreign countries are required to have a health-and-accident insurance policy in force while registered at the University. This may be achieved by purchasing either the student accident and sickness insurance offered through the University or other coverage, proof of which must be furnished to the International Services Office and for which an insurance waiver must be obtained. To avoid cancellation of registration, international students must pay tuition and either pay for the University-sponsored insurance or have a waiver on file by the tuition due date.

## International Services Office



[www.washington.edu/students/gencaf/front/International.html](http://www.washington.edu/students/gencaf/front/International.html)

The International Services Office provides assistance to international students, scholars, and faculty in meeting United States Immigration and Naturalization Service regulations dealing with such matters as maintaining lawful status, extensions of stay, transfers of schools/programs, and working authorizations. The Office also provides a formal orientation to the campus and community for new international students and visiting faculty; advice and counsel for educational, financial, and personal problems; and dissemination of important and timely information through newsletters and workshops. The Office is located in 459 Schmitz Hall, (206) 543-0841.

## Office of Special Services

The Office of Special Services, 460 Schmitz Hall, assists students eligible for veterans' educational benefits, advises and monitors students who must meet English As A Second Language requirements, and administers certain tuition-reduction programs (see Procedures and Fees section).

## Office of Student Financial Aid

The Office of Student Financial Aid, 105 Schmitz Hall, administers federal, state, and private financial aid programs designed to help students pay for their education. Assistance is offered in the form of grant aid, scholarships, long-term loans that must be repaid after leaving school, and work opportunities. An information packet describing the different programs, eligibility criteria, and application procedures may be obtained by calling (206) 685-9535.

There is a limited amount of grant aid for graduate students and assistance is generally limited to long-term loans and work opportunities. Information on graduate fellowships, scholarships, and teaching and research assistantships may be obtained from the graduate program coordinator in the individual department or program (see the Graduate School section of this catalog).

To be eligible for financial aid, an individual must be a citizen or permanent resident of the United States and be admitted to the University as a matriculated, degree-seeking student. Priority consideration is given to students who apply before the University's financial aid application deadline of February 28 (e.g., February 28, 2000, for the academic year beginning in September 2000).

The Office of Student Financial Aid also administers a short-term loan program for full-time students who find themselves in temporary financial difficulty. University students may take advantage of the short-term loan program without applying for financial aid.

## Student Legal Services



[www.washington.edu/students/handbook/legal.html](http://www.washington.edu/students/handbook/legal.html)

Student Legal Services provides legal advice, counseling, negotiating, and court representation in many legal matters. All currently enrolled undergraduate and graduate students are eligible for a free initial consultation. If additional services are needed, there is an hourly charge of \$10, plus a minimal supply fee and court costs, if any. The Office is staffed by third-year law students supervised by licensed attorneys. Students may call (206) 543-6486 or visit the Office, 31 Brooklyn Building, Box 354563, 4045 Brooklyn Avenue NE, to make an appointment or to learn more about the Office's services.

## Student Publications



[www.washington.edu/students/studentdir.html](http://www.washington.edu/students/studentdir.html)  
[www.thedaily.washington.edu](http://www.thedaily.washington.edu)

Student publications at the University include *The Daily* and the *Student Directory*. *The Daily* is published Monday-Friday throughout the academic year and is distributed in the mornings on campus without charge. During summer quarter, *The Daily* is published once a week. Any student with an interest in journalism may serve on *The Daily* staff.

## Student Union Facilities



[depts.washington.edu/sauf/](http://depts.washington.edu/sauf/)

The Husky Union Building (Student Union Building) and the South Campus Center are the principal centers of student activities and programs on the campus.

## Husky Union Building

The Husky Union Building (HUB), located in the center of campus, houses a variety of facilities and services for students, and faculty and staff members. These include lounges, a 478-seat auditorium, a multipurpose ballroom, a barber and hair-styling shop, a branch of the University Book Store, several retail food operations, a study/music lounge with email access, a lost-and-found office, a ticket sales office, a newsstand, a self-service post office, a limited-service bank, three cash machines, a number of student-organization offices, and a games area which includes a twelve-lane bowling center. Meeting rooms accommodating from 10 to 175 persons are available for registered student organizations.

## South Campus Center

The South Campus Center, located on the shore of Portage Bay, serves as the central meeting place for students and faculty on the southern end of campus. Facilities and services similar to those in the HUB are available and include meeting and conference rooms, display cases, a hair-styling shop, amusement games, a cash machine, a branch of the University Book Store, a newsstand, and lounges with beautiful views of Portage Bay.

## Student Activities and Organizations

### Student Activities Office

The services provided by the Student Activities Office (SAO) include assisting student organizations in understanding University policies and procedures, providing technical help in the planning and conduct of student events, and furnishing information and assistance in order that they may represent themselves and their interests in an effective manner. Advisers are available to assist students involved in group activities with budget and program planning, advertising, orientation to campus resources, and leadership and organizational skill development. Underlying the SAO service functions is a desire to provide an environment in which students can learn from their experiences in extracurricular activities as a supplement to their classroom experiences. Additional information about the services is available from the Student Activities Office, 207 HUB, (206) 543-2380.

### Student Organizations



[depts.washington.edu/sao/](http://depts.washington.edu/sao/)

Students at the University are encouraged to become active in at least one of the campus's approximately 400 voluntary student organizations, which include honorary, professional, and social organizations; service clubs; activity groups; and religious and fraternal organizations. Voluntary student organizations that register with the University receive various benefits and services to assist their respective activities. Additional information is available from the Student Activities Office, 207 HUB, (206) 543-2380.

### Associated Students of the University of Washington



[depts.washington.edu/asuwweb/](http://depts.washington.edu/asuwweb/)

The Associated Students of the University of Washington (ASUW) is a voluntary, nonprofit association of students designated by the University Board of Regents to carry out a variety of student activities and to represent student interests. In order to vote in ASUW elections, hold ASUW office, or be employed by the ASUW, a student must be a member of the ASUW. Membership is open to all students by providing an affirmative answer on the University registration form each quarter.

The ASUW has an annual budget of approximately \$1 million, supported by the services and activities fee paid as part of tuition and from program revenue. The government of the ASUW is headed by an eleven-member board of control elected by the student body each year, and one representative from the Graduate and Professional Student Senate. The ASUW maintains agencies and service groups to provide students with a varied program of activities during the school year and nominates students for service on a number of University committees. ASUW services include lecture notes, a poster printing service, the Experimental College, a bicycle repair shop, and an ongoing film and entertainment series. Questions regarding the ASUW and its services should be directed to either the ASUW Office, 204L HUB, (206) 543-1780, or the Student Activities Office, 207 HUB, (206) 543-2380.

## Graduate and Professional Student Senate

 [depts.washington.edu/gpss/](http://depts.washington.edu/gpss/)

The Graduate and Professional Student Senate (GPSS) serves primarily as an advocate for the academic welfare of graduate and professional students. It is composed of representatives elected from each graduate and professional degree-granting unit. Funded from student services and activities fees, GPSS dedicates a portion of its budget each year to direct allocations for departmental student groups and for special programs benefiting students from many departments. GPSS publishes informational bulletins, monitors legislative issues of impact to graduate students, maintains graduate student representation on University administrative committees, assists with personal or academic grievances and, in general, seeks to represent graduate student issues and concerns within the University community. Questions regarding the GPSS should be directed to the GPSS Office, 300 HUB, (206) 543-8576.

## Recreational Sports

 [depts.washington.edu/ima/](http://depts.washington.edu/ima/)

The Department of Recreational Sports Programs provides a comprehensive program of over sports and fitness activities designed to meet the diverse needs and interests of students. To provide this service, the department manages recreation facilities that include the Intramural Activities Building (IMA), Golf Driving Range, Waterfront Activities Center (canoe rentals), outdoor facilities (Denny Field and tennis courts), Hutchinson Hall swimming pool and locker rooms, and the practice Climbing Rock. Programs and facilities are open to students with a valid student identification card (Husky card).

For additional information call the telephone numbers listed below, or visit the Recreational Sports Web site at [depts.washington.edu/ima/](http://depts.washington.edu/ima/).

**Intramural Activities Building:** The IMA is located north of Husky Stadium and south of parking lot E1. The IMA includes activity space for basketball, volleyball, badminton, swimming, squash, racquetball, handball, martial arts, aerobics, archery, and roller skating. The IMA has a fitness center with free weights, weight machines, and cardiovascular machines. Located near the IMA are 16 tennis courts (six are night lighted), and three multipurpose sports fields for flag football, softball, soccer, rugby, lacrosse, ultimate, and other outdoor activities. For more information, contact the IMA at (206) 543-4590 or [ima@u.washington.edu](mailto:ima@u.washington.edu).

The **fitness center** is equipped with 17 climbers, 24 treadmills, 12 recumbent cycles, 12 stationary cycles, 17 cross trainers, six ergometers, 62 single-station weight machines, 24 strength benches, and one step mill.

**Sports Skills Instruction:** Recreational Sports offers non-credit classes in aikido, aerobics, step aerobics, hydro-aerobics, deep-water fitness, body conditioning, fencing, first aid and CPR, golf, judo, karate, kung fu, racquetball, rock climbing, scuba diving, ski conditioning, snow skiing/snowboarding (indoor), squash, swimming, tae kwon do, tai chi, tennis, volleyball, and weight training. For more information, call Sports Skills Instruction at (206) 543-2571.

**Club Sports:** Recreational Sports offers club sports, including aikido, archery, climbing, cycling, fencing, ice hockey, judo, karate, kayaking, kendo, kung fu, lacrosse, rowing, rugby, sailing, scuba diving, snow skiing, soccer, tae kwon do, ultimate Frisbee, volleyball, water polo, and water skiing. For more information, contact Club Sports at (206) 543-9499.

**Intramural Sports** are offered for men, women, and men and women combined in a variety of activities, including basketball, bowling, crew, flag football, inner-tube basketball, soccer, softball, swimming, tennis, track and field, ultimate Frisbee, and volleyball, as well as special events. For more information, call Intramural Sports at (206) 543-8558.

The **Golf Driving Range** is located at the foot of the 45th Street viaduct and is the center for all golf activities on campus. The facilities include 43 hitting tees, and two putting and chipping greens, and are open seven days a week. Group lessons are available for beginning players. For more information, contact the Golf Driving Range at (206) 543-8759 or [seagren@u.washington.edu](mailto:seagren@u.washington.edu).

Waterfront Activities Center (WAC): The campus center for water sports (e.g., canoe rentals, sailing, kayaking, rowing) is located at the WAC southeast of Husky Stadium. The WAC offers locker rooms with saunas, private boat storage for non-motorized craft, and group rental of the lounge and meeting rooms. The facility is open from 10 a.m. to dusk, seven days a week. For more information, contact the WAC at (206) 543-9433 or [h2o@u.washington.edu](mailto:h2o@u.washington.edu).

## Student Rights and Responsibilities

### Student Conduct Code

 [www.washington.edu/students/handbook/conduct.html](http://www.washington.edu/students/handbook/conduct.html)

The University Board of Regents has adopted a *Student Conduct Code*, which applies to both academic and nonacademic conduct for students while in attendance at the University. The *Code* specifies standards of conduct, jurisdiction for hearing disciplinary matters, and due process. Interested students may obtain copies through either their advisers or the Office of the Vice President for Student Affairs, 476 Schmitz Hall.

### Computer Use Policy

 [www.washington.edu/computing/rules.html](http://www.washington.edu/computing/rules.html)

All faculty, staff, and students who use any computer at the University are responsible for using computer resources in an ethical and legal manner. For example, it is not appropriate to share computer accounts or use them for commercial purposes, to send unwanted email, or to distribute copyrighted software, music, or images. Those who do not follow the rules could lose their UW computing privileges. For detailed information see the Web, or contact Computing and Communications Information at (206) 543-5970.

### University Policy on Student Education Records

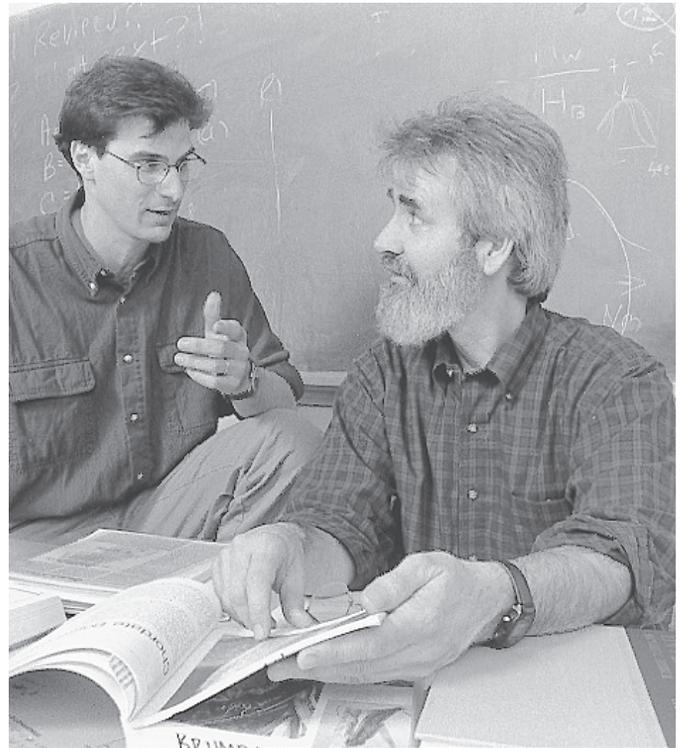
 [www.washington.edu/students/reg/ferpa.html](http://www.washington.edu/students/reg/ferpa.html)

A copy of the University's policy on a student's right to inspect his or her education records and the University's responsibility to maintain the confidentiality of such records is located at each departmental reference station. The policy is filed under the Washington Administrative Code 478-140-010. Copies of the policy are available at the Registration Office, 225 Schmitz.

### Sexual Harassment Complaint Procedure

 [www.washington.edu/students/handbook/harrass.html](http://www.washington.edu/students/handbook/harrass.html)

Students, staff, faculty, and other users of University services who have a concern or complaint regarding sexual harassment may contact either the Ombudsman for Sexual Harassment, (206) 543-0283, or the University Complaint Investigation and Resolution Office, (206) 616-2028. Personnel in these offices provide assistance in resolving concerns and complaints. Also, University staff may contact their human resources representative about sexual harassment concerns.



**Vice Provost for Research**

Alvin L. Kwiram

**Assistant Vice Provost for Research**

Malcolm R. Parks

**Director, Grant and Contract Services**

Carol A. Zuiches

**Associate Vice Provost for Research and Director,  
Office of Technology Transfer**

Robert C. Miller

[www.washington.edu/research/](http://www.washington.edu/research/)

The Office of Research provides a range of services in support of scholarly and scientific inquiry at the University of Washington. The Vice Provost for Research works with faculty to establish appropriate research policies, develop research-related initiatives, increase resources available for research, and guarantee that the successes of faculty and the public benefits of research programs are widely known and understood. The Office of Research cooperates with the Graduate School and other units within the University that depend on or are affected by the research and graduate education activities of UW faculty. The Office of Research also serves as a point of contact with the public and private sectors on issues relating to research, including the solicitation of corporate research support, the transfer of research discoveries, and the promotion of economic development. The two main service organizations within the Office of Research are the Office of Grant and Contract Services and the Office of Technology Transfer.

The Office of Grant and Contract Services (GCS) reviews and approves all proposals to outside agencies for support of UW research. The Director of GCS is responsible for negotiating the terms and conditions for grants and contracts in consultation with the principal investigator and appropriate UW administrators. All grant and contract awards received by the University are communicated to GCS, which maintains a historical record of grant activity. GCS is also responsible, through its Human Subjects Division, for managing the human subjects review process at the University in cooperation with University's Human Subjects Review Committees.

The Office of Technology Transfer (OTT) works with UW faculty, staff, and students to identify commercially viable research discoveries. OTT seeks legal protection for inventions through patenting and other means, and negotiates contracts with companies interested in developing UW intellectual property. The revenues derived from OTT's activities are channeled back to the inventors, the UW units where the discovery originated, the Graduate School Fund, and the centrally administered Royalty Research Fund which supports UW research on a campus-wide basis.

**Funding for UW Research**

External Support for Research and Training is fundamental to the UW's established role as one of the nation's leading research institutions. During fiscal year 1999, the University received roughly \$600 million in grant and contract support for a wide array of research and training programs. Since the late 1960s, the University has ranked among the top five institutions in the United States in the receipt of federal research awards. About 80 percent of the University's grant and contract funds comes from federal agencies, most of the remainder coming from foundations, industry, and other private sources. These funds are awarded in response to faculty-initiated, University-approved proposals for funds to support specific projects in accord with the University's research, education, and public-service goals. Grant and contract funding, which is received in addition to legislative appropriations for the basic operation of the University, funds about 5,900 full- and part-time employees and provides significant opportunities for students who work with faculty members in the conduct of research as a vital component of their education.

In addition to federal research funding, corporations provide an increasing amount of funding for research. Last year, the UW received more than \$57 million in corporate research awards. This activity is expected to grow as University-industry collaborations continue to expand. Private gifts to the University total more than \$103 million per year and also add significantly to the opportunities of students and faculty to pursue research interests.

Internal Support for Research at the UW is based in part on the principle of directing revenue that arises from UW research discoveries back into the University's research enterprises. The Office of Research administers the Royalty Research Fund (RRF), which is derived from the UW's central share of royalty and licensing income negotiated by OTT and the Washington Research Foundation

with companies that commercialize University technologies. The goal of the RRF is to stimulate additional scholarly initiatives, to encourage faculty to explore new directions in research and scholarship, and to improve the environment for intellectual endeavors at the University. Proposals must demonstrate a high probability of generating important new scholarly materials or resources, significant data or information, or essential instrumentation resources that are likely to lead to external funding or that might lead to a new technology. The RRF guidelines, procedures, and application forms are available from the Office of Research.

**Special Facilities**

In support of scholarship, research activities, and regular academic offerings, the University maintains a wide range of special facilities that provide unique educational opportunities. The following list is illustrative of the range and diversity of special facilities at the UW.

**Academic Computer Center**

Provides instructional and research computing services for the University.

**Applied Physics Laboratory**

A research and development organization within the College of Ocean and Fishery Sciences, APL is one of four university research centers in the United States affiliated with the U.S. Navy. APL conducts a program of fundamental research, technology development, engineering, and education, emphasizing naval applications of ocean and polar science, acoustics, and engineering. APL has a \$30 million annual research and development budget and employs approximately 270 staff members, including 147 scientists and engineers (33 with faculty appointments) who conduct research for the Navy, NSF, NASA, NOAA, ARPA, and other federal agencies and who participate in partnerships with private companies.

**Burke Memorial Washington State Museum**

An educational and cultural center whose function is to collect, preserve, research, exhibit, and interpret the natural and cultural objects of the human environment, particularly the Pacific Ocean, its islands, and mainland shores.

**Henry Art Gallery**

The art museum of the University of Washington.

**Friday Harbor Laboratories**

The Friday Harbor Laboratories facility is the principal marine-science field station of the University of Washington. Its faculty is drawn from various academic units of the University, including botany, fisheries, oceanography, and zoology, as well as visiting faculty members from many other U.S. and foreign institutions.

The Laboratories, located approximately 80 miles north of Seattle near the town of Friday Harbor on San Juan Island, offer a biological preserve of nearly 500 acres of wooded land with about two miles of shoreline. The island is one of the largest of the 172 that make up the San Juan Archipelago, located in the northwest section of the state of Washington between Vancouver Island and the United States mainland. In addition to the Friday Harbor site, the Laboratories' administration has the responsibility for overseeing biological preserves leased or owned by the University on San Juan Island (False Bay and Argyle Lagoon), Shaw Island (uplands adjacent to Point George and Parks Bay; Cedar Rock Biological Preserve), and Lopez Island (Point Colville and Iceberg Point). Goose and Deadman islands, biological preserves owned by the Nature Conservancy, are also under the stewardship of the Laboratories.

The Laboratories are located close to seawaters that range from oceanic to those highly diluted by streams, some with depths to 1,000 feet, others with bottoms varying from mud to rock, and water movements ranging from those of quiet bays and lagoons to those of swift tideways. The waters about the San Juan Archipelago abound in varied marine flora and fauna.

The Laboratories offer opportunities for independent and supervised research, as well as a varied program of instruction for graduate and undergraduate students. Throughout the year, use of the Laboratories' facilities for research in various areas of marine science is encouraged.

**Nuclear Magnetic Resonance Facility**

The UW has one of the most advanced facilities for nuclear magnetic resonance (NMR), with high-field superconductivity magnets capable of investigating biomolecules, macromolecules, and solid state samples at frequencies of 500 MHz for protons. The UW also has a state-of-the-art 750 MHz spectrometer installed at the end of 1995.

**Nuclear Physics Laboratory**

The Nuclear Physics Laboratory is one of the nation's foremost university-based nuclear research facilities. It houses a Van de Graaff accelerator and a cyclotron for research in physics, chemistry, cancer therapy, nuclear medicine, radiation biology, and related fields.

**Oceanographic Research Vessels**

These are operated for field study and research in Puget Sound and the Pacific Ocean.

**Speech and Hearing Clinic**

Serves as a center for research in speech science, speech and language pathology, and audiology, and provides services to the public.

**University of Washington Medical Center/  
Harborview Medical Center**

The University operates two major teaching hospitals: its own 450-bed University of Washington Medical Center and, under contract with King County, the 411-bed Harborview Medical Center.

**University Libraries**

With more than five million volumes, an equal number of microforms, several million items in other formats, and more than 50,000 serial titles, the University of Washington Libraries houses one of the top research collections in the country and forms a part of one of the most innovative electronic campus information networks in the world. The fully integrated, computerized UW Libraries Catalog provides bibliographic information and circulation status for the cataloged holdings of the Libraries. The UW Libraries Catalog and an increasing number of other databases (ERIC, MEDLINE, INSPEC, PsychINFO, MLA Bibliography, etc.) may be searched by author, title, subject, publisher, keyword, and various numbers, including call number, International Standard Book Number (ISBN), International Standard Serial Number (ISSN), and Superintendent of Documents Number. Publication date and date ranges are among the limit options available.

The UW Libraries Information Gateway provides access through a single World Wide Web location to all the Libraries' resources, print and electronic, as well as tools, services, and the ability to search a wide range of Internet resources. For more information, call Reference and Research Services, (206) 543-0242, or consult the Libraries' Web site ([www.lib.washington.edu](http://www.lib.washington.edu)).

The Libraries also offer an extensive array of services at each of its 22 units. The Suzzallo and Allen Libraries, the Odegaard Undergraduate Library, the Health Sciences Library and Information Center, the East Asia Library, and 15 branch libraries each provide reference services and offer instruction in the use of library resources.

**X-Ray Beamline Facility**

Located at the Advanced Photon Source of the Argonne National Laboratory in Argonne, Illinois, this facility is operated by a Pacific Northwest consortium led by the UW. It supports the investigation of the properties of x-rays and their interaction with matter. The Advanced Photon Source uses synchrotron radiation to provide the most brilliant source of x-rays currently available.

**Centers, Institutes,  
and Other Research Organizations**

More than 170 centers, institutes and other organizations operate at the UW in support of faculty research activity. In many cases, centers and institutes are created to facilitate interdisciplinary research or to coordinate research involving many participants, some from outside the UW community.

- Addictive Behaviors Research Center
- Advanced Power Technologies Center (APT)
- Aerospace & Energetics Research Program
- Alcohol and Drug Abuse Institute
- Alzheimer's Disease Research Center
- APEC Internet Collaboration Center
- APEC Study Center
- AVID Clinical Trial Center
- Behavioral Research and Therapy Clinics (BRTC)
- Biomolecular Structure Center
- Bone and Joint Center
- Canadian Studies Center
- Cardiovascular Research and Training Center
- Cascade Center for Public Service
- Cascadia Community and Environment Institute (CCEI)
- Center for Advanced Research Technology in the Arts and Humanities (CARTAH)
- Center for Advanced Study and Research on Intellectual Property (CASRIP)

- Center for AIDS and STD
- Center for AIDS Research
- Center for American Politics and Public Policy
- Center for Anxiety and Depression
- Center for Applied Microtechnology (CAM)
- Center for Child Environmental Health Risks Research
- Center for Clinical Research
- Center for Clinical Research of Epilepsy
- Center for Community Development and Real Estate
- Center for Cost and Outcomes Research (CCOR)
- Center for Design of Analog-Digital Integrated Circuits (CDADIC)
- Center for Disability Policy and Research
- Center for Ecogenetics and Environmental Health
- Center for Educational Renewal
- Center for Effective Schools
- Center for Engineering, Learning, and Teaching (CELT)
- Center for Environmental Design and Education
- Center for Health Education and Research
- Center for Health Management Research
- Center for Inherited Diseases
- Center for Instructional Development and Research
- Center for Intelligent Materials and Systems (CIMS)
- Center for International Business Education and Research (CIBER)
- Center for International Trade in Forest Products (CINTRAFOR)
- Center for Internet Studies
- Center for Labor Studies
- Center for Law, Commerce, and Technology
- Center for Medical Education Research
- Center for Multicultural Education
- Center for Nanotechnology
- Center for Process Analytical Chemistry (CPAC)
- Center for Social Science Computation and Research (CSSCR)
- Center for Streamside Studies
- Center for Studies in Demography and Ecology
- Center for Studies in Social Psychology
- Center for Sustainable Communities
- Center for the Study and Teaching of At-Risk Students (C-STARS)
- Center for the Study of Teaching and Policy
- Center for the Study of the Pacific Northwest
- Center for Urban Horticulture
- Center for Urban Water Resources Management
- Center for Vascular Biology
- Center for Videoendoscopic Surgery (CVES)
- Center for West European Studies
- Center for Women's Health Research
- Center of Excellence for Chemically-Related Illness
- Center on Human Development and Disability
- Center on Reinventing Public Education
- Child Health Research Center
- Clinical Nutrition Research Unit
- Columbia Basin Research
- Comprehensive Center for Oral Health Research
- Consortium for Risk Evaluation with Stakeholder Participation
- Core Center for Gene Therapy
- Cystic Fibrosis Center
- Dart Center for Journalism and Trauma
- deTornyay Center for Healthy Aging
- Diabetes Endocrinology Research Center
- Diagnostic Imaging Sciences Center
- East Asian Studies Center
- Electron Microscopy Consortium
- Engineering Center for Surfaces, Polymers, and Colloids
- EPA Northwest Research Center for Particulate Matter and Health
- European Union Center
- Fetal Alcohol and Drug Unit
- Field Station for Protected Area Research
- Fiscal Policy Center
- Fisheries Research Institute
- Friday Harbor Laboratories
- General Clinical Research Center
- George M. O'Brien Kidney Research Center
- George Taylor Institute
- George M. O'Brien Research Center
- Geriatric Research, Education, and Clinical Center
- Halbert Robinson Center for the Study of Capable Youth
- Harborview Center for Sexual Assault and Traumatic Stress
- Harborview Injury Prevention and Research Center
- Human Interface Technology Laboratory (HIT LAB/HITL)
- Human Services Policy Center (HSPC)
- Institute for Economic Research
- Institute for Ethnic Studies in the United States
- Institute for International Policy

## THE OFFICE OF RESEARCH

Institute for Nuclear Theory (INT)  
 Institute for Public Policy and Management  
 Institute for Risk Analysis and Risk Communication  
 Institute for the Study of Educational Policy  
 Institute on Aging  
 Intelligent Transportation Systems (ITS)  
 International Studies Center  
 Joint Institute for the Study of the Atmosphere and Ocean (JISAO)  
 Markey Center for Genetic Medicine  
 Markey Molecular Medicine Center  
 Middle East Studies Center  
 Multidisciplinary Pain Center  
 Nathan Shock Center of Excellence for the Basic Biology of Aging  
 National Alzheimer's Coordinating Center  
 National ESCA and Surface Analysis Center for Biomedical Problems  
 (NESAC/BIO)  
 National Research Center for Statistics and the Environment  
 National Simulation Resource in Circulatory Mass Transport and Exchange  
 Northwest Center for Occupational Health and Safety  
 Northwest Center for Public Health Practice  
 Northwest Center for Research on Women  
 Northwest Policy Center  
 Northwest Prevention Effectiveness Center (NWPEC)  
 Northwest Regional Spinal Cord Injury System  
 Olympic Natural Resource Center  
 OSHA Training Institute Education Center  
 Pacific Earthquake Engineering Research Center  
 Pacific Northwest Agricultural Safety and Health Center  
 Pacific Northwest Consortium-Collaborative Access Team (PNC-CAT)  
 Pacific Rim Finance Center  
 Pain Clinical Research Center  
 Pediatric Epilepsy Research Center  
 Pharmaceutical Outcomes Research and Policy Program  
 Polar Science Center  
 Poplar Molecular Genetics Cooperative  
 Population Research Center  
 Program in Drug Interactions  
 Puget Sound Blood Center and Program  
 Quaternary Research Center  
 Regional Clinical Dental Research Center  
 Regional Epilepsy Center  
 Regional Primate Research Center  
 Resource Facility for Kinetic Analysis  
 Robert Wood Johnson Clinical Scholars Program  
 Russian, East European, and Central Asian Studies Center (REECAS)  
 School Law Division  
 Science and Technology Center for Molecular Biotechnology  
 Sexually Transmitted Diseases Cooperative Research Center  
 Simpson Center for the Humanities  
 Social Work Prevention Research Center  
 South Asian Studies Center  
 Southeast Asian Studies Center  
 Specialized Center of Research (SCOR): Adult Respiratory Failure  
 Stand Management Cooperative (SMC)  
 Transportation Northwest (TransNow)  
 Treaty Research Center  
 University of Washington Engineered Biomaterials (UWEB)  
 UW Health Policy Analysis Program  
 UW Hepatitis C Cooperative Research Center  
 Virginia Merrill Bloedel Hearing Research Center  
 Volcano Systems Center  
 W. M. Keck Center for Advanced Studies in Neural Signaling  
 Warren G. Magnuson Institute for Biomedical Research and Health  
 Professions Training  
 Washington Cooperative Fish and Wildlife Research Unit  
 Washington Sea Grant Program  
 Washington State Transportation Center (TRAC)  
 Western Regional Aquaculture Center (WRAC)  
 WWAMI Rural Health Research Center

### Field Stations

Field work is an essential component of research and instructional programs in many academic disciplines, and access to appropriate field sites is vital and necessary for research universities. Detailed information about each of the University's research sites is available in *University of Washington Field Stations*, an inventory available from the Office of Research. The following list of 28 sites represents a broad spectrum of types and locations.

Apache Point Observatory, Archaeology Field School, Big Beef Creek, Blue Glacier, Cheeka Peak Atmospheric Research Station, Chignik Lake, Clifford A. Barnes Research Vessel, Energy Test Homes, Friday Harbor Laboratories, Joe E. Monahan Findlay Lake Reserve, Lake Ilamna and Porcupine Island, Lee Forest, Manastash Ridge Observatory, Olympic Natural Resources Center, Organization for Tropical Studies, Pack Forest, Regional Primate Research Center, Rome Center, Seismic Network, Seward Park Hatchery, Thomas G. Thompson Research Vessel, Thompson Research Site, Union Bay Ecological Research Area, University of Washington Aircraft Hangar, Washington Park Arboretum, Westport House, Wind River Canopy Crane Research Facility, Wood River System.

### The Impact of UW Research

Research programs at the UW benefit students, the state, and the nation. Over the last decade, these programs have produced life-saving advances in medical technology, support for key state and regional industries, research and analysis on critical public-policy issues, patented technologies, training for more than 8,000 graduate and professional students each year, as well as contributions to scholarly literature in virtually all major fields of the arts, sciences, and humanities. The following sections contain brief descriptions of a few of the many interesting research projects currently underway at the UW.

#### Earth, Ocean, and Atmospheric Sciences

UW earth scientists have a long tradition of concentrating on regional studies to learn more about the forces that continue to shape the Pacific Northwest. Recent evidence suggests that great earthquakes of magnitude 7 or 8 have occurred in the Pacific Northwest in the not-too-distant past, and are likely to recur at some time in the future. Data gathered from a network of seismic stations throughout the Pacific Northwest are permitting new faults in the region to be mapped and characterized. The first three-dimensional images of structures within the earth in this region are being generated. Lessons learned from seismic studies since the eruption of Mount St. Helens are being applied to eruptive activity around the globe, from Alaska to Mount Pinatubo in the Philippines. Additionally, extreme conditions deep inside the earth are simulated in the UW High Pressure Mineral Physics Lab in order to understand the geologic processes that shape our planet.

Underwater observing platforms have been installed to monitor volcanic activity on the sea floor more than a mile and a half below the surface of the Pacific Ocean off the coast of Washington state. These undersea volcanoes and hydrothermal vents spew out heated, mineral-laden waters that nourish exotic life forms and form rich metal deposits. The heat-loving organisms, capable of existing without light from the sun, are among the most ancient forms of life on earth.

UW scientists have long been interested in polar research, including both the Arctic and the Antarctic. The University is one of the major centers in the world for studies of ocean currents, ice formation, ice movement, and air-sea-ice interaction in these regions. UW personnel have developed unusual expertise for operating in polar regions. Through the Applied Physics Laboratory, UW investigators regularly conduct studies from bases sited on Arctic pack ice and have deployed a series of weather buoys on the ice and in Arctic waters that form part of a worldwide weather-forecasting system.

An ice core containing an unprecedented record of climate conditions in a near-coastal area of Antarctica has been obtained by scientists in the UW Quaternary Research Center. The ice sample, which goes back 140,000 years through a complete ice-age cycle, was taken at Taylor Dome, the site of major changes in glacier cover that affected sea level at the end of the last ice age.

Work by UW atmospheric scientists has established the role of sulfate aerosol in global climate change. Other studies are shedding light on past and future El Niño weather events—intervals of especially warm ocean temperature that periodically appear around December in the equatorial Pacific and that disrupt weather patterns around the globe. UW researchers have developed a theoretical understanding of the mechanisms that give rise to the El Niño phenomenon. Cores obtained from coral formations in the Pacific provide a record of past El Niño events and may lead to more accurate forecasts of these weather changes in the future.

UW atmospheric scientists pioneered the study of clouds and weather systems by flying into the heart of storms approaching the Washington coast. Now, aeronautical engineering researchers at the UW will be able to gather weather data using a fleet of unmanned airplanes. With the advent of global positioning satellite technology, these unmanned aircraft can be piloted by computer on flights of more than a thousand miles to gather data to improve the accuracy of northwest weather forecasts.

The School of Fisheries, renowned for the development of the Donaldson salmon as well as for its contributions to the High Seas Salmon Program and Alaska Salmon Program, also has made many important contributions to the development of shellfish aquaculture in Puget Sound and around the world. The triploid oyster, prized for its superior characteristics, was developed by UW fisheries researchers.

The Columbia River Salmon Passage model, or CRISP, is a computer model that relates the number of juvenile salmon that survive their journey through reservoirs and dams on the Columbia River to various parameters such as hatchery release dates, reservoir levels, and water flow rates. The model may help fishery biologists and planners understand the complex implications of river management decisions.

### Physical and Chemical Sciences

Extremely high precision measurements of atomic properties are the forte of a strong atomic physics group, which brought recognition in the form of a Nobel Prize awarded to Professor Hans Dehmelt in 1989. Later, the University won a competition sponsored by the Department of Energy for its first Nuclear Theory Institute. Since that time, a distinguished staff and an international visitor program have made the University a center for research in fundamental nuclear physics and associated problems in astrophysics and particle physics.

One of four Department of Energy-supported nuclear physics laboratories located at American universities is found at the University. This laboratory is equipped with a superconducting booster to a tandem Van de Graaff accelerator, placing the nuclear physics research facility on a par with the best in the world in its energy range. The Particle Physics Group and the Visual Techniques Laboratory are engaged internationally in research at the frontiers of knowledge relating to high-energy particles created both in the laboratory and by nature.

The University has been a leader in the development and use of XAFS, a sophisticated x-ray tool for determining the structure of materials. Physicists studying condensed matter are engaged in the development of the Advanced Photon Source, a high-energy x-ray source that will be the most intense in the world. With this source it will be possible to carry out detailed studies of topics such as the growth and structure of liquid-crystal films; the structure on an atomic scale of proteins and new, specially tailored drugs; and the structure of thin films, ranging from one atom thick to multiple-layered heterostructures with many layers of atoms.

Astronomers at the University conduct research in a wide variety of astronomical subjects, from the study of solar system bodies to the nature of the universe. The UW's Interplanetary Dust Laboratory has pioneered the discovery and study of cometary and asteroidal dust. The Stardust mission led by UW astronomer Don Brownlee will gather and return samples of interstellar dust from a comet called Wild-2 in January 2004. Stardust, which was selected by NASA as the fourth flight mission in its Discovery program, was launched on an expendable launch vehicle in February 1999. The return capsule carrying the comet dust samples will parachute to Earth in January 2006.

The University is part of a consortium that has constructed a 3.5-meter optical telescope located at Apache Point in the New Mexico mountains. An innovative design made this telescope lighter and more inexpensive to build than previously possible. One of the largest university-operated telescopes in the country, faculty and students can access it remotely from a laboratory in the new Astronomy-Physics Building on the UW campus.



UW astronomers have also used the Hubble Space Telescope to probe the secrets of stellar evolution, deriving a fresh understanding of the way that stars are born, change, and die. Scientists explore the nature of galaxies and their mysterious content of "dark matter." Other studies range from the nature of cosmic black holes to mergers and violent collisions of galaxies, and quasar phenomena.

Basic research in the chemical sciences is aided by exceptional research tools. The Department of Chemistry is collaborating with Pacific Northwest National Laboratory, Richland, Washington to construct a 1,000-megahertz nuclear magnetic resonance (NMR) spectrometer which will provide an instrument of unprecedented power for probing molecular structure. The University also has state-of-the-art equipment for studies involving magnetic resonance imaging (MRI), used by health researchers studying complex biological processes.

The Center for Process Analytical Chemistry is a joint University/industry effort to develop novel sensors and instrumentation for continuous monitoring of chemical processes used in the manufacturing and environmental settings. Projects range from fiber-optic sensors and spectrometric methods to data analysis and process-control algorithms. Research results from the Center transferred to industrial sponsors have led, for example, to a commercial, online, near-infrared spectrometer for determining quality parameters of hydrocarbon fluids.

### Engineering and Applied Sciences

A group of UW engineering researchers working in the field of biomimetics is taking its inspiration from nature in designing new materials. The group is probing the secrets of such natural substances as slug mucus, spider webs, and abalone shells in order to produce man-made materials that are stronger, lighter, less expensive, and more environmentally benign to manufacture than conventional materials.

The Washington Technology Center (WTC) is a state resource, established in 1983 with funding from the combined Department of Community and Economic Development. It was created to encourage collaborative industry-University research and development in new and emerging technologies to benefit the economic vitality of the state of Washington. Current research areas include advanced materials and manufacturing, biotechnology, computer systems and software, microelectronics, and human-interface technology. The WTC promotes faculty collaborations with industry within the state, and co-sponsors applied research at the state's research universities directed toward the needs and interests of state industries. Its statewide headquarters are located in Fluke Hall at the UW.

The Center for Bioengineering is the home of pioneering work in diagnostic ultrasound, which enables physicians to image in detail the internal features of a patient without having to perform surgery. In addition, important strides continue to be made in understanding how to design man-made materials that are compatible with the human body. Working together in the University of Washington Engineering Biomaterials (UWEB) project, a group of UW researchers hopes to develop a new generation of medical implants that mimic the biology of the body parts they replace, thus fooling the body into accepting foreign materials.

The Department of Computer Science and Engineering is known for its catalytic role in bringing tools for designing microchips to engineers and industrial firms in the Pacific Northwest, and for its pioneering work to address critical safety issues in software systems. Recently, UW researchers have been recognized for work leading to a three-dimensional photography system as well as for the development of Internet and World Wide Web searching tools called software robots ("softbots").

The tremendous flexibility and power of Geographic Information Systems are being brought to bear on a wide range of research activities across the campus. In a fusion of GIS, computer-aided design, and virtual reality, efforts are underway to link GIS capabilities with visualization tools to allow users to display and move around in a virtual three-dimensional representation of a GIS database. For example, city planners may be able to use GIS systems to navigate through a cityscape to visualize key features or to evaluate different planning options. This is the focus of the Community and Environmental Design and Simulation Laboratory at the University, a partnership between the College of Architecture and Urban Planning and the Human Interface Technology (HIT) Lab of the WTC.

In another project at the HIT Lab, researchers have developed a process to display electronic images directly on the human retina. Researchers anticipate the retina display may replace computer screens and video monitors in the future.

The University is part of the Pacific Earthquake Engineering Research Center (PEER), a \$20-million effort funded by the National Science Foundation. Its goal is to identify and mitigate potential earthquake hazards along the Pacific Coast. The UW joins eight California universities in the project. Amid mounting historical evidence that the Pacific Northwest is at risk for devastating temblors, the center will study new ways to assess earthquake resistance, as well as seismic retrofitting options for major structures.

## Biological Sciences

Research programs in the biological and zoological sciences take research teams to sites in the Pacific Northwest region and beyond, to remote corners of the world. Research in zoology has focused on the neurological basis of behavior and the origin of circadian rhythms, the physiology of insect development and the role of hormones in metamorphosis, and the ecology of intertidal communities. Pioneering field studies of the male red-winged blackbird conducted by UW zoologists have helped to explain the phenomenon of territorial dominance in animals.

A multidisciplinary team of UW scientists has been intensely involved in the study of the recovery of life in the blast zone that resulted from the eruption of Mount St. Helens in 1980. Findings from that effort are changing how scientists understand and study the recovery of volcanic sites around the world.

In order to study the tops of trees and tips of branches where most budding, branching, and photosynthesis occur, and to understand what makes forests thrive, the UW has erected a construction crane in the Gifford Pinchot National Forest in southwest Washington. The crane's gondola can be moved in a 550-foot circle, giving researchers access to nearly six acres of old-growth canopy. The crane is the largest forest research crane in the world and the only one located in a temperate forest.

Forest nutrition studies initiated decades ago by UW researchers have produced one of the largest databases in the world on the growth characteristics of Douglas fir and western hemlock, and spawned a highly successful research cooperative comprising over 35 organizations. Today, the Stand Management Cooperative integrates research in forest nutrition, silviculture, wood quality, and modeling.

UW microbiologists have pioneered genetic engineering techniques for plants. A UW group applied the latest gene mapping techniques to the problem of how much genetic change is required in order for a new species to evolve, one of the central mysteries of evolutionary biology. Investigators from the College of Forest Resources and the Departments of Biochemistry and Botany have teamed up in this effort.

Researchers in the Department of Genetics in the College of Arts and Sciences have conducted basic research in yeast genetics that has led to a vaccine against Hepatitis B.

## Health Sciences

Since its establishment many decades ago, the UW Health Sciences Center has become well known for its teaching, research, and patient care. University physicians and staff members pioneered the first successful long-term kidney dialysis techniques, which have led to lifesaving treatments for tens of thousands of people. Continuing research is leading to the production of simpler and more portable devices for patients suffering from kidney failure.

Medic One, a system of rapid response for victims of accidents and heart attacks, is based at Harborview Medical Center, one of the University's two teaching hospitals. It has provided a national model for emergency medical care.

University physicians have been leaders in the development of bone marrow transplantation, which offers the hope of curing several forms of leukemia. E. Donnall Thomas, former head of medical oncology at the University, now professor emeritus, received the Nobel Prize in 1990 for developing bone marrow grafting techniques.

Fundamental research in biochemistry is unlocking the secrets of life processes at the molecular and cellular level. The discovery of protein phosphorylation—the reactions that regulate energy use, growth, and transformation of cells—by UW scientists Edmond Fischer and Edwin Krebs was recognized with the Nobel Prize for Medicine in 1992.

Building on work over the past three decades to understand the structures of ion channels in the cellular membrane, new efforts are directed toward the relationship between ion channel abnormalities and various diseases such as cystic fibrosis, certain bacterial infections, and forms of muscular dystrophy.

UW scientists have made important progress in understanding the causes of atherosclerosis, in understanding and isolating blood growth and blood clotting factors, and in studying the processes involved when white blood cells engulf and destroy bacteria. On another front, a UW team has developed a novel method to measure bone loss and to monitor the effectiveness of therapies to treat osteoporosis; the technology is being commercialized by a Seattle company.

The UW played an instrumental role in launching and promoting the Human Genome Project, the 15-year, \$3-billion effort to map the roughly 100,000 genes that provide the blueprint for the human body. Recently completed was the sequence analysis of the beta T Cell receptor family. The work has yielded the longest stretch of human genetic sequence analyzed to date and is changing how scientists study human T Cell receptor genes.

A UW center in ecogenetics explores the genetic basis for cellular responses to environmental insults or other stresses. Research programs at the UW in the study of heart disease, diabetes, and sexually transmitted diseases have achieved international recognition.

Genetic engineering techniques leading to the transgenic mouse and the use of transgenic animals in the study of new treatments for disease have been pioneered at the University.

The School of Pharmacy has a strong program in pharmacokinetics, the study of how drugs are metabolized and the rate at which they affect target organs and are eliminated by the body. Research is aimed at the analysis and prediction of dangerous drug interactions.

The University's Center on Human Development and Disability is recognized for its pioneering work in the causes, prevention, and treatment of diseases and disorders leading to mental retardation and other developmental disabilities.

The UW School of Dentistry is renowned for its work in periodontology, the study of infectious diseases of the tissues surrounding the teeth. The School has the largest clinical service in the world dedicated to the challenges of treating patients with dental fears and phobias. A UW dentistry team has developed the first diagnostic criteria for temporomandibular disorders—chronic pain in the ear, jaw, or muscles of the face, conditions which affect some 12 percent of the population. University faculty participated in a landmark survey of children's dental health in Washington state.

## Social Sciences

Interactions among individuals and groups determine the texture of society. The study of these interactions is the province of social scientists, whose work ranges from basic research on perception to the effect of interest groups on public policy.

Nationwide attention has been given to the work of UW investigators studying couples and the common factors that underlie successful relationships. In related research, several investigators are examining the processes of interaction in small groups, from families to work teams.

The award-winning Social Development Research Group in the School of Social Work conducts innovative research on the causes and prevention of violence, crime, drug use, school dropout, and other problems that affect children and families.

Important research in leadership and motivation, in human memory, and in alcoholism and addictive behavior is being carried on in a number of academic disciplines. Alcoholism studies range from physiological experiments to model counseling programs for pregnant women to participant-observer studies of addictive behavior. The focus for this effort is the Alcohol and Drug Abuse Institute.

Social scientists have performed provocative studies on the changing role of urban neighborhood organizations. Another group has concentrated on deviant behavior, including juvenile delinquency and possible prevention strategies. Its work is part of a larger effort by faculty members and graduate students to explore the ways that society's institutions react to deviant behavior.

Anthropologists are studying the changes in fertility, medical history, and cultural adaptation of the Japanese-American community in the Pacific Northwest, and the challenges faced by immigrants from Vietnam and Laos. Other faculty members are pursuing problems in distant locales and times, such as the beginning of agriculture in the Nile Valley.

Geographers are studying regional issues, such as the economic linkages between the Pacific Northwest and other parts of the country, the design and financing of efficient and equitable transit systems, the recent surge in population of nonmetropolitan areas and its policy implications, and the geography of access to health care.

Economists continue working on models to predict the results of federal monetary and fiscal policy. A group of researchers is breaking ground in a relatively unexplored area, the economics of natural resources, comparing the costs and benefits of different patterns of usage. These investigations are designed to help policy makers evaluate alternatives.

Social scientists at the University have a special interest in international relations. The University has been a pioneer in research concerning the Near and Far East, and this important role was emphasized with the establishment of the School of International Studies in 1978 (now the Henry M. Jackson School of International Studies), the culmination of more than 60 years of scholarly activity in area studies and international relations. Scholars in political science, anthropology, sociology, and the humanities study the role of culture in international affairs. Economists and geographers study development, resource management, and international economics. Historians complement the work of social scientists in exploring the basis of current thought, and scholars in languages and literature provide essential knowledge of original texts and the relationship of language to culture.

### Humanities and the Arts

Research in the humanities often fulfills a primary mission of humanistic study—the preservation of the literary and artistic achievements of mankind. One aspect of this research is textual scholarship, involving the identification and authentication of original texts and artifacts. New knowledge is also generated through reassessment of earlier texts and works of art.

Texts that form part of Egypt's Nag Hammadi Library, found more than a quarter of a century ago but only recently translated from Coptic, may lead to a reinterpretation of early Christianity. Located near the upper Nile, the library contains documents from little-known monastic groups, previously unknown Christian gospels, and both familiar and unfamiliar sayings of Jesus. A UW scholar studying these texts expects them to have as great an impact as the discovery of the Dead Sea Scrolls. The texts also will shed more light on the heretical Gnostic movement, which offers a radically different interpretation of Genesis.

The earliest history of Buddhism is largely lost, because the first documented efforts to commit Buddhist scriptures to writing did not occur until 400 years after the death of the Buddha. This gap has been filled in part by the recent discovery of 29 fragments of Buddhist texts, the earliest yet found. UW professors and graduate students from the Department of Asian Languages and Literature are engaged in a joint project with the British Library to transcribe and interpret the texts, which are expected to help clarify the early development of Buddhist doctrine and literature.

Research often is meant to describe exclusively the generation of new knowledge, but in the humanities a growing number of faculty members explore the theoretical basis underlying our knowledge and the means of transmitting it. The focus for these studies has been a colloquium in theory involving faculty members and graduate students. Discussions on problems in the theory of narrative, for instance, may span literature, history, science, and psychoanalysis—in fact, wherever the written word is used. The colloquia have acted as catalysts for several scholarly articles and may lead to an expanded program encompassing other disciplines.

Theoretical studies also form an important component of research in the arts. Some faculty in the School of Music conduct extensive research in the scientific analysis of sound, known as systematic musicology. Studies in this field include the influence of vibrato on judgments of vocal blend; context and time in musical perception; and rhythmic responses of preschool children. Other faculty members are exploring new ways of creating music, including the use of computers.

The concept of scholarly achievement in the arts often is synonymous with performance or exhibition. The UW School of Music has on its faculty a number of nationally recognized composers, including two long-time recipients of research funds from the American Society of Composers, Authors, and Publishers (ASCAP). The awards are designed to encourage and assist writers of serious music. The School of Music also is home to one of the finest opera programs in the country.

The School of Art faculty includes nationally and internationally known artists and scholars in nearly every one of its ten studio, art history, and design disciplines. Studio artists carry on the age-old quest for aesthetic quality but also pursue stylistic innovation, as well as developing new techniques in such diverse areas as non-toxic water-soluble printing and computer-generated imagery. Many of the School's art historians have helped reshape this young discipline through their studies of art as cultural expression.

The UW School of Drama houses the famous Professional Actors' Training Program, which, besides teaching basic acting skills, provides an intensive introduction to the practice of the theatre arts. The program attracts dedicated students who work for demanding, scrupulous visiting directors from the commercial stage as well as for permanent faculty members with extensive professional experience. Graduate research in the history and practice of theatre forms an integral part of the School's diverse program.

The University's program in creative writing is one of the oldest in the country. It achieved prominence in the 1950s and 1960s, when its faculty included Theodore Roethke, winner of the Pulitzer Prize in 1953. The tradition of excellence continues, with current University poets and authors receiving critical acclaim throughout the nation, including Professor Charles Johnson, who was awarded the 1990 National Book Award for Fiction. This concentration of talent has made the University a center for literary activity in the Pacific Northwest.

The Center for advanced Research Technologies in the Arts and Humanities (CARTAH) supports and promotes computer-based research and creative work in the arts and humanities. The center helps foster liaisons between the research community and the University's arts and humanities departments, and provides state-of-the-art computing and media resources. CARTAH has become known internationally as an important center for producing new digital art and plays a key role in developing educational technology at the UW.



# UW Extension

## Office of Educational Outreach (UW Extension, Summer Quarter, Evening Degree Program, and Distance Learning)

### Vice Provost

David P. Szatmary



[www.outreach.washington.edu](http://www.outreach.washington.edu)

Established in 1912, UW Extension brings the University's resources to the community by providing access to quality educational programs which meet ongoing professional and personal needs.

This section describes the various programs currently part of UW Extension. The quarterly UW Extension catalog contains details of the program offerings. It is mailed without charge to residents of western Washington, who may also receive it by calling (206) 543-2320 or by writing to UW Extension, Box 354224, Seattle, Washington 98105-4190. Catalogs can also be requested at UW Extension's Web site.

### Evening Degree Program

Many credit courses are offered each quarter for students pursuing a degree, as well as those who are not formally admitted to the University. The classes are intended for non-traditional degree seekers as well as for postbaccalaureate individuals pursuing new skills and knowledge. All evening credit courses are taught by University faculty members and lecturers, approved by the appropriate academic units. UW credit is awarded and the grades earned are included in GPA calculations. Matriculated students enrolling in these courses pay course fees in addition to regular tuition.

### Graduate Nonmatriculated Program

Individuals not admitted to a graduate program who wish to enroll in a graduate-level course may apply for graduate nonmatriculated student (GNM) status. Credits earned as a GNM may be applicable toward a degree upon subsequent admission to a graduate program. Application forms are available from participating departments. The Graduate School: Graduate Study section of this catalog offers more details.

### UW Extension Distance Learning

Approximately 130 credit courses and five certificate programs are delivered through UW Extension Distance Learning. Courses are delivered by print, video, audio, and the World Wide Web, and typically consist of assigned texts, study guides, assignments, and examinations. Most courses use interactive Web sites, email and voice mail to enhance interactions with instructors as well as other students. Certain noncredit courses required for University entrance are available to those who wish to qualify for admission. Other courses provide subject matter for professional continuing education.

Courses are open to persons who prefer an alternative to on-campus classroom meetings. Matriculated University students often find distance learning a convenient way to earn credits during summers or during the evening, or a way of taking courses that would otherwise be unavailable due to schedule conflicts.

Formal admission to the University is not required for enrollment in distance learning certificate programs and UW Extension courses. Students may register at any time for most courses and have between three and six months to complete the work. As many as 90 credits earned through distance learning may be applied to a University baccalaureate degree. Upon successfully completing a course, the grade and number of credits earned are recorded on an official University transcript. Grades earned, however, are not computed in the University GPA, which is based solely on courses taken in residence. (This policy is currently under review.) UW Extension offers certificate programs to students at a distance through various technologies (see the Certificate Programs section of this catalog).

UW Distance Learning catalogs may be obtained by telephone, (206) 543-2320 or 1-800-543-2320; by writing to UW Distance Learning, UW Extension, Box 354223, Seattle, Washington 98105-4190; or by sending email to [instudy@u.washington.edu](mailto:instudy@u.washington.edu). (Include name, address, and social security number). Additional information is available through the UW Extension Distance Learning Web site.

## English As A Second Language Department

The English As A Second Language (ESL) Department provides non-native speakers of English who are interested in improving language skills with the following services and resources:

1. *Academic ESL courses for UW students.* English is the language of instruction at the University, and many students who are not U.S. citizens need additional English training to facilitate participation in regular University programs.

Students who are not U.S. citizens (and whose native language is not English) admitted with TOEFL scores of at least 500 but below 580 or Michigan Proficiency Test scores of at least 80 but below 90 are required to take the University's ESL diagnostic test before matriculating. Students whose test results show their English to be adequate for full-time University study are excused from ESL course work. Others must take those ESL courses designated as required each quarter until the language requirement is completed.

During the academic year, the courses offered are designed for students who are not U.S. citizens who are officially enrolled in a degree program at the University as either undergraduate or graduate students. These students take ESL courses along with their regular programs of study. English As A Second Language courses count as the equivalent of five credits each for the purposes of satisfying visa requirements but do not count toward graduation. Special fees are charged for these courses instead of tuition.

2. *UW Extension ESL courses for all non-native speakers.* The ESL Center offers a separate series of noncredit courses that are open year-round to any adult non-native speaker who would like to study English. These courses do not require formal admission to the University. Application may be made to the address below.

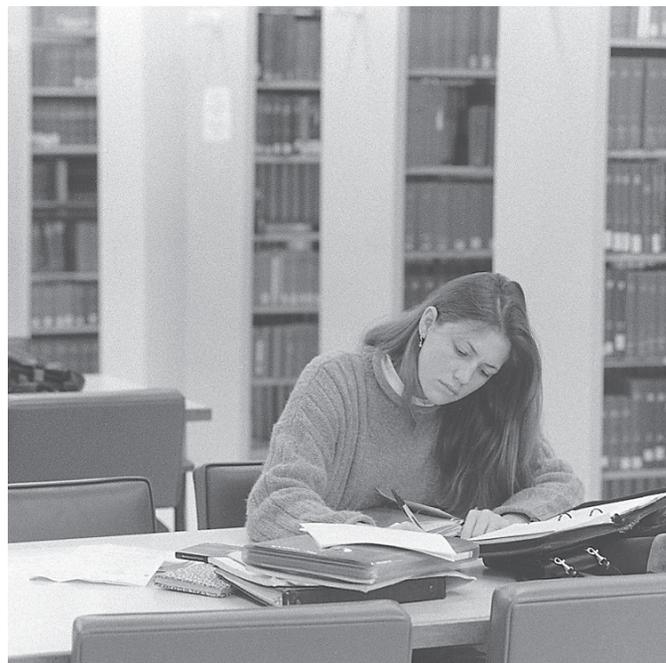
Additional information about ESL services, including complete listings and descriptions of current ESL course offerings at the University, is available from the ESL Department, Box 354232, Seattle, Washington 98195-4232, (206) 543-6242, or the ESL Web site ([www.outreach.washington.edu/esl/](http://www.outreach.washington.edu/esl/)).

## Noncredit Classes

UW Extension offers a broad range of courses, certificate programs, institutes, conferences, and seminars for adults, students, and children. Noncredit classes offer opportunities for professional development and personal enrichment. Specific programs are announced quarterly in the UW Extension catalog. To receive a catalog, call (206) 543-2320.

## Advising and Recruitment

UW Extension is committed to providing needed resources and skills to the Puget Sound community. Through its Advising and Recruitment department, companies are contacted and customized training programs are provided. Information meetings on various courses are held at companies, on campus, and in downtown Seattle. Advisers are available to answer questions on any of UW Extension's credit or noncredit courses or certificate programs. They may be reached at (206) 543-6160.



# University of Washington, Bothell

The University of Washington, Bothell (UW Bothell) admitted its first students in autumn quarter 1990 and has grown rapidly since. UW Bothell is fully accredited as part of the University of Washington and awards a University of Washington degree. In addition, professional programs are accredited by their respective accrediting bodies.

All programs give particular attention to the development of skills appropriate to an advanced level of study, to writing and oral communication, to the analysis and assessment of information, and to collaborative work with other students. At present the following programs are offered: Bachelor of Arts in Liberal Studies, Bachelor of Arts in Business Administration, Bachelor of Science in Nursing, Bachelor of Science in Computing and Software Systems, Master of Education, Master of Management, and a postbaccalaureate Teacher Certification Program for elementary school teachers. Minors are currently offered in computing, business, and education. A Bachelor of Science in Environmental Sciences, a Master of Arts in Public Policy, and a Master of Science in Computing and Software Systems are being planned for the 2001-2002 academic year. As state funding permits, options will be added in existing programs and additional undergraduate and graduate degree programs will be considered.

UW Bothell is committed to increased access to higher education for residents of north, northwest, and northeast Puget Sound. To serve a diverse student population, most programs offer part- and full-time study options, with day, late afternoon, and evening classes. The teacher certification program requires full-time study. Financial aid and a tuition installment plan are available.

UW Bothell is temporarily located in the Canyon Park Business Center, near the intersection of Interstate 405 and State Route 527. An exciting new campus, which is home to UW Bothell and Cascadia Community College will open for the 2000-2001 academic year. It is located on the former Truly Farms site, at the intersection of Interstate 405 and State Route 522. The campus is also home to the largest wetlands restoration project in the United States.

## Degree Programs

Detailed descriptions of the academic programs offered at UW Bothell may be obtained by calling the Office of Admissions at (425) 352-5000 or 1-800-736-6650. A brief overview of the programs is provided below. Undergraduate programs are offered at the upper-division level; students are expected to have completed their first two years (80 to 90 quarter credits) of college study prior to entry, and then to complete at least 90 additional credits at the upper-division level to earn the bachelor's degree. The teacher certification program is offered as a postbaccalaureate program. The Master of Education degree requires a minimum of 45 credits, and the Master of Management degree requires a minimum of 60 credits.

*Interdisciplinary Arts and Sciences:* The IAS program is an innovative and interdisciplinary program combining the methods, materials, and intellectual tools of the humanities, social sciences, and sciences. Because the ability to think, write, and speak effectively is a vital part of a liberal studies education, the program is designed to improve competence in these essential skills. The program leads to a Bachelor of Arts in Liberal Studies with degree options in American studies; society, ethics, and human behavior; culture, literature, and the arts; global studies; and science, technology, and the environment. Pending approval and funding, a Bachelor of Science in Environmental Science will begin in autumn 2001, as well as a Master of Arts in Public Policy.

*Business Administration:* The business administration program offers an integrated approach to the study of business. The program emphasizes effective oral and written communication, teamwork in a diverse workforce, entrepreneurial management, high technology and the global business environment. With close ties to the greater Seattle business community, a "real world, hands on" approach is offered. In addition, business students complete courses in liberal studies to better understand the larger social and cultural context in which business functions. The undergraduate curriculum focuses on essential business core courses and currently offers options in marketing; management; innovation and technology management; finance; and international environment.

At the graduate level, the business program offers a Master of Management degree with a focus on technology-oriented businesses and is designed for working professionals. The program covers advanced topics in finance, accounting, marketing, project management, and organizational behavior, within the context of the unique opportunities and challenges facing high-tech companies today.



Both the Bachelor of Arts in Business Administration and the Master of Management degrees are credited by the American Assembly of Collegiate Schools of Business (AACSB).

*Computing and Software Systems:* The Bachelor of Science in Computing and Software Systems (CSS) program features an innovative and broad approach to the design of applications software. Within the major, there are three options: applications programming, systems analysis, and information engineering. Students gain essential knowledge and skill in state-of-the-art computing theory, application development, problem solving, communication, and management. Through industry partnerships, students have the opportunity for "real-world" experience. Designed in collaboration with representatives of high-tech industries, the CSS program prepares students for employment, graduate education, and life-long learning in this dynamic field. Pending approval and funding, a new Master of Science in Computing and Software Systems is planned for autumn 2001.

*Nursing:* The Bachelor of Science in Nursing program at UW Bothell is specifically designed for registered nurses who have at least 90 transferable college credits. Through a credit by examination mechanism, nursing students may earn their junior-year credits. The program prepares professionals for the broader scope of current nursing practices and evolving future opportunities. Critical thinking, decision making, and oral and written communication are emphasized. The Bachelor of Science in Nursing program at UW Bothell is accredited by the CCNE accrediting body of the American Association of Colleges of Nursing (AACN) and is affiliated with the UW School of Nursing. The program begins annually in summer quarter and may be completed in four quarters; electives may be taken prior to summer quarter.

*Education:* The UW Bothell teacher certification program leads to Washington state teacher certification for grades K-8. Two options are available. Option I is a full-time, 12 month postbaccalaureate program designed for those who already hold a bachelor's degree. This option begins summer quarter. Option II is an extended two-year program that begins autumn quarter with three quarters of part-time study followed by three quarters of full-time course work. Through collaborative partnerships with area schools, the teacher certification program integrates courses and structured field experiences in a variety of school settings. This unique program incorporates the most current and thoughtful perspectives on preparing dedicated professionals for classrooms and schools. UW Bothell also offers a Master of Education degree. This program encourages educators to think deeply about the complex work of teaching, to explore questions central to their professional growth, and to develop sustained, collegial relationships with peers from across the region. The program challenges students' thinking and celebrates their accomplishments. Critical reflectivity, leadership, and the generation and use of research to improve classrooms and schools are emphasized throughout the program.



## University of Washington, Tacoma

The University of Washington, Tacoma, whose campus has won national awards for urban design and historic preservation, is changing the face of its region—architecturally and economically, as well as intellectually and culturally. Located in Tacoma's historic warehouse district, across from the Washington State History Museum and Union Station, UWT was established in 1990 to offer innovative upper-division, postbaccalaureate, master's-level programs that serve people in the South Puget Sound region. The UW Tacoma now enrolls more than 1,500 students and is expected to see continued dramatic growth in academic offerings, enrollment, and facilities. (January 2000 saw the dedication of one new building and ground-breaking for several more occurred on the same day.) An impressive faculty of scholars and researchers devote themselves to UWT students through quality teaching and to the community through service and partnership.

UWT's undergraduate programs are designed to be the next academic step for community college and transfer students who wish to complete a baccalaureate degree—either immediately upon completion of the first 90 college credits, or after a hiatus. UWT has served college students from age 14 to age 70 and enjoys tremendous community support, which has generated more than \$1.5 million in endowment support for scholarships and programs. UWT's master's programs have been tailored to serve specific demand in the South Puget Sound area. The one-year, postbaccalaureate teacher certification program has recommended alumni for more than 180 K-8 teaching certificates since 1994. With day, evening, and Saturday classes, UWT serves the needs of students who work or who have families and cannot travel long distances to further their education.

### Graduate Degree and Certificate Programs

Students seeking admission to master's degree programs should check with the specific program. Detailed information about the academic programs offered can be obtained by calling the UWT Office of Admissions at (253) 692-4400 or 1-800-736-7750; TDD (253) 692-4413; or visit UWT's Web site at [www.tacoma.washington.edu](http://www.tacoma.washington.edu).

*Master's Degree in Foundations of Public Action:* This graduate program, leading to a master's degree, prepares students for an enhanced capacity for roles of responsibility and leadership. The program will be developed through four closely integrated core courses: Models and Critical Inquiry; Culture and Public Problems; Evidence and Action; and Values and Action. Elective courses, internships, and a final project or thesis will provide opportunity for extended reflection on the application of the themes of the core to the student's particular area of interest. Anticipated start date is autumn quarter 2000.

*Business Administration:* The Master of Business Administration degree will be offered through a non-thesis graduate program that builds on the skills and knowledge of experienced business professionals while providing new tools to help manage a challenge facing every organization: change. The degree emphasizes a systems perspective of organizations, allowing managers to develop the

understanding needed to lead organizations facing an increasing pace of change. The proposed MBA degree program requires approval from the UW Graduate Council, the UW Board of Regents, and the Higher Education Coordinating Board. The proposal is currently under review. Anticipated start date is autumn quarter 2000 or winter quarter 2001.

For additional information, visit the program's Web site at [www.tacoma.washington.edu/business](http://www.tacoma.washington.edu/business).

*Education:* Underlying the UWT Education Program is a vision of the teacher as one who is broadly educated, continuing to learn, skilled at and committed to the craft of teaching, and entrusted to nurture the fullest human potential in each individual.

The Master of Education degree is a graduate course of study for experienced teachers at all levels of education, preschool through adult. Five study options are available: at-risk learner, integrated curriculum, science education, special education, and technology.

*Nursing:* The Master of Nursing degree program is accredited by the NLN and shares accreditation with the School of Nursing at the Seattle campus. The program provides advanced study in selected areas of nursing science, professional foundations, scientific and systematic inquiry/research, and related fields of study. The graduate program—Communities, Populations, and Health—assists students with looking at communities of interest, populations at risk, and health care systems. Topics emphasized are community assessment, health promotion and disease prevention, development and change, health-systems access, social justice, public policy, and health care leadership. The program aims to improve the health of populations, aggregates, communities, and delivery care systems. Students are provided with opportunities to explore individual interests within the context of the program, and an interdisciplinary focus is emphasized. The MN prepares students for advanced and specialized practice. Additional course offerings and opportunities for specialization are planned as the campus continues to develop and expand. Program information is available at [www.tacoma.washington.edu/nursing/master.htm](http://www.tacoma.washington.edu/nursing/master.htm).

*Social Work:* The Social Work Program is accredited by the Council on Social Work Education as the *Alternative* Master of Social Work for the University of Washington, Seattle School of Social Work. The MSW program prepares students to function in a wide variety of settings, including health-care agencies, child and family services, public social service organizations, the criminal justice system, and public schools. The advanced curriculum provides an in-depth education employing the classroom and practicum settings to prepare graduates for advanced specialized practice.

The *Alternative* MSW is currently offering one concentration in the area of Children, Youth, and Families. Topics include applied research, social policy, and advanced content in social work practice models and methods.

For more information or to request application materials, please visit the program's Web site at [www.tacoma.washington.edu/social/](http://www.tacoma.washington.edu/social/).

The symbols, abbreviations, and conventions below are used in the listings of program descriptions, faculty members, and course descriptions. Colleges and schools are presented in alphabetical order; departments and programs are listed alphabetically within the appropriate college or school. If you are unable to locate a department or program, consult the index.

## Faculty

Entries include appointment to the Graduate School faculty (indicated by \*); year of appointment to the University; graduate or professional degree, date, and institution. Entries also may indicate Acting, Adjunct, Affiliate, Clinical, Emeritus, or Research faculty; and area(s) of interest.

## Course Descriptions

Each course listing includes prefix, course number, title, and credits. Each listing also may include general-education designator(s), name(s) of instructor(s), description of the course, prerequisite(s), and quarter(s) offered.

Specific information on courses offered in a particular quarter, including descriptions of courses approved since the publication of this catalog, appears in the quarterly *Time Schedule*.

## Course Numbers

**400-499** Upper-division courses primarily for juniors, seniors, and postbaccalaureate (fifth-year) students. Graduate students may enroll in 300- and 400-level courses. When acceptable to the major department and the Graduate School, approved 400-level courses may be applied as graduate credit in the major field and approved 300-level courses may be applied in the supporting field(s).

**500-** Restricted to graduate students. (Courses numbered in the 500 and 600 series with a P suffix denote professional courses for students in the schools of Dentistry and Medicine; such courses may not be applied as graduate credit in the Graduate School.) Undergraduate, postbaccalaureate, and nonmatriculated students who wish to register for 500-level courses must obtain permission from the instructor of the class, departmental chair, or other designated person.

Graduate courses numbered 600, 601, 700, 750, or 800 are restricted to students in the Graduate School. They appear by number and title only where applicable under the departmental course listings in this catalog. Descriptions for these courses are listed below.

### (PREFIX) 600 Independent Study or Research (\*)

Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite: permission of supervisory committee chair or graduate program adviser.

### (PREFIX) 601 Internship (3-9, max. 9)

Internship required of students in a graduate degree program. Permission of supervisory committee chair or graduate program adviser is a prerequisite.

### (PREFIX) 700 Master's Thesis (\*)

Research for the master's thesis, including research preparatory or related thereto. Limited to premaster graduate students (i.e., those who have not yet completed the master's degree in their major field at the University of Washington). Prerequisite: permission of supervisory committee chair or graduate program adviser.

### (PREFIX) 750 Internship (\*)

Internship required of all graduate students in the Doctor of Arts degree program.

### (PREFIX) 800 Doctoral Dissertation (\*)

Research for the doctoral dissertation and research preparatory or related thereto. Limited to graduate students who have completed the master's degree or the equivalent, or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. Prerequisite: permission of supervisory committee chair or graduate program adviser.

## Credit Designation

**ART 100 (5)** 5 credits are received for the quarter.

**ART 101-102 (5-5)** Hyphenated course. Credit is earned, but may not be applied toward graduation until the entire sequence is completed. (An *N* grade may be given the first quarter and the final grade the second quarter.)

**ART 100- (5-)** Course may take longer than one quarter to complete. Repeated registration may be necessary. An *N* grade is received until the final grade is submitted.

**ART 100 (2, max. 8)** 2 credits per quarter; course may be repeated up to four times to earn a maximum of 8 credits.

**ART 100 (1-5, max. 15)** Up to 5 credits may be taken in a given quarter. Course may be repeated to a maximum of 15 credits.

**ART 100 (\*, max. 10)** Credit to be arranged per quarter; course may be repeated to a maximum of 10 credits.

**ART 100 (3/5)** 3 or 5 credits are earned in a given quarter. Specific amount is determined by school or college offering the course. The *Time Schedule* may indicate 3 credits, 5 credits, or 3 or 5 credits. Credits may vary by section.

**ART 100 (3/5, max. 15)** 3 or 5 credits are earned in a given quarter. Course may be repeated to earn a maximum of 15 credits.

**ART 700 (\*)** Credit is to be arranged with school or college offering the course. No maximum stated. Only 600-, 700-, and 800-level courses do not require a maximum.

## Undergraduate General Education Requirement Designators

The following general education requirement designators (on 400-level courses) are for purposes of undergraduate graduation and do not apply to graduate or professional students: VLPA, I&S, NW, QSR.

## Background Required

**Prerequisites** Courses to be completed or conditions to be met before a student is eligible to enroll in a specific course.

## Quarters Offered

**A,W,Sp,S** Indicates the quarter(s) the course is offered. A = Autumn, W = Winter, Sp = Spring, S = Summer.

*Examples:*

**ART 100 AWSp** ART 100 offered Autumn, Winter, and Spring quarters.

**ART 100, 101 A,W** ART 100 offered Autumn quarter. ART 101 offered Winter quarter.



# ACADEMIC PROGRAMS, FACULTY, AND COURSES

## College of Architecture and Urban Planning

224 Gould

### Dean

Jerry Finrow

### Associate Deans

Katrina Deines  
Gail L. Dubrow

General Catalog Web page:  
[www.washington.edu/students/gencat/academic/CAUP.html](http://www.washington.edu/students/gencat/academic/CAUP.html)



College Web page:  
[www.caup.washington.edu](http://www.caup.washington.edu)

The College of Architecture and Urban Planning (CAUP) comprises four departments that are directly concerned with the design and development of the physical environment: Architecture, Construction Management, Landscape Architecture, and Urban Design and Planning.

The College offers a variety of programs and degrees focusing on the environmental design disciplines within a liberal arts education. The undergraduate programs of the departments of Construction Management and Landscape Architecture lead to the professional degrees that serve as the educational credentials for careers in their respective fields. Master's degrees are offered in the College: Master of Architecture, Master of Science in Construction Management (evening degree), Master of Urban Planning, and Master of Landscape Architecture. Master's students may elect to work toward the Certificate in Urban Design or the Certificate in Preservation Planning and Design. An interdisciplinary doctoral program in urban design and planning is available through the Graduate School. All curricula encompass an appropriate level of design and technical understanding and include broader social, economic, and cultural issues fundamental to understanding, preserving, and enriching our built and natural environments.

As part of a major university and metropolis in the Pacific Northwest, the College is able to reinforce its program by using its setting as a laboratory for study. It works closely with its various professional communities to build curricula and a faculty attuned to the understanding and creation of an appropriate physical environment.

Research centers include:

- Center for Real Estate and Community Development
- Center for Environment, Education, and Design Studies
- Institute for Hazard Mitigation Planning and Research
- Urban Ecology Laboratory

Educational programs include:

- Certificate programs
- Urban design
- Preservation planning and design
- Continuing education/extension programs
- Architecture
- Facilities management
- Real estate

### Preservation Planning and Design Certificate Program

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Gail L. Dubrow, Director  
Neile Graham, Program Coordinator

The College of Architecture and Urban Planning administers a special graduate-level program that leads to the Certificate of Achievement in Preservation Planning and Design. This 45-50 credit interdisciplinary program is available to students accepted for graduate work by the departments of Architecture, Landscape Architecture, or Urban Design and Planning. There are two options in this program: one for students in architecture and one for students in landscape architecture and urban planning. The curriculum offered by the 15-member faculty, which is drawn from the College along with visiting lecturers from the preservation community, provides students with a grounding in the history, theories, methods, and practices of historic preservation planning and design.

### Urban Design Certificate Program

410 Gould

Anne Vernez Moudon, Director  
Neile Graham, Program Coordinator

The College of Architecture and Urban Planning administers a special graduate-level program that leads to the Certificate of Achievement in Urban Design. Since 1968, this interdisciplinary program has provided a collective framework that allows students to specialize in the study and design of the urban environment as part of their professional education.

The 14-member faculty offers backgrounds in urban design as well as in architecture, landscape architecture, and urban planning. In addition, the communities of the Puget Sound region provide a unique learning laboratory for students to experience the issues and professional activities of urban design. A core curriculum and mandatory course work in four substantive areas provide the student with a firm grounding in theory, methods, and practical skills. The program is normally seven quarters in length, concurrent with the master's program.

Students accepted for graduate work by the departments of Architecture, Landscape Architecture, or Urban Design and Planning are eligible for the program if they possess the necessary design abilities prior to enrollment in advanced studios.

### Institute for Hazard Mitigation Planning and Research

Robert Freitag, Director

The Institute for Hazard Mitigation Planning and Research was established in 1999 as a vehicle for research, teaching, and public service that address the mitigation of natural and man-made hazards through planning and design, and through the integration of mitigation principles into a wide range of disaster and

risk-management opportunities. The institute's approach is interdisciplinary, with close links to other academic research units in the University and to risk management organizations in government and industry.

The research agenda is aimed at developing practical mitigation solutions that can be incorporated into local government land-use planning, development regulation, infrastructure, and emergency management; state and federal response to disasters; planning for business continuity; and planning for post-disaster recovery and reconstruction.

The institute is also pursuing curriculum development to incorporate mitigation principles and methods into existing and new courses in the College's degree programs.

### International Programs

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The departments of the College offer many opportunities for foreign study in which participants earn academic credit while studying abroad. Programs in Rome, the Italian Hill Towns, and Mexico are sponsored on a regular basis. In addition, various study and exchange opportunities exist in such locations as Germany, the Scandinavian countries, Colombia, Mexico, India, and Japan. Faculty exchanges with foreign institutions occur regularly.

### University of Washington Rome Center

95 Piazza del Biscione, Rome, Italy

Katrina Deines, Co-director  
Dan Harmon, Co-director

The College maintains a permanent year-round facility in Rome. Studio and classroom spaces, a library, administrative offices, and housing accommodations for faculty are located in the Palazzo Pio on the Campo de Fiori. The Rome Center is used by UW programs in classics, Romance languages, art, art history, English, creative writing, and comparative history of ideas, as well as by the departments of the College of Architecture and Urban Planning. The Rome Center fosters interaction among students from the University and other institutions, together with practicing professionals residing in or visiting Rome. Several major universities regularly share studio critics and lecturers.

### Remote Sensing Applications Laboratory

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Frank Westerlund, Director

The Remote Sensing Applications Laboratory (RSAL) is a facility for teaching, research, and public service applications of remote sensing and geographic information technologies in environmental planning and design. Remote sensing includes aerial photography and satellite systems that record earth-surface data in image or digital form for subsequent interpretation by visual or computer techniques and incorporation into geographic information systems. Research applications have included land-use mapping, urban form analyses, growth-management studies, development siting, natural-resource inventories, and environmental analysis. RSAL houses an extensive collection of air photo, satellite data, map, and documentary resources. In addition to optical photo interpretation equipment, the laboratory utilizes UNIX and NT workstation-based software systems such as ERDAS image processing and ArcInfo GIS.

### Facilities

#### Computing

A wide variety of computers, software, networks, computing facilities, and support services are available to CAUP students through UWired and College-operated

labs for studies and research in Computer-Aided Design (CAD) and Geographic Information Systems (GIS).

UW Computing & Communications (C&C) offers faculty, staff, and students accounts on C&C Uniform Access computers, which provide a variety of computing resources and information technologies such as email and UWIN. Establishing a UW NetID allows attachment to the campus network, and in turn, connection to a vast national and international collection of networks, computer users, computers, and bibliographic and other library resources.

CAUP facilities, composed of both Macintosh and PC computers, are connected in a College network which, in turn, is connected to the Internet. UW computing and data resources are available through these machines. The College employs one full-time Computer Resources Manager and several student consultants.

General-purpose labs are available to all CAUP students. They are networked to file servers, plotters, and laser printers. A wide variety of software is available including spreadsheets, word processors, CAD, GIS, 2D and 3D graphics, rendering, animation, scheduling, estimating, bid analysis, project management, modeling, and design programs. Furthermore, all labs support email. Hours of access to these labs generally parallel those of the College library except when classes are in progress.

For advanced course work, research, and certain independent studies, the College operates specialized labs such as the Multimedia Lab with its high-performance PowerMac workstations along with peripherals including CD-ROM drives, scanners, and a video-digitizing (capturing) system. Also, a SUN Workstation located in the Remote Sensing Applications Lab (see above) supports advanced research applications of GIS, remote sensing/image processing, and visual and other simulation modeling.

### Lighting Applications Laboratory

The Lighting Applications Laboratory includes a variety of facilities for use by students and faculty members in conjunction with lighting classes, design-studio courses, and research work. Equipment in the lighting workshop includes lamps and lighting fixtures, sample models and model-building materials, a mirror-box artificial sky, a direct-beam sunlight simulator, assorted light meters and data loggers, cameras, and demonstration displays.

The Department of Architecture is a co-sponsor of the Lighting Design Lab. This lab, a 10,000-square-foot, half-million-dollar facility, was designed to demonstrate the energy conservation potential of state-of-the-art architectural lighting technology. It is operated by Seattle City Light in downtown Seattle. Students can take various positions in the lab as interns. It is also available to assist in their lighting design and testing, as it does with regional architectural offices.

### Photography Laboratory

A large photography laboratory is provided with studio and darkroom facilities for use by photography classes, design-studio classes, special instruction, and independent activity.

### Shop

A fully staffed and equipped wood-, plastic-, and metal-working shop provides students with an opportunity to design and build selected projects. The shop is used as an instructional facility in conjunction with studio, structures, and materials classes. Thesis and other individual activity also can be accommodated.

### Library

The Architecture-Urban Planning Library, 334 Gould, is a branch of the UW Libraries. It is the primary location for materials on architecture, landscape architecture, construction management, and urban design and

planning. The collection contains 42,500 volumes, 7,500 microforms, and 300 currently received serial subscriptions. Access to its collection is provided through the UW Libraries Information Gateway, a single World Wide Web location which encompasses all of the library's print and electronic resources as well as tools, services, and the ability to search the library's catalog and a wide range of Internet resources. The Gateway is available in all UW libraries and on the Web at [www.lib.washington.edu](http://www.lib.washington.edu).

### Slide Collection

The slide collection consists of approximately 100,000 images covering architectural, landscape, design and planning, and construction subject matter, supporting the curricular and research needs of the College. New materials for lectures and projects are continually added.

### Student Organizations

Chapters of American Institute of Architects Students, American Society of Landscape Architects, Associated General Contractors, Planning Students Association, and the Historic Preservation Association provide opportunities for undergraduate and graduate students to meet informally and to participate in a variety of projects and events.

## Community and Environmental Planning

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CEP 446 Internship (5, max. 10)** Connects core and individual courses with field work. Group and individual readings develop understanding of how students' internships and field placements constitute particular element of community and environmental planning. Explores how what we do for a living is part of our lives as citizens and public service. Credit/no credit only. Offered: A/WSp.

**CEP 460 Planning in Context (5) I&S** Examines theory against backdrop of practice for broad, historical understanding of social, political, environmental planning. Critique from viewpoints, e.g., planning history, ethics, ecofeminism, environmental justice, class and capitalism, planning and global economy. Develop personalized history reflecting individual experience, professional experience, and philosophical heritage of planning profession. Credit/no credit only. Offered: A.

**CEP 461 Ethics and Identity (5) I&S** Examination of personal, societal, vocational, environmental, planning ethics. Readings and discourse on ethical foundations for public life. Individual and group readings on values, human potential. Develops understanding of ecological context, moral responsibility, self-awareness. Constructs positive, diverse view of humanity, environment regardless of race, gender, ethnicity, beliefs. Credit/no credit only. Offered: W.

**CEP 462 Community and Environment (5) I&S** Capstone quarter merges core seminars, disciplinary courses in major, community field experiences for mastery of personal knowledge and skills. Reflection and synthesis of themes in major; engagement with contemporary issues. Compares theoretical defini-

tions of community and environment with individual philosophies and knowledge within thoughtful, applied context. Credit/no credit only. Offered: Sp.

**CEP 498 Special Topics (1-9, max. 15) I&S** Systematic study of specialized subject matter.

## Architecture

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General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Archit.html](http://www.washington.edu/students/genecat/academic/Archit.html)



Department Web page:  
[www.caup.washington.edu/html/arch/](http://www.caup.washington.edu/html/arch/)

The Department of Architecture offers two degrees: the Bachelor of Arts (B.A.) degree in architectural studies and the Master of Architecture (M.Arch.) degree, an accredited professional architectural degree. The professional program is based on the architect's need to be a generalist well-rounded in the liberal arts, with a full command of the discipline of architecture, who can assume an enlightened, responsible, and creative role in society.

The curriculum embodies both broad and focused courses that cover the many and various aspects of architecture: design, graphics, computing, structural engineering, building sciences, history, theory, ecology, sociology, psychology, cultural studies, law, and professional practice. The faculty comprises a large and diverse group of teachers, practitioners, scholars, and researchers who represent a wide spectrum of backgrounds, experiences, and viewpoints. Approximately thirty permanent faculty members are supplemented by dozens of part-time professional practitioners from the region and around the country, as well as by exchange scholars from foreign institutions.

Priorities stressed by the faculty reflect changing ideas and concepts of architecture. Studios are sequenced, beginning with fundamentals and demanding an increasing independence at advanced levels. The defined studio sequence not only helps clarify the student's experience, but also insures that students get a broad and coherent cross section of design problems and instructors.

*Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board (NAAB): (1) the Bachelor of Architecture, which requires a minimum of five years of architectural study (this degree is not offered at the University of Washington), and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related pre-professional bachelor's degree. These professional degrees are structured to educate those who aspire to registration and licensure to practice as architects.*

Architectural education at the University of Washington requires a minimum of six years of higher education to attain the first professional degree, the Master of Architecture. The curriculum is divided into three two-year segments of course work with a pre-professional Bachelor of Arts degree (with a major in Architectural Studies) awarded at the completion of the second two-year segment. The professional degree, Master of Architecture, is awarded only upon completion of the third segment. (Students with bachelor's degrees in unrelated fields take an additional year of course work—see below.)

Students must also complete a master's thesis, extending over one or more additional quarters, on a research topic or design problem of their choice. Admission to the professional program requires admission to the Graduate School of the University of Washington.

## Graduate Program

Graduate Program Coordinator  
208 Gould, Box 355720  
(206) 543-4180  
archinfo@u.washington.edu

## Master of Architecture

The Master of Architecture degree is the only professional degree offered by the Department of Architecture. Completion of the requirements of this nationally accredited degree program satisfies the educational requirement for licensing (registration) as an architect. The accredited M.Arch. program accommodates two groups of undergraduate degree holders: (1) persons holding a pre-professional four-year degree, such as a Bachelor of Arts in Architecture (or equivalent), who normally will require seven or eight quarters of study; (2) persons with an undergraduate degree in an unrelated field, who normally will require ten or eleven quarters, over a period of at least three years, to complete the requirements for the degree. This three-year program may vary somewhat in duration and specific course work required, depending on selection of concentration/study areas and prior academic and professional experience.

Candidates with a pre-professional four-year degree, such as Bachelor of Arts (in architecture) or the equivalent, usually undertake six full-time quarters of study plus completion of a thesis for the M.Arch. degree. This program typically requires 99 credits of course work, including 36 credits of design studio, 36 credits of approved core courses, 9 credits of thesis, and 18 credits of electives. Special interests and certificate programs often can be accommodated within the 18 credits of electives and design-studio options.

Persons holding degrees in other fields normally take three quarters of preparatory course work to develop knowledge and skills equivalent to those of students who enter the program from undergraduate architecture programs. Upon completion of preparatory course work, the students merge with students in the two-year program described above.

The department offers an advanced M.Arch. degree program for persons holding an accredited professional five-year Bachelor of Architecture degree (and those already holding an accredited Master of Architecture degree). For these candidates the program represents a specialization or in-depth study of a specific area or interest in the field. Each student's program is developed on an individual basis in consultation with faculty advisers. The approved program of study becomes the student's curriculum, which must be completed for award of the degree. Typically this program involves a minimum of 45 credits of required course work, including a thesis, and can be completed in four or five quarters.

## Admissions

Students are admitted in autumn quarter only. All application materials should be received by the department no later than the preceding January 15. Notices of admission are mailed by April 15. Admission to the Master of Architecture program is a competitive process, with priority given to those students whose apparent abilities, as determined by the Department of Architecture Admissions Committee, will enable them to complete the program expeditiously and with a high level of achievement. In evaluating applicants, the Admissions Committee considers the following: a portfolio of work in visual arts and/or design, a Statement of Purpose, Graduate Record Examination general test scores, transcripts of previous degree programs and of additional academic study (with a 3.00 GPA requirement), three letters of recommendation, and the applicant's background and experience in architecture and/or related fields. Incomplete applications and those received after January 15 are not considered by the Admissions Committee.

## Certificate Programs

Graduate students may elect to participate in the College-wide certificate programs in urban design and preservation planning and design. (See program descriptions in the preceding College section.) The department also offers a certificate program in lighting design.

## International Studies

The department offers the Architecture in Rome program at the University of Washington Rome Center, and the Design/Build Mexico program in Cuernavaca, Mexico. Other programs have included summer study of the Italian Hill Towns and in Portugal and Scandinavia, and numerous exchanges including Scandinavia, England, Germany, Hong Kong, Colombia, Japan, and Australia.

## Financial Aid

Each spring quarter the department awards scholarships and assistantships for the following academic year. These are more typically available to students already enrolled in the architecture program at the time of the awarding, although some financial aid is offered to newly entering students. Other financial aid and assistantship possibilities may be found through the Graduate School Fellowship Division and the Office of Student Financial Aid in Schmitz Hall.

## Faculty

### Chair

Jeffrey K. Ochsner

### Professors

Badanes, Steven P. \* 1990; MArch, 1971, Princeton University; sustainable building technology, public art, community-based design/build, architecture.

Bonsteel, David \* 1963, (Emeritus); MArch, 1964, University of Washington; design process, computer applications, research.

Bosworth, Thomas L. \* 1968, (Emeritus); MA, 1954, Oberlin College; MArch, 1960, Yale University; design process, history, professional practice.

Ching, Francis D. K. \* 1985; BArch, 1966, University of Notre Dame; design drawing, process, and principles.

Clausen, Meredith L. \* 1979; PhD, 1975, University of California (Berkeley); twentieth-century and American architecture.

Dietz, Robert H. \* 1947, (Emeritus); MArch, 1944, Massachusetts Institute of Technology; design, housing.

Emery, Ashley F. \* 1961, (Adjunct); MS, 1958, PhD, 1961, University of California (Berkeley); energy and buildings, HVAC, thermal stresses, experimental design, stochastic finite elements.

Finrow, Jerry V. \* 1995; MArch, 1968, University of California (Berkeley); housing architecture.

Grey, Arthur L. \* 1963, (Emeritus); PhD, 1954, University of California (Berkeley).

Hildebrand, Grant \* 1964; MArch, 1964, University of Michigan; history, preservation design.

Jacobson, Phillip L. \* 1962, (Emeritus); MArch, 1969, Finnish Institute of Technology; design, professional practice.

Johnston, Norman J. \* 1960, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Kiyak, H. Asuman \* 1972, (Adjunct); MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.

Kolb, Keith R. \* 1952, (Emeritus); MArch, 1950, Harvard University; design, professional practice.

Lovett, Wendell H. \* 1948, (Emeritus); MArch, 1948, Massachusetts Institute of Technology; architecture.

Miller, David E. \* 1989; MArch, 1972, University of Illinois; design development, design.

Millet, Marietta \* 1976; MArch, 1972, Massachusetts Institute of Technology; illumination, environmental controls.

Nyberg, Folke E. \* 1969, (Emeritus); MArch, 1960, Yale University; theory, urban design, professional practice.

Ochsner, Jeffrey K. \* 1987; MArch, 1976, Rice University; history, preservation design, urban design.

Pundt, Hermann G. \* 1968, (Emeritus); PhD, 1969, Harvard University; history, historical preservation.

Pyatok, Michael \* 1990; MArch, 1967, Harvard University; design of affordable housing for lower income communities - urban and suburban regions.

Seligmann, Claus \* 1964; Diprch, 1950, London Polytechnic (UK); design, design process, theory.

Small, Robert \* 1965, (Emeritus); MArch, 1955, University of Oregon; design, community practice, barrier-free design, housing, site planning, design process.

Staub, Christian 1967, (Emeritus); Cert, 1944, Institute for Industrial Design, Arts and Crafts; photography.

Streatfield, David C. \* 1974, (Adjunct); MLA, 1965, University of Pennsylvania; history, historic landscape preservation, landscape theory, urban landscape design.

Streissguth, Daniel M. \* 1955, (Emeritus); MArch, 1949, Massachusetts Institute of Technology; design process.

Sutton, Sharon E. \* 1998; MArch, 1973, Columbia University; PhD, 1982, City University of New York; effect of the environment on learning and community well-being.

Thiel, Philip \* 1961, (Emeritus); MS, 1948, University of Michigan; visual design, design process, person-environment relations, experiential notation.

Vernez Moudon, Anne \* 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Zarina, Astra \* 1970; MArch, 1955, Massachusetts Institute of Technology; design, foreign studies.

## Associate Professors

Albrecht, Robert G. \* 1960, (Emeritus); MSCE, 1960, University of Massachusetts; structures.

Curtis, J. William \* 1962, (Emeritus); MA, 1969, University of Washington; design process, professional studies.

Deines, Katrina \* 1985; MA, 1975, University of Minnesota; MArch, 1979, University of Washington; design theory and foreign studies, history.

Donnette, James J. \* 1966, (Emeritus); MArch, 1969, University of Washington; graphics, design.

Dubrow, Gail Lee \* 1989; MA, 1979, University of Oregon; PhD, 1991, University of California (Los Angeles); preservation, urban design, public art, public history, gender, multiculturalism.

Goldblatt, Steven M. 1982, (Adjunct); JD, 1977, Golden Gate University; construction law, labor relations, and accounting.

Gross, Mark D. \* 1999; PhD, 1986, Massachusetts Institute of Technology; design and planning methods, computational models, human computer interaction.

Heerwagen, Dean Reese \* 1975; MS, 1967, MArch, 1971, Massachusetts Institute of Technology; environmental controls (passive and active).

Hill, Warren \* 1959, (Emeritus); MA, 1961, New York University; interior design, design, history.

Latourelle, Elaine Day \* 1975; MArch, 1964, Yale University; design, professional practice.

Lebert, Edgar A. 1965; MS, 1967, University of Washington; structures.

Loveland, Joel E. \* 1986; MArch, 1980, University of California (Los Angeles); energy conservation, design, research.

Minah, Galen F. \* 1970; MArch, 1968, University of Pennsylvania; design process, design, professional practice.

Mohler, Richard Ernest J. \* 1986; MArch, 1984, University of Pennsylvania; architecture and community, design of housing and urban public open space.

Norton, Thomas J. \* 1968, (Emeritus); MUP, 1960, University of Washington; urban community facilities, planning administration.

Palleroni, Sergio A. \* 1992; MS, 1987, Massachusetts Institute of Technology; the relationship between cultures, their histories, and the production of architecture.

Rohrer, John \* 1948, (Emeritus); BArch, 1937, University of Washington; graphics, design.

Rolfe, George R. \* 1984, (Adjunct); MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Rosner, Arnold S. \* 1966, (Emeritus); MSCE, 1949, California Institute of Technology; design process, building technology, computers.

Ryan, Dennis M. \* 1974; PhD, 1976, University of Pennsylvania; community planning, design, and identity; public processes; urban design, change, and continuity.

Sasanoff, Robert \* 1963, (Emeritus); MCP, 1968, University of California (Berkeley); design process, person-environment relations.

Winterbottom, Daniel M. \* 1993, (Adjunct); MLA, 1988, Harvard University; culture and environment, place attachment, building as design expression, therapeutic gardens.

### Assistant Professors

Anderson, Alex Thomas \* 1998; PhD, 1997, University of Pennsylvania; history and theory of architecture and decorative arts.

Do, Yi-Luen Ellen \* 1999; MDes, 1991, Harvard University; PhD, 1998, Georgia Institute of Technology; diagramming and freehand sketching, creativity, computer-aided design, cognitive studies.

Hill, Kristina \* 1997, (Adjunct); MLA, 1990, PhD, 1997, Harvard University; spatial patterns of land use, GIS mapping, land classification techniques, landscape ecology.

Johnson, Brian Robert \* 1978; MArch, 1981, University of Washington; computing in architectural design; 3D modeling and rendering; Web-based collaboration, communication.

Johnson, Julie M. \* 1995, (Adjunct); MCP, 1988, Massachusetts Institute of Technology; design and use of public/civic space, neighborhood design, suburban redevelopment.

Jones, Susan H. \* 1991; MArch, 1988, Harvard University; architectural design: the conceptual and tectonic ideas of making space.

Prakash, Vikramaditya \* 1996; MA, 1989, PhD, 1994, Cornell University; non-Western, Asian, Indian architecture; cultural and postcolonial studies, Le Corbusier, modernism.

### Senior Lecturers

Onouye, Barry S. \* 1967; MSCE, 1969, University of Washington; integration of structural technology into architectural design education.

Vanags, Andris 1969; BFA, 1968, University of Washington; building science, design.

Zuberbuhler, Douglas \* 1967; MArch, 1968, University of Washington; graphics, design, building technology.

### Lecturers

Dee, Jennifer 1982; MArch, 1984, University of Washington; theory, design.

Nicholls, James Keith 1995; BArch, 1986, University of British Columbia (Canada); design, industrial design, construction technology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ARCH 400 Architectural Design IV (6)** Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 302.

**ARCH 401 Architectural Design V (6)** Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 400.

**ARCH 402 Architectural Design VI (6)** Selection of studio sections that introduce advanced architectural design theories and methods. Focus and format vary. Prerequisite: ARCH 401.

### ARCH 403 Architectural Problems (6)

**ARCH 411 Computer Graphics Applications (3)** *Johnson* Lectures and weekly exercises focus on understanding and applying the underlying principles of 3D computer graphics and rendering software. Topics include user-interface, data creation and modeling, lighting models, smoothing, texture mapping, ray tracing, radiosity, animation, and solid modeling. Prerequisite: ARCH 370.

**ARCH 412 Architectural Illustration and Presentation (3)** Issues, conventions, and techniques used in architectural renderings, including line drawings, shaded drawings, use of color, composition, organization, advanced perspective, scale figures, entourage, reflections, and media. Prerequisite: ARCH 315.

**ARCH 413 Architectural Photography Projects (3)** Students develop in-depth photo essays relating to architecture, the urban movement, or landscape design following the principles introduced in ARCH 313. Lectures, seminar, and discussion. Prerequisite: ARCH 313.

**ARCH 415 Architectural Sketching (3)** Exercises in freehand representational drawing using charcoal, graphite, and conte crayon with emphasis on line, proportion, values, and composition. Studies progress from geometric to nongeometric forms. Recommended: either ARCH 210 or ART 104.

**ARCH 418 Watercolor Drawing (3)** Introduction to the principles and practice of using transparent watercolor for the naturalistic representation of objects, people, and interior and exterior space. Recommended: either ARCH 210 or ART 104.

**ARCH 420 Structural Design I (4) NW** Reinforced concrete fundamentals; establishes basics of reinforced concrete behavior and introduces methods of design used in current engineering practice. Basic mechanics of structural concrete introduced in examining bending, shear, and axial forces. Topic areas include beams, slabs systems, columns, foundations, retaining walls, and an introduction to prestressed concrete. Prerequisite: ARCH 322.

**ARCH 421 Structural Design II (4)** Design of steel structures.

**ARCH 426 Structural Unit Masonry (3)** *Lebert* Structural behavior and design of reinforced brick, tile, and unit masonry structures. Prerequisite: CEE 381. Offered: jointly with CEE 455.

**ARCH 430 Materials and Processes (3)** *Vanags* Lectures, field trips, and laboratory sessions directed toward the nature, potentials, and limitations of a variety of materials (wood, metal, plastics, inorganic cementing materials, minerals, rocks, and clay) and the processes involved with their production, fabrication, and system compatibility.

**ARCH 431 Environmental Control Principles (3)** *Heerwagen* Daylighting of buildings, reducing noise and enhancing sound for communication, and regulating heat transfer for occupant thermal comfort; description of passive means for environmental control, including presentation of scientific explanations and design guidelines for utilizing these means; design guidelines are intended for use in the preliminary schematic design phase. Offered: AW.

**ARCH 432 Construction Materials and Assemblies II (3)** Lectures and readings pertaining to a survey of materials, assemblies, and techniques of assembly of concrete and steel frame, commercial exterior envelope, and interior partitioning building construction systems. Prerequisite: either ARCH 400 or CM 313.

**ARCH 433 Active Control Systems for Building Operation (3) NW** *Heerwagen* Electrical, mechanical (HVAC), plumbing, and fire safety systems for buildings. Descriptions of what these systems do, where they are used, how they are integrated into the overall building design; rules of thumb, design strategies, and short cuts for anticipating system design and use. Prerequisite: either ARCH 331 or ARCH 431.

**ARCH 434 Color and Light (3)** *Millet* Lectures, demonstrations, exercises, and projects focusing on the use of color applied to the three-dimensional architectural context. Color theory is explored with the multiple effects of changing light.

**ARCH 435 Principles and Practices of Environmental Lighting (3)** *Millet* Perception-based approach to principles of natural and artificial lighting. Practical considerations of lighting involving environmental evaluations, calculations and the use of lamps and fixtures. Sketch and model studies for applications. Impact of lighting design on energy conservation. Relation of lighting design process to architectural design concepts. Prerequisite: either ARCH 331 or ARCH 431.

**ARCH 436 Building Acoustics (3) NW** *Heerwagen* Description of principles and practices for manipulating and enhancing sound in buildings. Information about sound behavior and the organization of architectural elements (deployment of design features, including various geometries and materials) for the control of sound in enclosed spaces and between adjacent spaces.

**ARCH 437 Passive Thermal Controls (3) NW** *Heerwagen* Devices for achieving energy-efficient buildings, analytic methods for evaluating likely thermal performances of buildings and building envelopes, resistance and capacitance of building materials, air flow through and around buildings, energy codes and industry standards, and strategies for integrating analytic techniques and guidelines into the architectural design process. Prerequisite: either ARCH 331 or ARCH 431.

**ARCH 439 Light Frame Building Assemblies (3)** *Vanags* Fundamentals of light-frame construction from soils examination, foundation systems to framing systems, and the integration of electrical, plumbing, and heating/cooling into the structure. Prerequisite: either ARCH 332 or CM 313.

**ARCH 443 Iberoamerican Architecture I: Meso-America (3) VLPA** *Palleroni* Advanced introduction to precolonial, colonial, and postcolonial architecture and urbanism of Mexico and Meso-America. Using methodologies drawn from culture studies, covers approximately four distinct periods spanning from Teotihuacan to the late twentieth century.

**ARCH 444 Iberoamerican Architecture II (3) VLPA** *Palleroni* Advanced introduction to postcolonial and modern architecture and urbanism of the Iberian peninsula and Latin America. Using methodologies drawn from culture studies, covers the cultures of Spain, Portugal, and Latin America after the period of colonialization and the nature of their continued relationship.

**ARCH 445 South Asian Architecture I (3) VLPA** *Prakash* Advanced introduction to precolonial architecture and urbanism of South Asia. Using methodologies of culture studies, examines select Hindu, Buddhist, and Islamic case studies on a comparative genealogy.

**ARCH 446 South Asian Architecture II (3) VLPA** *Prakash* Advanced introduction to colonial and postcolonial architecture and urbanism of South Asia. Using methodologies of culture studies, covers 1800 to present, emphasizing the past 50 years since India's independence in 1947.

**ARCH 447 Universal Design (3) I&S** *Kiyak* Addresses implications of recent social trends and legislation (e.g., American with Disabilities Act, extended lifespan, elimination of mandatory retirement, changing workforce) on design; emphasizes importance of integrating accessibility design concepts, including related laws and codes, into diverse design projects, in order to make environment usable by broad cross-section of people. Offered: A.

**ARCH 452 Characteristics of Puget Sound Architecture and Towns (3) I&S** *Hildebrand* Puget Sound architectural and town environment in terms of its historical development, but specifically including recent and pending changes affecting this environment in significant ways.

**ARCH 454 Greek Architecture (3) VLPA** *Langdon* Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ART H and CL AR 446.

**ARCH 455 Special Studies in Gothic Art and Architecture (3) VLPA** *Hildebrand* Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and England. Offered: jointly with ART H 455.

**ARCH 456 Nineteenth-Century Architecture (3) VLPA** *Clausen* From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Offered: jointly with ART H 490.

**ARCH 460 Design Theory and Analysis (3) VLPA/I&S** *Dee, Seligmann* Problematical nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism.

**ARCH 461 Recent Developments in Architectural Theory (3) VLPA/I&S** Concentrates particularly on developments that spring from recent work in the epistemology of science and in philosophy.

**ARCH 462 Spatial Composition in Architecture (3)** *Palleroni* Advanced introduction to compositional strategies in architecture. Drawing on a historical survey of the development of Western Architecture, the seminar investigates different compositional

strategies and their relationship to cultural values and systems of meaning. Intended as complement to the design studio.

**ARCH 463 Theories of Representation (3)** *Anderson* Seminar focusing on the development of representational techniques in western architecture from antiquity to the present which seeks to discover how these techniques have affected the realization and interpretation of architecture. Prerequisite: ARCH 350, ARCH 351, ARCH 352.

**ARCH 476 Design and the Uniform Building Code (3)** Lectures, case studies, and exercises to provide a detailed review of non-structural sections of the Uniform Building Code (UBC) including designer responsibility, code background, purpose, and requirements based on occupancy, construction type, and building design features. Prerequisite: either ARCH 302 or CM 313.

**ARCH 478 Architectural Computer Aided Design Systems (4)** *Johnson* Lectures and exercises in use of two-dimensional CAD as a tool to create working drawings (WD). CAD topics include data, accuracy, layering, symbols, 3D, customization, data exchange. WD topics include set organization, plans, building sections, elevation, wall sections, schedule, detail. Prerequisite: ARCH 370; CM 313.

**ARCH 488 American Architecture (3) VLPA** *Clausen* American architecture from indigenous native American traditions to the present. Offered: jointly with ART H 488.

**ARCH 493 Rome Preparation Seminar (2)** Seminar dealing with history, culture, topography, and customs of Rome, Italy. Required for students enrolling in 495, 496, or 497.

**ARCH 495 Architectural Studies Abroad (9)** Urban history and development of the city of Rome through first-hand studies of its topography and morphology. City's more recent quarters become subject of group research relative to problems and potentials of growth and future development. Students may be registered concurrently in an appropriate studio section. Prerequisite: ARCH 493.

**ARCH 498 Special Projects (1-12, max. 12)** Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter.

**ARCH 499 Undergraduate Research (1-6, max. 6)**

## Courses for Graduates Only

**ARCH 500 Architectural Design Studio (6)** Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on preservation design. Majors only.

**ARCH 501 Architectural Design Studio (6)** Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on urban design. Majors only.

**ARCH 502 Architectural Design Studio (6)** Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on design development. Majors only.

**ARCH 503 Architectural Design Studio Options (6)** Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

**ARCH 504 Architectural Design Studio Options (6)** Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

**ARCH 505 Architectural Design Studio Options (6)** Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

**ARCH 506 Advanced Architectural Studies (6)** Advanced experimental studies dealing with significant architectural relationships that involve scholarly investigation, development, and presentation of results.

**ARCH 520 Advanced Wood Structures Design (3)** *Albrecht* Design methods related to wood structures. Nature of wood as a building material, plywood, glued laminated wood structures, timber piles and pile foundations, pole buildings, and conventional wood building framing.

**ARCH 529 Seminar in American Architecture (5)** *Clausen* Topics vary. Offered: jointly with ART H 592.

**ARCH 535 Graduate Seminar: Study Topics in Environmental Lighting (3)** *Millet* Focus on individual student projects involving research and design for lighting.

**ARCH 540 Evolution and Aesthetics (3)** *Hildebrand* Exploration of new views toward the theory and philosophy of architectural aesthetics in which responses are seen as driven, in part, by predilections contributive to biological survival and evolution.

**ARCH 551 Scandinavian Architecture of the Nineteenth and Twentieth Centuries (3)** *Nyberg* Introduction to the contribution of Scandinavian architecture to early functionalism with emphasis on its relationship to neoclassicism and vernacular architecture.

**ARCH 553 Special Studies in Architecture in the Ancient World (3)** *Bosworth* Study and critical analysis of a selected topic from classical or preclassical periods. Prerequisite: ARCH 350.

**ARCH 556 History of Chicago School Architecture (3)** *Pundt* Study and critical investigation of the contribution of major architects in Chicago, the Midwest, and the West Coast from circa 1870 to 1920.

**ARCH 557 Neoclassicism and Romanticism in Europe and America (3)** *Pundt* Study and critical investigation of European and American architecture and urban design from 1750 to 1850.

**ARCH 558 Seminar in Twentieth-Century Architecture (3/5)** *Clausen* Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in architecture, architectural history, or permission of instructor. Offered: jointly with ART H 591.

**ARCH 559 American Utilitarian Architecture (3)** *Hildebrand* Significant American environmental design efforts arising from utilitarian needs, e.g., factories, bridges, skyscrapers, and associated technical building innovations.

**ARCH 560 Graduate Seminar on Architectural Theories (3)** *Dee, Nyberg, Seligmann* Recent developments in architectural theory, urban design theory, criticism, and the methodology of criticism.

**ARCH 561 Urban Design Theory (3)** Study of development of nineteenth- and twentieth-century urban design theories and parallel developments in architecture and urban planning. Theoretical premises are related to current practices of urban design in various sociopolitical contexts, European as well as American. Evolutionary nature of theory emphasized. Prerequisite: URBDP 479 or permission of instructor.

**ARCH 562 Regionalism (3)** *Nyberg* Exploration of design ideas that address the cultivation of regional character by acknowledging the commonplace, including both the landscape and its buildings. The many disruptive forces that threaten the possibilities of local culture are also considered from a political, social, and economic point of view.

**ARCH 563 Graduate Seminar in Architecture and Cultural Theory (3)** *Prakash* Study of contemporary cultural studies and postcolonial writings in terms of their impact on architectural theory and practice. Topical seminar based on reading and individual research. Offered: W.

**ARCH 570 Design Development (3)** *Miller* Lectures and case studies emphasizing the design development phase of architectural practice.

**ARCH 571 Project Feasibility (3)** Social, political, and economic factors affecting the location, design, financing, construction, and marketing of buildings.

**ARCH 572 Specifications and Contracts (3)** *Brown* Detailed organization and composition of contracts, specifications, and related contract documents.

**ARCH 573 Professional Practice (3)** *Rees* Operation of an architectural office and professional practice.

**ARCH 574 Design and Construction Law (3)** Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with CM 500.

**ARCH 581 Historic Preservation of Architecture, USA (3)** *Pundt* American achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

**ARCH 582 Technical Issues in Preservation Design (3)** *Sivinski* Issues, practices, and procedures involved in preservation and reuse of old and historic buildings. Technical and esthetic means by which practicing professionals approach the analysis, interpretation, and resolution of problems such work raises. Emphasis on recent and local projects and related experiences.

**ARCH 583 History of Historic Preservation in Europe (3)** *Pundt* European achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

**ARCH 590 Urban and Preservation Issues in Design (3)** Introduction to recent theory and practice in the fields of urban design and historic preservation primarily in North American urban contexts, including examples of recent projects presented by practicing professionals.

**ARCH 591 Architecture in the Landscape (3)** *Loveland* Advanced introduction to the relationships between buildings and places in the landscape with an emphasis on western concepts of nature. A taxonomy of place as nature is developed. Ways in which the architect can design places that landscape taxonomy are explored.

**ARCH 593 Residential Design: Methods and Practices (3)** Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods, and practices. Offered: jointly with URBDP 574.

**ARCH 596 Fieldwork in Professional Practice (\* max. 9)** On-location study under the supervision of a practicing professional involved in an aspect of environmental design. Credit/no credit only.

**ARCH 598 Special Topics for Graduate Students (1-6, max. 6)** Systematic study and offering of specialized subject matter. Topics vary and are announced in the preceding quarter. May be repeated for credit.

**ARCH 600 Independent Study or Research (\*)** Credit/no credit only.

**ARCH 700 Master's Thesis (\*)** Credit/no credit only.

## Construction Management

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General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Construction\\_Management.html](http://www.washington.edu/students/genocat/academic/Construction_Management.html)



Department Web page:  
[depts.washington.edu/cmweb/](http://depts.washington.edu/cmweb/)

The construction industry requires highly qualified professionals to manage its increasingly complex technical and management operations. The Department of Construction Management offers high-quality education and training to meet this demand. The interdisciplinary curriculums contain a mix of technical, managerial, and business courses to provide graduates with the essential skills needed to be successful in the construction industry. Oral and written communication skills are strengthened through written requirements and student presentations.

Construction Management is one of four departments within the College of Architecture and Urban Planning. The department was originally established as the Building Technology and Administration program in 1964; it began offering a Bachelor of Science in Building Construction degree in 1968 and a Master of Science in Construction Management degree in 1994. The mission of the Department of Construction Management is to offer a high-quality education in building construction and to conduct construction-related research.

The major objectives of the department's educational programs are:

1. To provide a valuable education that can prepare individuals to assume technical- and management-level positions in the construction industry.
2. To serve society and the construction industry each year by graduating 45 students who can obtain employment in the construction or related industries.
3. To provide a learning environment where students can acquire the technical skills and knowledge necessary for solving practical construction problems and managing the construction process.
4. To remain in full accreditation status by the American Council for Construction Education.

Emphasis is on course work that enables graduates to develop (1) technical skills necessary to define and solve practical construction problems; (2) self-discipline, analytical, and reasoning skills; (3) managerial skills necessary to make and implement sound and timely decisions in a prudent and professional manner; (4) broader perspectives of the humanities and social and natural sciences; and (5) the ability to effectively communicate verbally and in writing.

The department's faculty consists of a mix of permanent full-time professors and part-time lecturers. The full-time faculty members have construction experience. The part-time lecturers are mostly industry practitioners and include general contractors, specialty contractors, architects, engineers, and attorneys.

## Graduate Program

Graduate Program Coordinator  
116 Architecture Hall, Box 351610  
(206) 685-4440

### Master of Science in Construction Management

The evening Master of Science in Construction Management degree program makes high-quality graduate education accessible to working professionals. All graduate courses are offered during the evening to accommodate people who work during the day. The curriculum was developed with industry input to provide graduates with the skills desired by the construction industry. The graduate curriculum has been structured to build upon the educational foundation gained in an undergraduate building-construction or construction-management curriculum. Students with different educational backgrounds will need to take prerequisite courses, as discussed below. Admission is competitive and students are admitted in autumn, winter, and spring quarters. Applications must be submitted by July 1 for autumn quarter, November 1 for winter quarter, and February 1 for spring quarter.

**Admission Requirements:** Admission to the Graduate School is granted by the Dean of the Graduate School. Application for admission is made to the Office of Graduate Admissions. The prospective student must hold a baccalaureate degree from an accredited college or university in the United States or its equivalent from a foreign institution. The applicant must submit a completed UW graduate application form and official transcripts from all previously attended colleges, universities, and institutes. A prospective student must present recent scores (within the past five years) from the Graduate Record Examination (GRE) that indicate a potential for successful completion of a Master of Science in Construction Management degree. The applicant should have at least a 3.00 GPA in the last 90 graded quarter hours, or last 60 graded semester hours. International applicants should refer to the Graduate School section of this catalog for English language testing requirements. In addition, the Department of Construction Management requires a statement of personal goals and three letters of reference. All applications are reviewed by the department's Graduate Admissions Committee who make a recommendation regarding each applicant to the Dean of the Graduate School.

**Prerequisite Requirements:** All students admitted to the program who do not possess an undergraduate degree in building construction or construction management must complete the following prerequisite courses prior to admission into the graduate program or during their graduate studies: CM 333, 410, 411, 421, 422. All these prerequisite courses are offered during the day on a space-available basis with undergraduate students, or during the evening in the Construction Management Certificate Program offered by UW Extension. Three of the 400-level prerequisites may be counted toward elective requirements, if the student has been admitted to the graduate program prior to taking the prerequisites.

All students who do not have undergraduate degrees in building construction, construction management, engineering, or architecture must take the following prerequisites in addition to those previously listed: ARCH 320, 321, 322; CM 310, 313, 320, 321, 322, 323, 331, 332. Most of these prerequisites must be completed prior to admission into the graduate program.

Prerequisite courses may be validated if similar courses are reflected on the student's undergraduate transcript or if the student desires to take a validation examination. Students desiring to take a validation examination should contact the department's graduate program coordinator.

*Graduation Requirements:* The Master of Science in Construction Management degree program requires completion of a minimum of 45 credits of course work with at least a 3.00 cumulative GPA and satisfactory completion of either a thesis or report/project. A maximum of 6 credits may be earned for a report/project, and a maximum of 9 credits may be earned for a thesis.

## Faculty

### Chair

Saeed Daniali

### Professor

Daniali, Saeed 1997; PhD, 1975, University of Lille (France); structural design, failure analysis, value engineering, fiber reinforced plastics, marine structures.

### Associate Professors

Donnette, James J. \* 1966, (Emeritus); MArch, 1969, University of Washington; graphics, design.

Goldblatt, Steven M. 1982; JD, 1977, Golden Gate University; construction law, labor relations, and accounting.

Nemati, Kamran M. 1998; PhD, 1994, University of California (Berkeley); civil engineering materials, concrete technology, mechanical behavior of concrete, fracture mechanics.

Rolfe, George R. \* 1984; MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Schaufelberger, John E. 1994; MSCE, 1970, PhD, 1971, University of Illinois; construction practices, international project management, contract procurement and administration.

Torrence, Gerard R. 1954, (Emeritus); MS, 1950, Massachusetts Institute of Technology; structures.

### Assistant Professors

Pace, Clark B. 1994; PhD, 1999, University of California (Berkeley); productivity improvement, innovative affordable housing, process of new technology development.

Riley, David R. \* 1995; PhD, 1994, Pennsylvania State University; construction space planning, materials handling, sustainable building and educational technology.

Woolery, John C. 1999; PhD, 1979, University of California (Berkeley); cost estimating, wireless communications, operation research applications.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscaat/](http://www.washington.edu/students/crscaat/).

**CM 411 Project Planning and Control (3)** *Pace* Introduction to the basic principles, techniques, and practices used as tools by contractors to plan, schedule, and control costs on building construction projects. Offered: A.

**CM 412 Construction Practice (3)** *Woolery* Integration of classroom theory with practical experience through a direct, on-the-job internship and industry guest speakers. For majors in construction management with 135 credits completed. Offered: Sp.

**CM 413 Competitive Business Presentations (1)** *Riley* Study and development of skills needed to develop and deliver professional construction management presentations. Includes a series of workshops and practical exercises in construction presentation skills, teamwork, and leadership. Offered: A.

**CM 421 Project Management I (3)** Introduction to the organization, management, and administrative functions on construction projects including a hands-on and extensive case study of a commercial construction project, cost control, and introduction to the concepts of Value Engineering, partnering, and Total Quality Management. Offered: W.

**CM 422 Computer Applications in Construction (3)** *Nemati* Introduction to microcomputer applications in construction industry. Discussion of available hardware and software is combined with practical assignments using estimating and scheduling programs designed for contractors, architects, and developers. Offered: W.

**CM 423 Construction Law (3)** *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Washington state law is emphasized. Entry code required. Open to nonmajors on space-available basis. Offered: W.

**CM 431 Project Management II (4)** *Riley* Capstone project using case studies to apply skills, knowledge, techniques, and concepts developed in prior courses. Emphasis on the concept of integrated project management, including cost estimating and bidding, scheduling, cost control, safety, project organization, and documentation. Offered: Sp.

**CM 432 Soils and Foundations (3)** *Nemati* Origin, classification, and physical properties of soil as used in engineering and construction applications, together with loads and stresses of soil on, and from, the more common types of engineering structures. Offered: Sp.

**CM 433 Construction Labor Relations (4)** *Goldblatt* Introduction to construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Offered: Sp.

**CM 454 Introduction to Real Estate Finance (4)** *Rolfe* Introduction to the financing of real-estate development projects, including a survey of capital markets, banking regulations, interest/discounting theories, debt instruments, and project financing. Offered: jointly with URBDP 454.

**CM 455 Introduction to Real Estate Development Processes (5)** *Rolfe* Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Offered: jointly with URBDP 455.

**CM 456 Real Estate Investment Seminar (4)** *Rolfe* Analysis of private and public real estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in 453, 454, and 455. Prerequisite: URBDP 455 or CM 455. Offered: jointly with URBDP 456; W.

**CM 498 Special Topics (1-10, max. 20)**

**CM 499 Undergraduate Research (\* max. 12)** Individual or small-group studies in which students may select topics with approval of faculty sponsor and department.

## Courses for Graduates Only

**CM 500 Design and Construction Law (3)** *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with ARCH 574. Offered: WS.

**CM 505 Advanced Integrated Computer Applications (3)** Study of management information systems used in the construction industry. Emphasis on the utilization of current state-of-the-art integration of Computer Aided Design (CAD), scheduling (including advanced concepts such as resource leveling, schedule compression, and cash flow projections), and estimating programs. Offered: S.

**CM 510 Advanced Construction Techniques (3)** *Nemati* Study of techniques and practices used in complex construction projects, including industrial and high-rise structures, building renovation, and tenant improvements. Offered: A.

**CM 515 Innovative Project Management Concepts (3)** *Schaufelberger* Study of innovative concepts and trends in project management such as partnering, construction automation, and their application to construction projects. Total Quality Management, effective communication principles, leadership and team building are also examined. Offered: W.

**CM 520 Construction Procurement Systems (3)** *Schaufelberger* Study of the different methods used in the procurement and delivery of projects in the construction industry including lump sum, unit price, cost-plus, design-build, and construction management contracts. Offered: A.

**CM 525 Cost Analysis and Management (3)** *Pace* Study of cost management procedures applicable to the building process from the conceptual phase through owner operations, including conceptual estimating, project cost analysis and control, and value engineering and life-cycle costing. Offered: W.

**CM 545 Real Estate Development (3)** *Leahy* A study of the technical issues involved in developing real-estate projects. Tracks project development from initial conception through closing of the sale. Emphasizes the steps and processes involved in pursuing, analyzing, and closing a real-estate purchase. Offered: A.

**CM 550 Residential Project Development (3)** *Leahy* Study of the financial, technical, and management activities and environmental impact regulations and studies associated with the development of residential projects, including business and construction practices and marketing strategies for continued profitable operation of a residential construction firm. Offered: Sp.

**CM 555 Construction Firm Management I (3)** *Schaufelberger* Management of construction company including organization, corporate structure, operation procedures, marketing, and human resources management. Emphasis on safety and loss prevention management, insurance and risk management, financing, accounting, marketing construction services, and bonding requirements for construction company. Other topics include individual and corporate planning and process of strategic planning. Offered: W.

**CM 560 Construction Firm Management II (3)** *Huppert* Examination of the business practices, including market feasibility studies, related to use of Management Information Systems (MIS) in a construction company. Offered: Sp.

**CM 565 Managing International Projects (3)** *Schaufelberger* Study of processes involved in the selection, acquisition, and management of international construction projects. Emphasis is placed on examining common problems associated with managing construction projects outside the United States, identifying risks involved, and discussing possible solutions. Offered: Sp.

**CM 570 Facilities Management (3)** *Emam* Major issues involved in facilities management: facilities planning, financial planning, real estate management, interior space planning and management, facilities operation and maintenance, and emergency preparedness. Offered: A.

**CM 598 Special Topics (1-6, max. 6)** Systematic study and offering of specialized subject matter. Offered: A/WSpS.

**CM 600 Independent Study or Research (\* max. 6)** An in-depth independent investigation of some facet of construction management. Offered: A/WSpS.

**CM 700 Master's Thesis (\* max. 10)** Offered: A/WSpS.

## Landscape Architecture

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General Catalog Web page:

[www.washington.edu/students/genocat/academic/Landscape\\_Arch.html](http://www.washington.edu/students/genocat/academic/Landscape_Arch.html)



Department Web page:

[www.caup.washington.edu/html/larch/](http://www.caup.washington.edu/html/larch/)

## Graduate Program

Graduate Program Coordinator  
448 Gould Hall, Box 355734  
(206) 543-2564, (206) 616-3582  
[cauplarc@u.washington.edu](mailto:cauplarc@u.washington.edu)

## Master of Landscape Architecture

The Master of Landscape Architecture program, accredited by the American Society of Landscape Architects, is a professional program that offers training in design and inquiry. The design studios form the core of this program, which is supported by rigorous independent investigation in seminars and in a thesis project. Students are expected to develop a specialty within the discipline, under the professional guidance of the faculty. The curriculum emphasizes the following:

*Urban Ecology.* The rapidly changing environment of the Pacific Northwest offers an excellent opportunity for courses and thesis projects to explore the connections between culture and nature and to test ideas for how social and spatial conflicts between development and conservation might be addressed. The faculty are particularly interested in the changing roles of familiar urban and suburban landscapes, as these areas are increasingly expected to function as part of an ecological infrastructure. At the same time, diverse human cultural communities have developed with differing perceptions of and values for these changing landscapes. This department offers students the opportunity to study the rich cultural resources of these human communities as they develop new relationships to their environments, and to participate in this overlap between natural and cultural processes. The department currently offers students exposure to the social, cultural, and natural environment of central Mexico as an international example of community development and design.

*Design Leadership.* The faculty is committed to training students to be leaders in design practice and education. This includes the education of both children and adults to understand the consequences of human transactions with the natural environment. Courses are offered and research is being conducted on designing outdoor educational environments. Graduate students are also encouraged to develop independent leadership skills which will provide them with self-confidence and adaptability in a rapidly changing professional world. The primary areas in which students are encouraged to develop leadership abilities are in the definition and practice of design as a basis for interdisciplinary work, environmental education and the application of ecological concepts to urban design, the use of communication technology to develop creative solutions to cultural and environmental conflicts, and international design-build projects in which students confront the global nature of contemporary development issues.

The graduate program considers applicants with and without previous design education, and encourages applications from persons with diverse academic and professional backgrounds. The faculty is experienced in teaching mature students and seeks to admit students with a range of ages, backgrounds, and interests. Students are encouraged to benefit from the location of the department within a broad and excellent research university by adding elective courses in other disciplines to their core curriculum. In addition, graduate students may elect to participate in College-wide certificate programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

## Program Requirements

Specific program requirements are arranged to fit each student's individual background. Seminar and field courses are selected to help students achieve their educational goals and develop a credible specialty area within landscape architecture. Students with a previous degree in landscape architecture begin course work with the Required Graduate Curriculum studios, while students from other educational backgrounds begin with the Basic Core design studios. The Required Graduate Curriculum sets the academic work required for the degree at 72 approved credits. In addition, a specialization must be developed in the area of a student's individual interests, which is worth 12 credits. This encourages students to deepen their knowledge in a particular area, while maintaining substantial flexibility for each individual.

A thesis is required of all master's degree program students. This is a creative, scholarly project which includes a rigorous written component. The thesis process allows students to develop greater intellectual maturity through independent inquiry, and to demonstrate mastery of a specialized subject area. Students select an appropriate methodology for the thesis in cooperation with their thesis adviser, and present the final product in either written and graphic form, or only in written form.

## Admission Requirements

Candidates applying to the Master of Landscape Architecture program must apply both to the Graduate Admissions Office and to the Department of Landscape Architecture by January 15 to be considered for admission the following autumn quarter.

Admission to the Graduate School requires (1) a baccalaureate degree from an accredited U.S. college or university, or its equivalent in a foreign institution; (2) a GPA of 3.00 or higher in the last 90 graded quarter hours or the last 60 graded semester hours; and (3) a Graduate Record Examination (GRE) score taken within the past three years.

Admission to the Master of Landscape Architecture program is a competitive process with priority given to applicants whose abilities, as determined by the department's admissions committee, will enable them to complete the program expeditiously and with a high level of achievement. Please contact the department for additional information.

## Faculty

### Chair

Iain M. Robertson

### Professors

Bradley, Gordon A. \* 1972, (Adjunct); PhD, 1986, University of Michigan; forest land use planning, conservation area planning, urban forestry.

Haag, Richard 1958, (Emeritus); MLA, 1952, Harvard University; theory and perception of landscapes, master planning, urban recreation, recycling landscapes.

Johnston, Norman J. \* 1960, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Ochsner, Jeffrey K. \* 1987, (Adjunct); MArch, 1976, Rice University; history, preservation design, urban design.

Schauman, Sally \* 1979; MS, 1971, University of Michigan; landscape ecology, stressed landscapes, countryside conservation.

Streatfield, David C. \* 1974; MLA, 1965, University of Pennsylvania; history, historic landscape preservation, landscape theory, urban landscape design.

Sutton, Sharon E. \* 1998, (Adjunct); MArch, 1973, Columbia University; PhD, 1982, City University of New York; effect of the environment on learning and community well-being.

Vernez Moudon, Anne \* 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

### Associate Professors

Booth, Derek B. \* 1980, (Adjunct Research); PhD, 1984, University of Washington; geomorphology, environmental geology.

Dubrow, Gail Lee \* 1989, (Adjunct); MA, 1979, University of Oregon; PhD, 1991, University of California (Los Angeles); preservation, urban design, public art, public history, gender, multiculturalism.

Ewing, Kern \* 1990, (Adjunct); PhD, 1982, University of Washington; wetland plant ecology, urban ecology, ecosystem management.

Hamilton, Clement Wilson \* 1985, (Adjunct); PhD, 1985, Washington University; landscape plant selection, taxonomy of horticultural and tropical plants.

Horner, Richard R. \* 1981, (Research); PhD, 1978, University of Washington; wetland and stream conservation and storm water management.

Loveland, Joel E. \* 1986, (Adjunct); MArch, 1980, University of California (Los Angeles); energy conservation, design, research.

Palleroni, Sergio A. \* 1992, (Adjunct); MS, 1987, Massachusetts Institute of Technology; the relationship between cultures, their histories, and the production of architecture.

Robertson, Iain M. \* 1982; MLA, 1975, University of Pennsylvania; planting design, planning and design of arboreta/botanical gardens, assessment of design education.

Winterbottom, Daniel M. \* 1993; MLA, 1988, Harvard University; culture and environment, place attachment, building as design expression, therapeutic gardens.

**Assistant Professors**

Alberti, Marina \* 1996, (Adjunct); PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Hill, Kristina \* 1997; PhD, 1997, Harvard University; spatial patterns of land use, GIS mapping, land classification techniques, landscape ecology.

Johnson, Julie M. \* 1995; MCP, 1988, Massachusetts Institute of Technology; design and use of public/civic space, neighborhood design, suburban redevelopment.

Wolf, Kathleen L. 1994, (Adjunct Research); MLA, 1987, PhD, 1993, University of Michigan; urban forest environment, behavior.

**Lecturers**

Deutsch, Barbara L. 1995; MLA, 1997, University of Washington; landscape planning, growth management issues, marketing the profession.

Hamilton, Roxanne 1994; MLA, 1992, University of Washington; cultural landscapes; native American community design; therapeutic, restorative landscapes.

MacElroy, William P. 1996; MLA, 1983, University of Michigan; nature and urban environments, storm water management, role of craft in landscape architecture.

Smith, Luanne 1997; MLA, 1984, University of Oregon; design, planting, learning environments, children, art.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**L ARCH 401 Urban Recreation Design (1-6) VLPA/I&S** Special studies in metropolitan, urban, and neighborhood recreation areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

**L ARCH 402 Site Design/Cluster Housing (1-6, max. 6)** Large-scale site planning and design. Generally related to housing, new communities, and institutional development. Identification of landscape character, resources, and problems of site, cost factors, design alternatives and implications for architectural direction, policy for land acquisition. Program development to maximize site utilization and preservation of natural attributes.

**L ARCH 403 Cultural Landscape Studio (1-6, max. 6)** Studies of the landscape at various scales and in diversified contexts. Offers better understanding of visual components of landscapes, designer's capacity to evaluate and change these components, and resultant interaction with, and effect on, landscape user.

**L ARCH 406 Individual Design Studio (6)** Senior projects in landscape architecture; projects vary according to the student's particular emphasis and needs.

**L ARCH 411 Landscape Graphics (3)** Delineation techniques for landscape perspectives, sections, rendering of plant materials. Historical and contemporary examples of landscape drawing.

**L ARCH 412 Landscape Communications (2)** Multimedia and video production techniques and presentation methods suitable for public hearings, citizen groups, design commissions, and private clients. Individual projects and case-study examples.

**L ARCH 423 Planting Design Studio (3)** Utilization of plants as design elements to manipulate space and modify the landscape for various activities and resolutions of site problems. Factors that determine the appropriate use and arrangement of plant materials in an urban context. Composition, plant selection, planting techniques, and maintenance requirements are major components of this class.

**L ARCH 425 Advanced Planting Design Studio (1-6, max. 6)** Advanced seminar/studio in planting design. Provides opportunity to explore ecological, technical, and esthetic principles for selecting plants to meet specific site conditions. Project types include historical sites, multifamily housing projects, plazas, landfills, and reclamation sites.

**L ARCH 433 Large-Scale Site Construction (4)** Includes studies of natural determinants and restraints on large-scale construction, development affected by service and utility systems, physiographic suitability of site, cost-benefit analysis, and critical path methodology for site construction projects.

**L ARCH 440 Computers in Landscape Architecture (1-3, max. 3)** Laboratory, lecture, and demonstration classes to introduce software applications specific to required landscape architecture courses. Credit/no credit only.

**L ARCH 450 History of Environmental Design in the Pacific Northwest (3) VLPA** Development of landscape architecture, architecture, and urban planning in the Pacific Northwest from nineteenth century to the present, with major emphasis on twentieth century. Open to nonmajors.

**L ARCH 451 History of Environmental Design on the West Coast (3) VLPA** Development of the environmental arts of landscape architecture, architecture, and urban planning from the eighteenth century to the present, with major emphasis on the twentieth century. Open to nonmajors.

**L ARCH 470 Landscape Architecture Tutorial (2, max. 6)** Various aspects of project organization, programming, scheduling of work loads, graphic and verbal communication problems, data collection methods and interpretation, methodologies for landscape planting and design.

**L ARCH 473 Professional Practice (3)** Professional practice in private office, academic institutions, and public agencies. Evolution of landscape architecture as a profession, possible scenarios for future, variety of practice types and their relationships, ethical and legal/contractual responsibilities of a professional.

**L ARCH 474 Project Design (1-6, max. 6)** Detailed design studies of small-to-medium-scale projects. General focus on public landscape areas and social/psychological uses of site. Specific focus on design development and professional office presentation.

**L ARCH 475 Advanced Project Design Studio (1-6, max. 6)**

**L ARCH 476 Professional Operations (3-6, max. 6)** Practicum course for landscape architecture majors for internship and exposure to the profession with working experiences at various levels of professional endeavor. Student apprenticeship in selected private offices and public agencies. Credit/no credit only.

**L ARCH 495 Landscape Architectural Studies Abroad (1-10, max. 30)** Studies conducted under faculty supervision in various locations outside the United States.

**L ARCH 498 Special Projects (1-10, max. 30)** Special projects as arranged. Open to nonmajors.

**L ARCH 499 Undergraduate Research (1-9, max. 9)** Individual or small-group studies pertaining to special problems, theories, or issues of landscape architecture and environmental issues.

**Courses for Graduates Only**

**L ARCH 501 Landscape Design and Planning I (1-6)** Enhances perceptual awareness and design sensitivity to natural and man-made landscapes. Basic skills necessary for more advanced course work required in the Master of Landscape Architecture degree program. Examination of landscape environment through problem-solving techniques that acknowledge holistic approach to the environment.

**L ARCH 503 Landscape Design of Communities (1-6)** Methods and techniques for developing physical design solutions and implementation strategies in neighborhoods and small communities. Social, economic, political, and individual forces affecting community development and growth. Comparison of several communities, identifying pertinent landscape issues, potential design solutions, and methods for achieving design goals through the political process.

**L ARCH 504 Regional Landscape Planning (1-6)** Studio in applied regional landscape planning in metropolitan regions to examine conflicting land-use pressures of urban/rural fringe. Ecosystematic approach emphasizes maintenance of landscape quality. Computer applications in design.

**L ARCH 505 Regional Landscape Design (1-6)** Theory/techniques of regional design to analyze, evaluate, plan, design, and manage the resources of the regional landscape continuum.

**L ARCH 506 Landscape Visual Resources (1-6)** Survey of existing theory/techniques and the generation of new methods to analyze, evaluate, plan, design, and manage the visual resources of the landscape.

**L ARCH 507 Landscape Art (1-6)** Public art placed in, or developed for, specific landscape settings. Various aspects and benefits of public art, including materials, technologies, philosophies of landscape imagery and meaning. General planning criteria for location for maximum public benefit and identification of objectives for a specific site and artwork.

**L ARCH 523 Landscape Technology (1-6)** Studio on rehabilitation of stressed urban landscapes. Focus varies but often deals with an analysis of the potentials in urban watershed and the study of alternative site designs for enhancing a range of landscape functions related to water quality. Taught by an interdisciplinary team.

**L ARCH 550 History and Theory of Modern Landscape Architecture (3)** Lecture/seminar on history and theory of landscape architecture from the eighteenth century to the present. Relation to theory in related environmental design disciplines such as architecture and urban planning and other disciplines such as geography.

**L ARCH 561 Regional Landscape Planning and Design (2)** Seminar on objectives, philosophy, history, and theory of regional landscape planning and design. Overview of the context of regional landscape planning, examination of critical issues in the Pacific Northwest, and opportunities and role of the landscape architect in addressing these issues.

**L ARCH 570 Scholarship and Research in Landscape Architecture (3)** Seminar on the trends and results of research related to landscape architecture. Introduction to important scholars and researchers. Open to nonmajors with permission of instructor.

**L ARCH 571 Seminar on Landscape Architecture Research (3)** Introduction and exploration of problems and opportunities of several basic research methods currently employed in landscape architecture research. Emphasis on how researchers identify research topics and develop appropriate research methods. Introduce analysis and interpretation of research results.

**L ARCH 590 Seminar in Landscape Architecture (1-3, max. 12)** Advanced topics in landscape architecture with focus on unpublished areas of research.

**L ARCH 598 Special Topics (1-6, max. 9)** Systematic study of specialized regional landscape subject matter, including history, technology, implementation, and other topics depending on current interest/needs. Topics vary and are announced in the preceding quarter.

**L ARCH 600 Independent Study or Research (\*)**

**L ARCH 601 Internship (3-9, max. 9)** Credit/no credit only.

**L ARCH 700 Master's Thesis (\*)**

## Urban Design and Planning

410 Gould



General Catalog Web page:

[www.washington.edu/students/genocat/academic/Urban\\_Des.html](http://www.washington.edu/students/genocat/academic/Urban_Des.html)



Department Web page:

[www.caup.washington.edu/html/urbdp/](http://www.caup.washington.edu/html/urbdp/)

Urban design and planning deals with critical issues of human settlement and urban development. It provides communities with an informed basis for coordinated public- and private-sector action. Urban design and planning constitutes a professional field of growing complexity, responding to the urban complexities of this century and the next. The Department of Urban Design and Planning fosters an integrative approach to education and research in planning the physical environment. The academic program includes the social, behavioral, and cultural relationships between people and the form and quality of their built and natural environment; the financial, administrative, political, and participatory dimensions of planning, design, and development; and the informational base for making deliberate decisions to shape urban areas and regions, bringing analysis together with vision.

Departmental faculty are active participants in interdisciplinary research units of the College of Architecture and Urban Planning, including the Center for Community Development and Real Estate and the Institute for Hazard Mitigation Planning and Research. Faculty also participate in the Puget Sound Regional Synthesis Model (PRISM) University Initiative Fund program. The department also administers the Remote Sensing Applications Laboratory, concerned with applications in urban planning of remote sensing and geographic information systems (GIS) technology and the Urban Ecology Research Laboratory. In addition, the College has a wide array of facilities for computer-based instruction related to design, including CAD, GIS, and visualization technology, and runs a joint program in advanced computer technology and virtual reality with the Human Interface Technology Laboratory of the Washington Technology Center.

## Graduate Program

Graduate Program Coordinator  
410 Gould, Box 355740  
(206) 543-4190

The department offers the Master of Urban Planning (M.U.P.) degree and its faculty participate in the interdisciplinary Doctor of Philosophy (Ph.D.) in Urban Design and Planning. The M.U.P. is the professional degree, while the Ph.D. is primarily for students planning to enter research and teaching positions in urban planning and design.

The graduate program focuses on planning the physical environment and its socioeconomic and political determinants. Advanced students are encouraged to conduct research and studies in one of the following specializations:

- urban design dealing with physical form, character, and quality issues
- community development and real estate including public/private development processes
- preservation planning and design
- land-use planning, including its environmental, socioeconomic, legal, information systems, and administrative aspects.

Graduate students may elect to participate in the College-wide Certificate Programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

## Master of Urban Planning

The Master of Urban Planning degree is the usual educational qualification for professional practice of city and regional planning, including generalist planning, research, urban design, and administrative positions in a wide variety of public agencies and private consulting firms. It is a two-year, or six-quarter, program requiring a minimum of 72 credits.

Requirements for graduate-level study include a satisfactory academic record and undergraduate training in one of a variety of disciplines, including urban planning and environmental design or in other appropriate fields, such as geography, economics, or other social sciences; English and other humanities; civil engineering and environmental studies; or architecture and landscape architecture. Students planning to enter the program should have completed at least one college-level course in each of the following areas: economics, mathematics, statistics, American government, environmental systems, and cultural diversity. Students without sufficient background must take these prerequisite courses concurrently with their graduate studies.

The primary objective is to educate professional planners with a broad range of competence in planning and design; a second objective is to provide opportunities for individual studies in selected professional areas. Core course requirements include 30 credits covering the history and theory of planning and urban design, urban form, communication methods, quantitative methods, processes and methods of land use planning, planning law, research methods, and a planning studio. Also required are 14 credits of restricted electives, including a course in advanced methods and a second studio; both may be in an area of specialization. In addition, a course in land-use planning and in urban development economics is required. A 9-credit thesis or professional project is required upon completion of all other degree course work. Of the 72 minimum credits required for the degree, 19 credits may be in open electives.

The core provides a foundation in urban design and planning for all students. An internship is required for those without previous professional experience. A specialization in one area of planning is encouraged. Six major specialized areas offered in the department include land-use planning and growth management, community development and real estate, urban design, preservation planning, environmental planning, and transportation planning.

Students are admitted to the M.U.P. program primarily in autumn quarter and all application material should be received by the department no later than the preceding February 1. Graduate Record Examination general test scores, three letters of recommendation, transcripts of previous degree programs and any additional academic study, and a statement of purpose are required.

## Doctor of Philosophy

Some of the departmental faculty are part of an interdisciplinary faculty group which offers doctoral study in urban design and planning. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of the catalog.

## Faculty

### Chair

Frank Westerlund

### Professors

Amoss, Harold L. 1963, (Emeritus); MA, 1947, University of New Mexico; PhD, 1951, University of California (Berkeley); planned social change, community organization.

Bell, Earl J. \* 1966, (Emeritus); PhD, 1965, University of California (Berkeley); operations research, statistics, quantitative methods and geographic information systems.

Beyers, William B. \* 1962, (Adjunct); PhD, 1967, University of Washington; economic geography, regional analysis, regional development.

Bradley, Gordon A. \* 1972, (Adjunct); PhD, 1986, University of Michigan; forest land use planning, conservation area planning, urban forestry.

Grey, Arthur L. \* 1963, (Emeritus); PhD, 1954, University of California (Berkeley).

Hancock, John L. \* 1969, (Emeritus); PhD, 1964, University of Pennsylvania; urban and planning history, society, planning and environmental policy.

Johnston, Norman J. \* 1960, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Ludwig, Richard L. \* 1971; PhD, 1971, University of Pittsburgh; housing development planning, social factors in development planning.

Miller, Donald H. \* 1970; PhD, 1972, University of California (Berkeley); land use and urban spatial structure, data analysis and forecasting, planning theory.

Ochsner, Jeffrey K. \* 1987, (Adjunct); MArch, 1976, Rice University; history, preservation design, urban design.

Rutherford, G. Scott \* 1981, (Adjunct); PhD, 1974, Northwestern University; transportation planning and engineering.

Streatfield, David C. \* 1974; MLA, 1965, University of Pennsylvania; history, historic landscape preservation, landscape theory, urban landscape design.

Sutton, Sharon E. \* 1998; MArch, 1973, Columbia University; PhD, 1982, City University of New York; effect of the environment on learning and community well-being.

Untermann, Richard K. \* 1971, (Emeritus); MLA, 1967, Harvard University; urban design and site planning, housing, recreation, nonmotorized circulation.

Vernez Moudon, Anne \* 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Wong, Shawn H. \* 1984, (Adjunct); MA, 1974, San Francisco State; creative writing, Chinese-American area studies.

Zarina, Astra \* 1970; MArch, 1955, Massachusetts Institute of Technology; design, foreign studies.

### Associate Professors

Blanco, Hilda J. \* 1996; MRP, 1984, PhD, 1989, University of California (Berkeley); comprehensive and neighborhood planning, environmental planning, infrastructure, finance.

Dubrow, Gail Lee \* 1989; MA, 1979, University of Oregon; PhD, 1991, University of California (Los Angeles); preservation, urban design, public art, public history, gender, multiculturalism.

Kasprisin, Ronald J. \* 1989; MUP, 1968, University of Washington; community design studios, town planning, planning/design communications, urban design principles.

Norton, Thomas J. \* 1968, (Emeritus); MUP, 1960, University of Washington; urban community facilities, planning administration.

Rolfe, George R. \* 1984; MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Ryan, Dennis M. \* 1974; PhD, 1976, University of Pennsylvania; community planning, design, and identity; public processes; urban design, change, and continuity.

Waddell, Paul A. \* 1997; PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

Westerlund, Frank \* 1971; PhD, 1977, University of Washington; remote sensing applications, energy development and conservation, regional environmental planning.

### Assistant Professors

Alberti, Marina \* 1996; PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Bae, Christine \* 1996; MRP, 1986, State University of New York (Albany); PhD, 1994, University of Southern California; transportation, environment, land use, growth management, quantitative methods.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**URBDP 407 Urban Planning Studio (5) VLPA/I&S** Synthesis of urban design and planning problems and methods in a laboratory section.

**URBDP 420 Database Systems and Planning Analysis (3)** Applications of relational database management systems in urban design and planning. Emphasis on practical aspects of database design and use. Design, create, and modify databases and database applications, including spatial databases. Introduction to GIS. Use of personal computers linked to desktop mapping packages and relational database management systems.

**URBDP 422 Geographic Information Systems in Planning Analysis (5)** *Alberti* Principles of GIS applied to problems in urban design and planning, landscape architecture, and environmental and resource studies. Practical problem-solving approaches using contemporary desktop mapping packages and vector and raster GIS systems. Siting, environmental evaluation and inventories, and modeling. Prerequisite: 3.0 in URBDP 420.

**URBDP 429 Computer-Aided Planning of Urban Systems (3)** Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigation of hardware/software trade-offs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered: jointly with CEE 418.

**URBDP 446 Practical Experience (4, max. 8)** *Rolfe* Off-campus internship under academic supervision in situations useful to the education of planners, such as public/private planning and design offices, projects related to the environment, cross-cultural matters, and decision making. Assistance in identifying appropriate projects.

**URBDP 451 Housing (3) I&S** *Ludwig* Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Prerequisite: 3.0 in URBDP 300.

**URBDP 454 Introduction to Real Estate Finance (4)** *Rolfe* Introduction to the financing of real estate development projects, including a survey of capital markets, banking regulations, interest/discounting theories, debt instruments, and project financing. Offered: jointly with CM 454.

**URBDP 455 Introduction to Real Estate Development Processes (5)** *Rolfe* Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Offered: jointly with CM 455.

**URBDP 456 Real Estate Investment Seminar (4)** *Rolfe* Analysis of private and public real-estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in 453, 454, and 455. Prerequisite: URBDP 455 or CM 455. Offered: jointly with CM 456; W.

**URBDP 457 Housing in Developing Countries (3)** *Ludwig* Emphasis on role of the design and planning professional in housing delivery in developing countries. Exploration of issues of culture, political environment, social context, economic circumstances, and other factors which define and limit the manner in which the professional planner and designer can and should function.

**URBDP 460 History of City Development (3) VLPA/I&S** *Dubrow* Analysis of city forms and designs, emphasizing their relation to the culture of each period.

**URBDP 461 History of Urban Planning in the United States (3) I&S** *Hancock* Seminar in origins, development, and significance of the American planning movement and the profession that emerged from it, as defined by some of its seminal innovators, theories, practices, and achievements, and as evaluated by cultural realities thereby served.

**URBDP 465 Land Use (3) I&S** *Westerlund* Land use as a substantive focus for urban and regional planning and growth management. Consideration of data collection, analysis, plan development, and implementation methods. Seminar and group project sections.

**URBDP 466 Infrastructure and Community Facilities (4)** *Blanco* Issues and methods associated with planning for parks, schools, drainage, sewerage, utilities, libraries, solid waste and transportation. Covers their relationship to comprehensive plans, project permitting and impact assessment. Financing, regulating, and relationships to social, environmental, and economic goals are discussed.

**URBDP 467 Urban Planning Uses of Remote Sensing (3)** *Westerlund* Using aerial photographs and satellite image data in urban planning. Urban change analysis, land-use and land cover classification, and environmental planning applications. Scale and resolution considerations. Development of proficiency through laboratory exercises and use of image-processing software.

**URBDP 470 Introduction to Urban Design (3) VLPA/I&S** *Rolfe* Definitions and examples of urban design; heritage of urban design; theories of city building; the role of urban design in the fields of architecture, landscape architecture, and urban planning.

**URBDP 471 History of Urban Design (3) VLPA/I&S** *Streatfield* Aspects of form, pattern, and space that mark efforts of individuals and groups to express their values and goals in the design of their cities. Special attention given to both historical and modern examples.

**URBDP 479 The Urban Form (3) VLPA** *Moudon* Elements, patterns, and evolution of urban form. The forces that shaped cities in history. Contemporary trends. Methods of urban morphological analysis as related to urban design and planning practices. Required for MUP graduate students.

**URBDP 481 Metropolitan Planning and Development in Developing Countries (3) I&S** *Ludwig* Examination of the nature and causes of urban planning and management problems in developing countries and exploration of alternative approaches to solve some of these problems.

**URBDP 494 Alaska Field Study (2)** *Kasprisin, Westerlund* Travel to Alaskan communities for interpretation of natural systems, history, cultures, settlement patterns, and current issues of planning and economic development. Meetings with community leaders and planners. Students either select a topic for field and documentary research, or participate in intensive charrette-type projects or quarter-long projects in communities. Offered: Sp.

**URBDP 498 Special Topics (1-9, max. 15)** Systematic study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs, and are announced in the preceding quarter.

**URBDP 499 Special Projects (1-12, max. 12)** Independent/tutorial study for undergraduates. Individual reading, research, fieldwork, or other special project, outlined in advance, approved by, and under the direction of, the faculty adviser most appropriate for the project proposed. A report on the purposes, procedures, and results of the study is required.

### Courses for Graduates Only

**URBDP 500 Survey of Urban Planning (3)** *Miller* Concepts and logic of planning as a professional activity. Evolution of guiding ideas in relation to changing social, economic, and environmental conditions within the American political framework. Major procedures used by planners. Critical appraisal. Open to graduate students in urban design and planning and to graduate students in architecture seeking the urban design certificate.

**URBDP 503 Communication and Analysis (4)** *Kasprisin* Development of communication skills understanding within the planning and design process. Presentation of communications as a design process with mental, visual, oral, written, and kinesthetic cognitive actions combined to form communications thinking. Offered: W.

**URBDP 507 General Urban Planning Laboratory (5)** Studio/field project in applied professional planning of a comprehensive nature, utilizing a local study area to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, implementation, and presentation phases of the planning process.

**URBDP 508 Specialized Planning Laboratory (5, max. 10)** *Blanco, Dubrow, Kasprisin, Moudon, Rolfe, Westerlund* Studio/field project on a specialized planning problem. Several options are offered each year, such as regional-environmental planning, housing, metropolitan planning, and urban design. Prerequisite: ARCH 500 and ARCH 507. Additional prerequisite for some sections: urban planning seminar or lecture courses.

**URBDP 510 Theories and Methodologies of Planning I (4)** *Bae* Survey of the philosophy, methods, and analytical techniques used in planning public actions and policies, with emphasis on the logic and assumptions upon which these are based. Various planning surveys and methods. Open to graduate students in urban design and planning and to graduate students seeking the urban design certificate. Prerequisite: URBDP 500.

**URBDP 512 Research Seminar (2)** *Miller* Development and presentation of advanced topics of individual investigation.

**URBDP 520 Quantitative Methods in Urban Design and Planning (4)** *Bae* Methods of statistical and mathematical analysis in design and planning. Emphasizes the use of computer packages for analyzing urban data. Regression, matrix methods, cohort-survival populations models with examples solved on microcomputers. Prerequisite: college mathematics and basic course in probability and statistics.

**URBDP 530 Land-Use/Transportation Models (3)** *Waddell* Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land-use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with CEE 588.

**URBDP 537 Open Space Land Uses (3)** *Westerlund* Exploration of public and private values of open space; its aesthetic, environmental, recreational, natural resource uses from development sites to metropolitan regions. Methods of open space inventory, analysis; legal and administrative tools for preserving and managing open space; development of multipurpose open space programs in local governments. Prerequisite: URBDP 500.

**URBDP 546 Practicum (4, max. 8)** *Rolfe* Off-campus experience under academic supervision in situations useful to the education of planners, such as planning offices, public bureaucracies, projects related to the environment, cross-cultural matters, and decision making. Assistance in identifying appropriate projects. Credit/no credit only. Prerequisite: permission of instructor.

**URBDP 547 Professional Project (1-9, max. 9)** Independent development of client oriented project involving application of professional planning/design methods and approaches. Professional-quality report relates project to larger professional context, addresses alternative approaches/methods and includes an evaluation of the project. Master of Urban Planning students only, taken in lieu of 700. Not recommended for those continuing into Ph.D. program. Credit/no credit only.

**URBDP 560 Urban Affairs (3)** Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with PB AF 560.

**URBDP 561 Urban Economics and Public Policy (3)** Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with PB AF 561.

**URBDP 562 Introduction to Neighborhood Planning and Community Development (3)** Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with PB AF 562.

**URBDP 563 Seminar in Urban Planning and Policy (1)** Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with PB AF 563.

**URBDP 571 Research and Analytical Methods for Urban Design (3)** *Moudon* Conceptual framework for an epistemology of urban design and physical planning. Review of relevant research in related fields and disciplines. Prerequisite: specialization in urban design or permission of instructor.

**URBDP 572 Case Studies in Urban Design and Development (3)** *Kasprisin* Wide range of urban design and development projects recently completed. Effective urban design implementation, including design process, decision making, administration, management. Tools and techniques such as design analysis, policy making, regulation, design review, taxation, financing. Prerequisite: URBDP 510 and URBDP 580 and/or permission of instructor.

**URBDP 574 Residential Design: Methods and Practices (3)** *Dubrow* Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods and practices. Offered: jointly with ARCH 593.

**URBDP 580 Legal and Administrative Framework for Planning (4)** *Blanco* Political, legal, and administrative institutions closely related to the planning process. Issues of devolution of authority and public representation and participation. Legal basis for planning and associated regulation.

**URBDP 585 Introduction to Historic Preservation Planning (3)** *Dubrow* Theories, methods, and practices associated with historic preservation planning. Overview of preservation planning programs at federal, state, and local levels. Introduction to tools and methods needed to identify, document, evaluate, and plan for protection of historic properties. Provides opportunity to learn fundamentals of preservation planning through practical experience. Offered: Sp.

**URBDP 586 Implementation in Preservation Planning and Urban Design (4)** Analysis of recent case studies in implementation of preservation planning and urban design in terms of planning and design products and related processes, decision making, administration, management. Tools and techniques include design analysis, policy-making, regulation, design review, taxation, financing, public participation. Prerequisite: introductory course in preservation or urban design.

**URBDP 587 Preservation and the Vernacular Environment (3)** *Dubrow* Exploration of theoretical, methodological, and practical issues related to the preservation of vernacular architecture and cultural landscapes in the United States. Offered: W.

**URBDP 591- Doctoral Seminar I (4-)** Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

**URBDP -592- Doctoral Seminar II (-4-)** Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

**URBDP -593 Doctoral Seminar III (-4)** Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

**URBDP 598 Special Topics (1-6, max. 15)** Systematic study of specialized subject matter. Topics vary for each quarter, depending upon current interest and needs, and are announced in the preceding quarter. Prerequisite: permission of instructor.

**URBDP 600 Independent Study or Research (\*)**

**URBDP 700 Master's Thesis (\*)**

**URBDP 800 Doctoral Dissertation (\*)**

# College of Arts and Sciences

## Dean

David C. Hodge  
50 Communications

## Divisional Deans

Gary D. Christian—Natural Sciences  
Michael R. Halleran—Arts and Humanities  
Julie K. Stein—Computing, Facilities, and Research  
Susan Jeffords—Social Sciences



General Catalog Web page:  
[www.washington.edu/students/genccat/academic/arts\\_sci.html](http://www.washington.edu/students/genccat/academic/arts_sci.html)



College Web page:  
[ascc.artsci.washington.edu/](http://ascc.artsci.washington.edu/)

The departments and schools of the College of Arts and Sciences offer graduate study leading to master's and doctoral degrees. Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet the general requirements outlined in the Graduate School section of this catalog, as well as the requirements established by the graduate faculty in the department or unit offering the degree program. Graduate students must satisfy the requirements for an advanced degree that are in force at the time the degree is to be awarded.

## Afro-American Studies

See American Ethnic Studies.

## American Ethnic Studies

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsccat/](http://www.washington.edu/students/crsccat/).

### American Ethnic Studies

**AES 461 Comparative Ethnic Race Relations in the Americas (5) I&S** Sketches the ethnoracial systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnoracial systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with SOC 461.

**AES 462 Comparative Race and Ethnic Relations (5) I&S** Scott Race and ethnicity are examined as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Offered: jointly with SOC 462.

**AES 489 Ethnicity, Gender, and Media (5) I&S** Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with CMU 489/WOMEN 489.

**AES 494 Community Practicum and Internship (3-5, max. 10)** Faculty supervised practicum and internship experience in variety of settings and agencies, e.g., ethnic specific agencies, government and civic community-based offices. Students contribute skills and knowledge to respective communities and gain experience by working with professionals and community organizers. Credit/no credit only.

**AES 498 Special Topics in American Ethnic Studies (1-5, max. 15) I&S** Designed to provide the student an opportunity to concentrate on one specific aspect of American Ethnic Studies through a comparative, interdisciplinary approach.

**AES 499 Independent Study or Research (1-5, max. 10)** Independent readings and/or research under the supervision of a faculty member.

### Afro-American Studies

**AFRAM 401 Intermediate Swahili (5) VLPA** Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: either AFRAM 308 or AFRAM 309.

**AFRAM 402 Intermediate Swahili (5) VLPA** Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 401.

**AFRAM 403 Intermediate Swahili (5) VLPA** Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 402.

**AFRAM 437 Blacks in American Law (5) I&S** Walter Historical continuity for changing relationship between American jurisprudence and Black Americans, 1640-1986. Statutory and case law which determined role of Blacks in American society, and use of law by Blacks to gain civil and personal rights.

**AFRAM 490 Research in the Black Community (1-5, max. 10)** Identification and investigation of the problems and needs of the Black community. Methods and alternatives of approaching these problems and needs. Students designate their areas of interest and subsequently pursue research and problem solving.

**AFRAM 492 Special Topics in Afro-American Studies (3-5, max. 15) I&S** Topics in which students and faculty have developed an interest as a result of work done in other classes or as a result of the need to investigate in greater depth Afro-American Studies issues. Topics vary.

### Asian-American Studies

**AAS 401 Asian-American Literature to the 1940s (5) VLPA** Asian-American literature from nineteenth-century immigrants to the 1940s. Emphasis on Chinese, Japanese, and Filipino writings detailing the experience and sensibility of first generation immigrants. Early twentieth-century writing focus on the development not only of Asian-American community, but also of second generation American-born Asian-American writers. Recommended: AAS 205 or AAS 206.

**AAS 402 Contemporary Asian-American Literature (5) VLPA** Asian-American literature from the 1940s to the present. Emphasis on the development of attitudes and identities in contemporary Asian-American literature, the role of the writer in a minority culture, and the relationship of literature to self and society.

**AAS 403 Survey of Asian-American Poetry (5) VLPA** Asian-American poetry, nineteenth century to present. Readings include poetry of the early immi-

grant to America, cultural imperatives transferred from old world to new world, and establishment of an Asian-American identity in poetry from 1870s through 1890s.

### AAS 498 Special Topics (5, max. 10) I&S

### Chicano Studies

**CHSTU 405 Advanced Chicano Studies (5) I&S** Gamboa Chicano culture as related to current values and health practices, Mexican labor and immigration in both historical and contemporary setting. Chicano politics 1848 to present. Recurrent problems of Chicanos in society; social movement for acceptance and for self-determination.

**CHSTU 491 Special Topics in Chicano Studies (3-5, max. 10) I&S** Gamboa, Olguin, Salas Interdisciplinary course concentrating on one or more aspects of the Chicano experience.

## American Indian Studies

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsccat/](http://www.washington.edu/students/crsccat/).

**AIS 425 Indians in Western Washington History (3) I&S** Harmon Relations of Indians and non-Indians in the Puget Sound region, from the 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with HSTAA 417.

**AIS 431 History of American Indian Education (5) I&S** Traditional and European-introduced methods of schooling, the federal role in Indian education, and contemporary Indian education issues. Special attention to Indian concepts of learning; boarding school education; the role of the Bureau of Indian Affairs; current trends in bilingual and bicultural education for Indians.

**AIS 440 Reading Native American Women's Lives (5, max. 10) I&S** *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada. Prerequisite: either WOMEN 342, WOMEN 423, AIS 201, AIS 330, or AIS 423. Offered: jointly with WOMEN 440.

**AIS 442 Images of Natives in the Cinema and Popular Cultures (5) I&S/VLPA** Ross Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Offered: jointly with WOMEN 442. Prerequisite: AIS 330 and WOMEN 200.

**AIS 450 American Indian Song and Dance Tradition: Performance (3) VLPA** Performance of various American Indian social dances, songs, and games. In-depth study of various American Indian vocal styles.

**AIS 469 Special Studies in American Indians (3, max. 6) I&S** Delineation and analysis of a specific problem or related problems in American Indian Studies. Offered occasionally by visitors or resident faculty.

**AIS 475 Special Topics in Indian Studies (1-5, max. 15) I&S** Current research and readings in American Indian Studies content areas.

**AIS 499 Independent Study (1-5, max. 15)** Readings and/or research under faculty supervision.

# Anthropology

M32 Denny



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/anthropology.html](http://www.washington.edu/students/genecat/academic/anthropology.html)



Department Web page:  
[www.anthro.washington.edu](http://www.anthro.washington.edu)

Anthropology is a discipline committed to describing, interpreting, and explaining the historical, biological, and cultural diversity of the human species. This covers our species' evolutionary origins as well as our continual evolution through many millennia of biocultural microevolution. It also covers more recent sociocultural changes up through the current global flux in population, genes, languages, practices, and identities. Anthropology's unique contribution to the human sciences and humanities is its expansive scope—temporally and spatially—in studying the human species.

In studying anthropology, students can learn about the range of human situations in the world today. They can better understand how to find ways to live together in today's world of some six billion people, respecting profound human differences of outlook while building upon common human values. A degree in anthropology can be of value in many ways. A graduate degree prepares a student for college or university teaching, research, or work for government and non-government agencies, museums, and social and human services.

## Graduate Program

Graduate Program Coordinator  
 M31 Denny Hall, Box 353100  
 (206) 685-1562

The department recognizes four principal subfields of anthropology within its faculty, programs, and curriculum: archaeology, biocultural anthropology, environmental anthropology, and sociocultural anthropology (including anthropological linguistics). The department offers four distinct Ph.D. programs within the subdisciplines. A Ph.D. program in sociocultural anthropology with emphasis in ethnomusicology is offered in cooperation with the School of Music. The M.A. degree may be earned within the Ph.D. programs. Graduate students are admitted to, and specialize in, their chosen subfields from the beginning of their graduate studies.

## Admission Requirements

Applicants are admitted to begin study only during autumn quarter and are advised to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School Application, official transcripts, the Supplementary Information Form, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE). International students are required to take the TOEFL exam as well as the GRE.

## Program Requirements

For each of the respective graduate programs, completion of the core requirements and a reading knowledge of one foreign language are required. Under the guidance of a supervisory committee selected from the appropriate subfield, the student shapes an individual program. The major areas emphasized in the faculty and curriculum are the United States, Mexico, Africa, South Asia, Southeast Asia, China, Oceania, and the post-Soviet states. The M.A. programs usually require two years of graduate study; the Ph.D. programs usually require at least three years beyond the master's level, including a year of independent field research and a year to organize field materials and write a doctoral dissertation.

## Financial Aid

One-year fellowships are awarded to one or two outstanding entering students. A limited number of teaching and research assistantships and hourly positions are offered primarily to advanced students. Some students may be qualified for a few National Resource Fellowships for Language Studies. Work-study positions are also available for eligible graduate students.

## Faculty

### Chair

Miriam Kahn

### Professors

Chrisman, Noel J. \* 1973, (Adjunct); PhD, 1966, University of California (Berkeley); community partnership research, clinical cultural competence, ethnic health beliefs and practices.

Dunnell, Robert C. \* 1967, (Emeritus); PhD, 1967, Yale University; archeological theory, field method, eastern North America.

Grayson, Donald K. \* 1975; PhD, 1973, University of Oregon; North American prehistory, paleoecology, European paleolithic, zooarchaeology.

Harrell, Stevan \* 1974; PhD, 1974, Stanford University; family systems, demography, ethnicity, social evolution, religion, China, Taiwan.

Hunn, Eugene S. \* 1972; PhD, 1973, University of California (Berkeley); cognitive anthropology, ethnobiology, cultural ecology and evolution, Mexico, North American Indians.

Hutterer, Karl L. \* 1990; PhD, 1973, University of Hawaii; prehistory, ethnology of Southeast Asia, East Asia.

Jacobs, Sue-Ellen \* 1974, (Adjunct); PhD, 1970, University of Colorado (Boulder); anthropological studies of women, applied anthropology, ethnohistory, Native North America.

Keyes, Charles F. \* 1965; PhD, 1965, Cornell University; ethnic group relations, sociology of Theravada Buddhism, mainland Southeast Asia.

Lockard, Joan S. \* 1962, (Adjunct); PhD, 1963, University of Wisconsin; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior.

Miller, Marc \* 1979, (Adjunct); PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology, tourism, and social/cultural change.

Muecke, Marjorie A. \* 1979, (Adjunct); PhD, 1976, University of Washington; medical anthropology, women's health, refugee health, Southeast Asia.

Nason, James \* 1970; PhD, 1970, University of Washington; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America.

Newell, Laura L. \* 1957; PhD, 1967, University of Washington; primateology growth and development, human biology, evolutionary aspects of dermatoglyphics.

Nute, Peter E. \* 1970, (Emeritus); PhD, 1969, Duke University; genetics and evolution.

Pena, Devon G. \* 1999, (Acting); PhD, 1983, University of Texas (Austin); agroecology, bioregionalism, social movements, labor process theory.

Smith, Eric A. \* 1980; PhD, 1980, Cornell University; ecology, environmental studies, evolutionary theory, hunter-gatherers, demography, Native Americans.

Spain, David H. \* 1968; PhD, 1969, Northwestern University; psychocultural anthropology, African studies, research methods.

Stein, Julie K. \* 1980; MA, 1976, PhD, 1980, University of Minnesota; New World archaeology, Northwest coast archaeology, geoarchaeology, shell middens.

Wenke, Robert J. \* 1975; PhD, 1975, University of Michigan; archaeology of Egypt, the Middle East, and quantitative methods.

Winans, Edgar V. \* 1957, (Emeritus); PhD, 1959, University of California (Los Angeles); politics, economics and law, Africa, the developing world.

Witherspoon, Gary J. \* 1987; PhD, 1970, University of Chicago; language, art, and history; Indians of the Southwest.

### Associate Professors

Anagnost, Ann S. \* 1990; PhD, 1985, University of Michigan; ethnography of the state, ideology and popular culture, peasant society; China.

Close, Angela E. \* 1995; MA, 1974, PhD, 1976, Cambridge University (UK); prehistory of North Africa, lithics, paleolithic.

Eck, Gerald G. \* 1974; PhD, 1977, University of California (Berkeley); primate paleontology, especially African Pliocene-Pleistocene monkeys and hominids.

Ellingson, Terry J. \* 1983, (Adjunct); PhD, 1979, University of Wisconsin; MA, 1979, University of Chicago; ethnomusicology.

Feathers, James K. \* 1983, (Research); PhD, 1990, University of Washington; luminescence dating of sediments and pottery from archaeological sites.

Horn, Beverly M. \* 1976, (Adjunct); PhD, 1975, University of Washington; cross-cultural research in maternal-child nursing.

Kahn, Miriam \* 1986; PhD, 1980, Bryn Mawr College; cultural representations, museums, concepts of place, Melanesia, Polynesia.

Leonetti, Donna \* 1978; PhD, 1976, University of Washington; biological and sociocultural interactions in adaptation demography, epidemiology, Japanese Americans.

Posner, Karen L. 1986, (Adjunct Research); PhD, 1990, University of Washington.

Rhodes, Lorna A. \* 1983; PhD, 1973, Cornell University; medical anthropology, anthropology of institutions, religion, psychiatry.

Sorensen, Clark W. \* 1989, (Adjunct); PhD, 1981, University of Washington; Korea, social change in East Asia, development, ethnic identity.

Twine, France Winnandance 1994, (Adjunct); MA, 1990, PhD, 1994, University of California (Berkeley); critical race feminisms, racism/antiracism, whiteness studies, multiracial families, Brazil, Britain.

### Assistant Professors

Bilaniuk, Laada M. 1997; PhD, 1998, University of Michigan; linguistic anthropology.

Ferguson, G. (Jack) 1998; PhD, 1997, Stanford University; sociocultural anthropology.

Fitzhugh, J. Ben \* 1997; PhD, 1996, University of Michigan; archaeology, evolutionary ecology, archaeological method and theory, arctic/subarctic, Alaska.

Holman, Darryl J. \* 1999; MS, 1990, University of Wisconsin; PhD, 1996, Pennsylvania State University; human reproductive ecology, paleodemography.

Kyes, Randall C. \* 1993, (Adjunct Research); PhD, 1989, University of Georgia; animal behavior, primate behavior and cognition, conservation biology.

Lowe, Celia 1999; PhD, 2000, Yale University; environment, identity, representation, science studies, insular southeast Asia.

McGrath, Barbara B. \* 1987, (Research); PhD, 1993, University of Washington; medical anthropology, illness knowledge and practice, US Pacific Islander populations, HIV/AIDS.

O'Connor, Kathleen A. \* 1999; MS, 1987, PhD, 1995, State University of New York (Albany); biogeography, human reproductive biology and ecology, mortality, fertility.

Shell-Duncan, Bettina \* 1995; MS, 1988, University of Wisconsin; PhD, 1994, Pennsylvania State University; nutrition, maternal and child health, demography, Africa.

Sivaramkrishnan, K. 1999; MS, 1991, MPhil, 1993, PhD, 1996, Yale University; environmental anthropology, agrarian studies, technology studies, South Asia.

Taylor, Janelle S. \* 1999; PhD, 1999, University of Chicago; anthropology of medicine, science, and technology; reproduction; gender; consumption.

### Senior Lecturer

Green, James W. \* 1975; PhD, 1972, University of Washington; mental health, death studies, comparative aging, religion, West Indies, Pakistan.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Sociocultural Anthropology

**ANTH 401 West African Societies (3) I&S** Social and cultural features of coastal and interior West African societies, including the Western Sudan. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 402 Societies of Eastern and Southern Africa (5) I&S** Historical background and contemporary life of cultural groups in eastern and southern Africa with special study of selected cases of political and economic organization and cultural change. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 404 South America (5) I&S** Survey of anthropological research among the traditional peoples of South America. Historical background and contemporary life of cultural groups of the Amazonian Basin. Transformation of traditional life-styles through the process of European conquest and the aftermath of colonialism. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 412 South Asian Social Structure (5) I&S** Caste class, and community in modern India. Transitions from colonial typology to analysis of social change, diversity, stability, and caste hierarchy in rural society. Current debates on class and community in Indian society, rural and urban, explored through themes of identity, structure, and mobility. Prerequisite: one 200-level ANTH course.

**ANTH 418 Indian Heritage of Mexico and Central America (5) I&S** Indian civilization of Mexico and Guatemala, their origins and ecological foundations. Contemporary communities of Mexico and Guatemala, focusing on creative adaptation of pre-Columbian traditions to modern national realities. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 420 Psychoanalysis and the Study of Culture (3) I&S** *Spain* Anthropological use of theories developed by Freud to understand culture. Reviews psychoanalytic theory as a foundation for examining the work of Roheim, LaBarre, Devereaux, Kardiner, and Spiro, among others. Topics covered include the universality of oedipality and the utility of psychoanalysis in non-Western cultures.

**ANTH 421 Belief, Ritual, and the Structure of Religion (5) I&S** Systematic survey of concepts, models, and theories that characterize the anthropological study of religion. Consideration of the human universal basis of religion and of diverse ways in which religions are constructed and related to social experience. Prerequisite: either ANTH 321 or RELIG 201; RELIG 202.

**ANTH 423 Traffic Across Cultural Boundaries (5) I&S** Focuses on the movement of cultural patterns and processes across boundaries, examining the "contact zones" in colonial encounters, moving to borrowing and blendings along ethnic and national borders. Examines border crossing of immigration and diasporas. Ethnographic examples from the Americas and Africa. Prerequisite: one 200-level ANTH course.

**ANTH 424 Hunter-Gatherer Societies (4) I&S** Comparative examination of human foraging societies, emphasizing ethnographic cases and socioecological analysis. Foraging and human evolution; rationality of foraging societies; population and reproductive strategies; variability in social organization and land use; power relations between the sexes; ritual and belief; contemporary status of hunter-gatherer populations. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 425 Anthropology of the Post-Soviet States (5) I&S** Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with SISRE 425.

**ANTH 427 Anthropology in Urban Settings (3) I&S** Cross-cultural examination of theoretical issues in anthropology as studied in urban places. Focuses on ethnic identity and the formation of urban ethnic groups; migration and its rural and urban consequences; family and kinship organization as an adaptation to urban complexity; the nature of urban voluntary associations; law and politics; and the developments in anthropological method. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 428 Anthropological Perspectives on Ethnicity (5) I&S** Anthropological approaches to ethnicity and ethnic group relations with reference to other models including race, caste, class, regional groupings, nations, religion, and stratification. Data drawn from precolonial, colonial, and postcolonial periods. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 429 Expressive Culture (5) VLPA** Anthropological view of one expressive aspect of culture: plastic and graphic arts, myth and folktale, music, dance, humor and tragedy, or play and games. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 430 The Anthropology of Music (3) VLPA/I&S** Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation, e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with MUSIC 480; alternate years.

**ANTH 431 Oral Traditions (5) VLPA** Oral traditions and verbal expression, examined anthropologically and in relation to student interests. Critical examination of relevant theories and methods of analysis. Recommended: ANTH 100.

**ANTH 432 Sociolinguistics I (5) VLPA/I&S** Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: LING 400; recommended: prior or concurrent registration in ANTH 451 or LING 451. Offered: jointly with LING 432.

**ANTH 433 Sociolinguistics II (3) VLPA/I&S** *Wassink* Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of linguistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with LING 434.

**ANTH 434 Comparative Morals and Value Systems (3) I&S** Moral basis of human society and comparison of value systems based on anthropological studies. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 435 Economic Anthropology (5) I&S** Chief features of nonmonetary and simple monetary economics. Impact of central or metropolitan market economy and industrial technology as peripheral systems, especially of small-scale and limited monetary circulation. Development and application in anthropology of economic concepts, including Marxian. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 436 Comparative Family Organization (5) I&S** Function and structure of family developmental processes in band, tribal, peasant, and modern societies. Illustrates inter- and intrasocietal variation and provides data for construction of formal models of process and variation in family systems. Prerequisite: either one 200-level ANTH course, LING 203, or SOC 352.

**ANTH 437 Political Anthropology and Social Change (5) I&S** *Sivaramkrishnan* Study of politics from different anthropological perspectives, especially processual approaches to political change. Focused examination of cultural aspects of modern state formation in local and regional contexts. Themes: colonialism and nationalism, regime and transitions, local politics and global processes, social construction of bureaucracy. Prerequisite: one 200-level ANTH course.

**ANTH 438 The Analysis of Kinship Systems (5) I&S** Data, theories, and analytical technique used in the study of kinship systems, including our own, from around the world. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 440 Child Rearing, Culture, and Health (3) I&S** Cross-cultural study of the child-rearing practices, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used. Offered: jointly with NURS 495.

**ANTH 441 Psychological Anthropology (5) I&S** Assessment of mutual relevance of cultural and psychological variables in anthropology. Historical development of principal topics, e.g., cognition, national character, enculturation, personality and social change, cross-cultural psychiatry, sex and temperament, deviance, and psychoanalytic studies of culture. Prerequisite: either PSYCH 101 or PSYCH 205.

**ANTH 443 Anthropology of Modern Japan (5) I&S** Examines the problem of modernity in Japan since the late nineteenth century, with emphasis on contemporary Japan. Critically addresses previous an-

thropological work concerning patterns of Japanese "culture." Particular focus on the influence of modern forms of power, media, and exchange in the construction of present-day Japan. Offered: jointly with SISEA 447.

**ANTH 444 Politics of Representation in Modern China (5) I&S** Focuses on issues of representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with SISEA 444.

**ANTH 445 Literature and Society in Southeast Asia (5, max. 10) VLPA/I&S** Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with SISSE 445.

**ANTH 446 Class and Culture in East Asia (5) I&S** Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hierarchy, resistance, and the formation of class identity. Offered: jointly with SISEA 443.

**ANTH 447 Religion in China (5) I&S** Place of religion in Chinese society, examining the doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Prerequisite: either one 200-level ANTH course, ANTH 370, ANTH 403, LING 203, HSTAS 211, HSTAS 454, RELIG 202, SISEA 370, or SISEA 443. Offered: jointly with SISEA 445.

**ANTH 448 Modern Korean Society (5) I&S** Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/SISEA 212. Offered: jointly with SISEA 448.

**ANTH 449 Social Transformation of Modern East Asia (5) I&S** Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with SIS 449.

**ANTH 450 Language and Gender (5) I&S, VLPA Bilaniuk** Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with WOMEN 450 and LING 458.

**ANTH 451 Comparative Historical and Social Ecology of the Tropics (3) I&S Sivaramakrishnan** Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Offered: jointly with ENVIR 451. Prerequisite: ANTH 210.

**ANTH 454 Women, Words, Music, and Change (5) VLPA/I&S** Comparative analysis of use of myths, tales, music, and other forms of expressive culture

to account for, reinforce, and change women's status and roles. Recommended: WOMEN 353. Offered: jointly with WOMEN 454.

**ANTH 455 Areal Linguistics (3, max. 6) VLPA/I&S** Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Borrowing vocabulary specialization, lexical change, and language death and revival. Offered: jointly with LING 455.

**ANTH 456 Contemporary Ethnography (5) I&S** Techniques and theories of ethnographic description for the anthropological analysis of contemporary life. Materials drawn from the contemporary United States, with a focus on issues and events in the Seattle area. Includes fieldwork projects. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 457 Ecological Anthropology (5) I&S** Survey of anthropological research on interaction between human societies and their environments. Logic of different subsistence systems; intensification and transformation of subsistence strategies; population regulation; ecological aspects of human nutrition, disease, spatial organization, ethnicity, social stratification, conflict, and cooperation; historical roots of current ecological crisis.

**ANTH 458 Ethnobiology: Plants, Animals, and People (5) I&S Hunn** Culturally mediated relationships between human and natural environment studied in a comparative and evolutionary framework. How do peoples in diverse cultures recognize and name plants and animals and understand their relationship with nature? How is this traditional ecological knowledge applied in people's daily lives? Prerequisite: either BIO A 201, ARCHY 205, or one 200-level ANTH course.

**ANTH 459 Culture, Ecology, and Politics (5) I&S Pena** Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ENVIR 459.

**ANTH 460 History of Anthropology (5) I&S** Sources and development of leading concepts, issues, and approaches in anthropology. Findings of anthropology in relation to scientific and humanistic implications and to practical application. Main contributors to field; their work and influence. Past, present, and future perspectives, including anthropology of modern life.

**ANTH 464 Language Politics and Cultural Identity (3) VLPA/I&S Bilaniuk** Theories and case studies of the power of language an how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with LING 433.

**ANTH 465 Critical Anthropology of Mass Culture (5) I&S** Critical overview of theories of mass culture and their relationship to current anthropological practice. Analyses of the historical interconnections among capitalism and commodity fetishism, modernity and representation, and media and consumption.

**ANTH 466- Anthropology Honors Thesis ([1-9]-, max. 18) I&S** Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

**ANTH 467 Anthropology of Education (5) I&S** Uses a wide range of social theory and philosophy to investigate mechanisms which reproduce inequality and asymmetry in American education.

**ANTH 469 Special Studies in Anthropology (3-5, max. 15) I&S** Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visitors or resident faculty. Prerequisite: one 200-level ANTH course or LING 203.

**ANTH 470 Minority Peoples of China (5) I&S** Interaction between China and the peoples of its periphery, including inner Asia, Tibet, northern mainland Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: either one 200-level ANTH course, LING 203, ANTH/SISEA 370, or HSTAS 454. Offered: jointly with SISEA 470.

**ANTH 471 Colonialism and Culture (5) I&S** Explores the cultural, political, and historical implications of the power to colonize. Readings include ethnographic, historical, and literary works on colonialism, nationalist responses, and postcolonial positions.

**ANTH 475 Perspectives in Medical Anthropology (5) I&S** Introduction to medical anthropology. Explores the relationships among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with HSERV 475.

**ANTH 476 Culture, Medicine, and the Body (5) I&S** Explores the relationship between the body and society, with emphasis on the role of medicine as a mediator between them. Case study material, primarily from contemporary bio-medicine, as well as critical, postmodern, and feminist approaches to the body introduced within a general comparative and anthropological framework.

**ANTH 477 Medicine in America: Conflicts and Contradictions (3) I&S** Introduction to the pragmatic and theoretical dilemmas of current biomedical practice with emphasis on social and cultural context. Case studies in technological intervention, risk management, and other health-related issues used to explore connections among patients' experiences, medical practices, and the contemporary social context.

**ANTH 480 Introduction to Museology (3) I&S** Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with MUSEUM 480.

**ANTH 481 Museum Collection Management: Ethnology (3) I&S** Lecture and work experience in museum collection management in the ethnology collections of the Burke Memorial Washington State Museum, including identification, cataloging, fumigation, storage, cleaning, inventory, and specimen preparation for exhibition of archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Offered: jointly with MUSEUM 481.

**ANTH 482 Museum Conservation (3) I&S** Lecture and demonstrations in the recognition and treatment of museum conservation problems for specimens of all types. Application of basic principles to specific preventive and active conservation and restoration problems encountered by curatorial personnel. Offered: jointly with MUSEUM 482.

**ANTH 484 Motherhood: Ideologies and Technologies (5) I&S Twine** Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with WOMEN 458.

**ANTH 485 Cultural Property: Legal and Ethical Issues (3) I&S** Examines the complex history of legal and ethical issues affecting the acquisition, ownership, and disposition of cultural property, with special attention to modern indigenous peoples' requests for repatriation of collections from museums, as well as concerns with intellectual property rights, national patrimony policies, and related trade issues.

**ANTH 486 Human Family Systems: Biological and Social Aspects (5) I&S** Biological bases for human mating and reproduction and an examination of the range of cross-cultural variability in human systems of kinship and marriage; comparisons among a wide range of human and nonhuman species and between Western and non-Western human societies; interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with SOC 486.

**ANTH 488 Agroecology (5) I&S** *Pena* Cross-cultural survey of agroecological research methods, theoretical problems, policy issues, and ethical debates. Local knowledge and ethnoscientific bases of alternative agriculture. Comparative political ecology of agroecosystems with a focus on indicators of social equity and ecological sustainability.

**ANTH 489 Anthropology Practicum (3-9, max. 15)** Faculty-supervised off-campus internships in organizations utilizing anthropological skills in nonacademic settings. Establishing educationally valuable individual projects for internships with faculty sponsor. Organizations include museums, social service and other governmental agencies, and private nonprofit service agencies.

**ANTH 491 Honors Colloquium (2, max. 12) I&S** Introduction to anthropological research. Students read original articles and papers and discuss them with authors. Research presenters include department faculty, visiting faculty, and advanced graduate students. Credit/no credit only.

**ANTH 495 Advanced Problems in Ethnology (3-5, max. 10) I&S** Current problems in ethnology. Seminar format.

**ANTH 499 Undergraduate Research (\* max. 12)**

### Courses for Graduates Only

**ANTH 500 Preceptorial Reading (6)** For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems. Not open to graduate students in the sociocultural anthropology program.

**ANTH 503 Preceptorial Reading in Linguistic Anthropology (6)** For beginning graduate students who have not had prior training in the problems, principles, and methods involved in linguistic anthropology. See also course description for 203. Not open to graduate students in the linguistics program.

**ANTH 507- Current Issues in Sociocultural Anthropology (2-)** Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

**ANTH -508 Current Issues in Sociocultural Anthropology (-2)** Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

**ANTH 509 Sociocultural Anthropology Problem Paper (4)** All first year graduate students in sociocultural anthropology select a topic for independent research, conduct that research, and prepare a paper of about 25-50 pages on the topic chosen. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

**ANTH 510 Seminar on North American Indians (3)** Advanced comparative treatment of selected aspects of the Indian cultures and societies of North America.

**ANTH 514 Regional Seminar (3-5, max. 15)** Comparative treatment of selected aspects of cultures and societies of a particular region or area.

**ANTH 517 Seminar on South Asia (3)** Advanced analysis of selected problems in South Asian ethnology and social structure. Prerequisite: ANTH 412.

**ANTH 521 Seminar on the Anthropological Study of Religion (3, max. 9)** Advanced seminar in the anthropological study of religion designed for students who have a background in the theory and applications of theory developed in the anthropological study of religion. Seminar topics vary each quarter. Prerequisite: ANTH 422 and graduate standing; permission of instructor for graduate students in Comparative Religion.

**ANTH 525 Seminar in Culture Processes (3, max. 6)** The concept of process and its application to the study of culture.

**ANTH 527 Ethnicities, Nations, and Cultural Identities (3)** Exploration of how cultural differences have been represented in ethnic and national narratives and how these narratives have shaped identities and social relations.

**ANTH 530 Dialectology (3)** Principles of dialect deviation as related to linguistic structure and usage. Prerequisite: ANTH 452 or permission of instructor. Offered: jointly with LING 530.

**ANTH 535 Research Issues in Demography and Population Studies (1-2, max. 7)** Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Offered: AWSp.

**ANTH 536 Seminar in Visual Anthropology (3)** Significance of anthropological cinema and photography placed in historical perspective. Screening of films to determine the role of the anthropologist as filmmaker, as well as the role of the filmmaker as anthropologist.

**ANTH 537 Political Anthropology and Law (3, max. 6)** Seminar on special topics in politics and law and their interrelationships. Prerequisite: ANTH 437, ANTH 439, or permission of instructor.

**ANTH 538 Politics of Representation (3)** Representations of power and the powers of representation. Critical approaches to representation in colonial and postcolonial worlds. Divine kings, exemplary centers, the New World Order, voting subjects, and the possibilities of transgression.

**ANTH 541 Cultural Aspects of International Development (3)** *Sivaramakrishnan* Emergence of development as an aspect of late colonialism and the decolonization process. Ways in which development came to visualize social change in sectoral terms like rural land use, cities, and education, while objectifying people in target groups. Relationships between development and modernity, and development and globalization.

**ANTH 542 Seminar in Cognitive Anthropology (3)** Examines the intellectual history of cognitive anthropology; assesses its major findings in kinship, folk biology, color classification, and decision and planning theory. Replicates key studies, using cognitive anthropological methods. Evaluates influences from linguistics, psychology, and artificial intelligence research. Practical applications and future prospects.

**ANTH 550 Field Techniques in Ethnography (5)** Techniques of collecting, ordering, and utilizing ethnographic data in the field. Problems of rapport, elicitation, observation, interpretation, and ethics. Credit/no credit only.

**ANTH 551 Research Design (3)** Principles of research design, including problem delineation and selection of appropriate methods, as applied to current issues in sociocultural anthropology. Prerequisite: permission of instructor.

**ANTH 552 Practicum in Ethnographic Research (3)** Techniques of data recording, analysis, and writing for the field ethnographer. Not recommended for non-anthropology graduate students. Prerequisite: ANTH 550 and ANTH 551.

**ANTH 553 Analysis of Linguistic Structures (3, max. 6)** Syntactic, semantic, or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with LING 553.

**ANTH 555 Discourses in Feminist Anthropology Seminar (5)** *Jacobs* Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with WOMEN 553.

**ANTH 556 The Evolution of the Family (3)** Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with SOC 556.

**ANTH 559 Seminar in Language and Culture (3, max. 9)** Theoretical and methodological problems in language and culture.

**ANTH 561 Seminar in Methods and Theories (3, max. 9)**

**ANTH 562 Clinically Applied Anthropology (3)** Anthropology as it relates to interdisciplinary delivery of health care. Cultural variation in illness beliefs and behavior, types of healing practice, illness prevention, and social support networks. Prerequisite: graduate standing and permission of instructor. Offered: jointly with NURS 562.

**ANTH 565 Theory of Sociocultural Anthropology (5)** Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: graduate standing in anthropology or permission of instructor.

**ANTH 566 Theory of Sociocultural Anthropology (5)** Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 565.

**ANTH 567 Theory of Sociocultural Anthropology**

**(5)** Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 566.

**ANTH 570 Environmental Anthropology (5)** Current issues in the study of human environment interaction from a cross-cultural perspective: ecological adaptation and maladaptation; ethnoecology and indigenous knowledge; anthropogenic environmental change; political ecology of "development;" interrelations of cultural and biological diversity; conflicts over indigenous land use and property rights, environmental justice, resource conservation, and sustainability.

**ANTH 571 Communicational Anthropology (3-9, max. 9)** Introduction to communicational aspects of culture. Prerequisite: permission of instructor.

**ANTH 574 Socio-Cultural Perspectives of Public Health Genetics (2)** Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with NURS 582/PHG 521.

**ANTH 575 Cultural Construction of Illness: Seminar in Medical Anthropology (5)** Historical and comparative examination of depression, neurasthenia, somatization, hypochondriasis, and hysteria. Anthropology of psychosomatics and psychiatry, including cultural analysis of selected biomedical, indigenous folk medical, and popular common-sense conceptualizations of illness.

**ANTH 584 Ways of Speaking (5)** Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned styles of communicative conduct. Offered: jointly with SP CMU 584.

**ANTH 590 Seminar in Museum Theory (3)** Fundamental theoretical issues involved in current museum administrative and operations work, including administrative structure, organizational conflicts, museum-community relations, and museum educational programming. Prerequisite: permission of instructor. Offered: jointly with MUSEUM 590.

**ANTH 591 Seminar in Museum Operations (3)** Designing hypothetical museums and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurring budgets, security system, records system, educational plan, and policy making. Recommended: 590. Offered: jointly with MUSEUM 591.

**ANTH 592 Seminar in Museum Specimen Documentation (3)** Seminar discussion of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic studies. Documentation of a collection and reference work. Recommended: 590 and 591. Offered: jointly with MUSEUM 592.

**ANTH 599 Effective Teaching of Anthropology (1)** Class required of all graduate students who accept teaching assistantships: instruction in teaching methods and issues, e.g., professional ethics, preparing and delivering lectures, leading discussion groups, test writing and grading, diversity in the classroom. Credit/no credit only.

**ANTH 600 Independent Study or Research (\*)**

**ANTH 700 Master's Thesis (\*)** Credit/no credit only.

**ANTH 800 Doctoral Dissertation (\*)** Credit/no credit only.

**Archaeology****ARCHY 401 Archaeology of Human Origins (5) I&S**

*Close* Early part of the prehistoric archaeological record in Africa and Eurasia, from >2,000,000 years ago until the spread of modern human beings; development of stone and bone technologies; ways of making a living; cultural adaptations; intellectual and social development. Prerequisite: ARCHY 205. Offered: Sp.

**ARCHY 465 Issues in Cultural Resource Management (3) I&S** Examines practical application of archaeology to cultural resource management. Topics include role in environmental permitting, inventory and significance evaluation of resources, project impacts and design of mitigation measures, consultation with government agencies and Indian tribal organizations, and practical aspects of cultural resource management business operation.

**ARCHY 466- Archaeology Honors Thesis ([1-9]-, max. 18) I&S** Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

**ARCHY 469 Special Studies in Archaeology (3-6, max. 18) I&S** Consideration in detail of specific archaeological topics, either methodological or substantive in content, of current interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduates and graduate students. Prerequisite: ARCHY 205.

**ARCHY 476 New World States and Empires (5) I&S** Considers theoretical and methodological scholarship on complex societies in Meso-America and the Andes. Highlights current research on population dynamics, subsistence strategies, economic foundations, and political processes in the development of states and empires. Considers archaeological evidence and texts of native and European documents. Prerequisite: ARCHY 205; ARCHY 304.

**ARCHY 477 Archaeology of the North (5) I&S** *Fitzhugh* Archaeological history of the circumpolar arctic and subarctic from Neanderthals to the 19th century. Variability in human adaptation and social evolution in some of the world's most extreme environments such as Eurasian tundra, North Pacific rim, Beringia, and North American high arctic. Prerequisite: ARCHY 205. Offered: Sp.

**ARCHY 478 Prehistory of the Arid West (5) I&S** Archaeology of arid western North America, with particular emphasis on the earliest peoples of this region (and on the peopling of the New World in general), and on the prehistoric hunter-gathers of the Great Basin and Southwest. Prerequisite: ARCHY 304.

**ARCHY 479 Prehistoric Cultures of North America: Eastern North America (5) I&S** Ecological and evolutionary account of prehistoric cultural developments in North America east of the Rocky Mountains. Cultural and environmental change from appearance of people in New World to collapse of indigenous cultural systems. Prerequisite: ARCHY 304.

**ARCHY 480 Advanced Archaeological Analysis: Ceramics (6) I&S** Human technology in traditional societies. Ceramic tools as evidence for technological innovation, continuity, and change; and as evidence for ancient economic systems involving production, consumption, and distribution. Examines variety of approaches to the study of material culture—especially ceramics—including archaeological, ethnographic, experimental, and technical. Prerequisite: ARCHY 371.

**ARCHY 481 Advanced Archaeological Analysis: Faunal Remains (6) I&S** Seminar on techniques and methods employed in analysis of faunal remains from

a wide range of Pleistocene and Holocene settings, including archaeological sites, coupled with a laboratory focusing on identification of faunal remains from these settings. Prerequisite: ARCHY 371.

**ARCHY 482 Advanced Archaeological Analysis: Geoarchaeology (6) I&S** Identification, analysis, and interpretation of sediments and soils associated with archaeological remains. Laboratories deal with sediment description and chemical analysis; field trips and student projects focus on archaeological applications of these subjects. Prerequisite: ARCHY 371.

**ARCHY 483 Analyses of Stone Artifacts (6) I&S** *Close* Current approaches to lithic analysis, including types of information obtainable (technological, functional, social, ideological) and constraints affecting the formation and analysis of lithic assemblages. Lectures interspersed with application of methods under discussion to individual artifacts and to assemblages. Prerequisite: ARCHY 371.

**ARCHY 490 Museum Curation Practicum (1-5, max. 15)** Application of museological training in curation of ethnographic, archeological, geological, or zoological collection materials in the Burke Museum. Supervised work ranges from fundamental collection documentation and research to preventive conservation, storage, and other special curation projects: Offered: jointly with MUSEUM 490.

**ARCHY 495 Quantitative Archaeological Analytic Techniques (5) I&S** Introduction to quantitative approaches to archaeological problems; data screening, numeric methods of classification and identification, graphical and computer-based seriation techniques, and the analysis of spatial patterning in artifact distributions.

**ARCHY 497 Archaeological Method and Theory I: Formal Theory (5) I&S** Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Prerequisite: ARCHY 205.

**ARCHY 498 Archaeological Method and Theory II: Explanatory Theory (5) I&S** Conceptual frameworks employed by archaeologists in obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisite: ARCHY 205; ARCHY 497.

**ARCHY 499 Undergraduate Research (\* max. 12)**

**Courses for Graduates Only**

**ARCHY 501 Preceptorial Reading (6)** For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the reconstruction of prehistory. Not open to graduate students in the archaeology program.

**ARCHY 520 Principles of Archaeological Theory (5)** Review of principles of archaeological theory. Student presentation of research on archaeological theory and seminar discussion or presentations. Open only to first-year graduate students in anthropology.

**ARCHY 530 Prehistory of the Northwest Coast (5)** Origins, development, and variation of Pacific Northwest cultures, focusing particularly on Washington. Adaptations to maritime and interior environments. Artifacts from a variety of archaeological sites. Technological, functional, and historical significance of Northwest artifacts.

**ARCHY 560 Seminar in Archaeological Methods (5, max. 20)** Basis, limitations, and applications of a particular archaeological analytical method, or closely related set of methods. Prerequisite: permission of instructor.

**ARCHY 570 Seminar in Archaeological Theory (3-6, max. 18)** Detailed consideration of a particular archaeological theory or closely related set of theories, including their methodological and epistemological bases. Prerequisite: ARCHY 497, ARCHY 498.

**ARCHY 571 Field Course in Archaeology (5)** Introduction to field acquisition of archaeological data through survey and excavation. Ongoing field projects; instructional emphasis on recovery and recording techniques and on management of field projects. Prerequisite: permission of department.

**ARCHY 575 Archaeological Field Research Design (6)** Nature of the archaeological record, and methods and techniques of field research, to illustrate range of data sources and modern techniques of general applicability. Practical experience in mapping, map interpretation, sampling design, remote sensing, photogrammetry, and research proposal writing. Prerequisite: permission of instructor.

**ARCHY 576 Designing Grant Proposals (5)** Design and writing of grant proposals for archaeological research at both dissertation and senior investigator levels, with particular emphasis on National Science Foundation structure and requirements. Prerequisite: upper-level graduate standing and permission of instructor.

**ARCHY 591 Advanced Field Course in Archaeology (6-9)** For students with previous field experience and graduate work in archaeology. Emphasis on decision making in field and project management. Prerequisite: ARCHY 497, V498, ARCHY 571, and ARCHY 575 or permission of instructor.

**ARCHY 600 Independent Study or Research (\*)** Prerequisite: permission of instructor.

**ARCHY 601 Internship (3-10, max. 10)** Credit/no credit only.

## Biocultural Anthropology

**BIO A 465 Nutritional Anthropology (3) I&S/NW** Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with NUTR 465.

**BIO A 466- Biocultural Anthropology Honors Thesis ([1-9]-, max. 18) NW** Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

**BIO A 469 Special Topics in Biocultural Anthropology (3-5, max. 15) NW** Delineation and analysis of a specific problem or a more general area in biocultural anthropology. Offered occasionally by visiting or resident faculty.

**BIO A 473 Biological Adaptability of Human Populations (5) NW** *Shell-Duncan* Mechanisms enabling humans to maintain homeostasis in extreme environments: high altitude, heat, cold, nutritional deficiency, radiation. Adaptive process operating at levels of physiology, metabolism, and population, including the strategies of fertility and birth spacing. Prerequisite: BIO A 201.

**BIO A 476 Sociocultural Ecology and Health (3) NW** *Leonetti* Sociocultural ecology of health/disease, focusing on humans as bioculturally integrated beings and on populations as biocultural units of adaptation. Examples of research on disease, both infectious and chronic, and patterns of morbidity and mortality, infant, maternal, old age, with particular attention to situations of sociocultural changes. Prerequisite: BIO A 201.

**BIO A 477 Evolutionary Perspectives on Sex and Gender Roles (3) I&S/NW** Critical examination of theories explaining the evolution of gamete specialization and sexual reproduction. Consideration of the extent to which gametic asymmetries lead to gender-based differences in mating patterns, conceptions of attractiveness, parental investment, subsistence patterns, aggressiveness, and coercion. Interactions of biology and culture. Prerequisite: BIO A 201.

**BIO A 482 Human Population Genetics (5) NW, QSR** *Holman* Micro-evolutionary changes in human populations. Effects of mutation, selection, inbreeding, gene flow, and genetic drift as causes of evolutionary change. Mathematics beyond high school not required. Prerequisite: BIO A 201.

**BIO A 483 Human Genetics, Disease, and Culture (5) NW** Considers relationships among genetic aspects of human disease, cultural behavior, and natural habitat for a wide variety of conditions. Also considers issues of biological versus environmental determinism, adaptive aspects of genetic disease, and the role of cultural selection. Prerequisite: BIO A 201.

**BIO A 484 Human Life Cycle (5) NW** *Newell* Human growth and physical/social development: fetal life to old age. Cultural, ecological, and evolutionary aspects of the life cycle. Population differences in age and sex related to morbidity and mortality. Prerequisite: BIO A 201.

**BIO A 485 Research in Growth and Development (2, max. 8) NW** Focus on topics relating to primate growth and development. Prerequisite: either BIO A 484, BIO A 495, or BIO A 496, any of which may be taken concurrently.

**BIO A 486 Primate Socioecology (3) NW** Focus on the variety of social systems exhibited by nonhuman primates and adaptive significance of these societies; social systems in terms of the present ecology and evolutionary past of the species; the function of communicatory gestures and vocalizations, tradition, kinship, and social roles in maintaining and structuring groups over generations; the relationship among mating systems, foraging strategies, ranging patterns, and ecological separation/resource partitioning and their contribution to species-typical social organization. Prerequisite: either BIO A 370 or PSYCH 418.

**BIO A 487 Human and Comparative Osteology (3) NW** Introduction to the vertebrate skeleton. The skeleton is described in detail and various methods of determining age and sex, as well as osteometry and modern statistical methods for handling such data, are presented.

**BIO A 488 Primate Evolution (5) NW** *Eck* Major trends in nonhominid primate evolution through the Cenozoic. Discussion of the specimens, geological context, and age of the fossil taxa and their relationship to modern taxa. Practical experience in analyzing fossil material. Prerequisite: BIO A 201.

**BIO A 491 Issues in Human Paleontology (5) NW** *Eck* Addresses five major unanswered questions concerning human evolution as represented by the fossil record. Prerequisite: BIO A 389.

**BIO A 495 Growth and Development: Infancy (5) NW** *Newell* Genetic and environmental influences on growth and development from prenatal life through infancy. Includes exploration of methods for assessing development and comparisons of development in non-human primates with human development. Prerequisite: BIO A 370.

**BIO A 496 Growth and Development: Adolescence and Reproductive Maturity (5) NW** *Newell* Genetic and environmental influences on growth and development during adolescence. Emphasis on the interaction of biological and social factors in attainment

of reproductive maturity. Compares conditions of non-human primates with human conditions. Prerequisite: BIO A 370.

**BIO A 499 Undergraduate Research (\* max. 12)**

## Courses for Graduates Only

**BIO A 502 Preceptorial Reading (6)** For beginning graduate students who have not had adequate training in the study of primate principles and methods involved in the study of evolution, human genetics, and the evolution of modern populations. Not open to graduate students in the biocultural anthropology program. Offered: AWS.

**BIO A 520 Human Behavioral Ecology (3-5) Smith** Principles and methods of evolutionary behavioral ecology, and critical examination of their application to human behavior in such areas as resource utilization, mating, parenting, life history, cooperation, and competition.

**BIO A 525 Biocultural Research Methods and Study Design (5) Shell-Duncan** Survey of basic conceptual issues in the design of empirical research, with special attention to problems that arise during anthropological fieldwork. Topics include defining data needs, sampling strategies, problems with co-funding, proposal writing, human subjects approval, and basic ethical issues in human biocultural research.

**BIO A 526 Quantitative Methods and Modeling for Biocultural Anthropology (5)** Surveys the concepts, tools, and methods for developing quantitative models based on underlying biocultural processes. Introduces methods of testing models from observations collected in anthropological field studies. Oriented toward longitudinal research of fertility, mortality, disease dynamics, population genetics, and other biocultural processes.

**BIO A 550 Skeletal Biology and Prehistoric Demography (5) O'Connor** Composition and structure of calcified tissue. Analytical techniques and their contribution to interpretation of the archaeological record.

**BIO A 568 Human Reproductive Ecology (3)** A consideration of the determinants of fertility variation within and among traditional human societies. Biocultural and ecological perspectives on pubertal timing, nuptiality, duration of birth intervals, and reproductive senescence.

**BIO A 569 Demographic Analysis in Biological and Social Anthropology (5) Leonetti** Demographic analysis relevant to anthropological research on small populations. Use of data collected through local surveys, genealogical methods, and from other sources. Focuses on use of demography to analyze social and biological processes with adaptive and/or cultural-historical significance. Theoretical approaches emphasized.

**BIO A 584 Topics in Ecology and Adaptation (3, max. 9)** Seminar dealing with various aspects of ecology and adaptation. Topics vary each quarter.

**BIO A 588 Topics in Primate Evolution (3)** Emphasis on fossil taxa and their importance in understanding the morphologies and distributions of members of modern taxa. Prerequisite: BIO A 488 and permission of instructor.

**BIO A 590 Current Issues in Human and Non-Human Primate Evolution (2, max. 18)** Biweekly presentation by participants and guest lecturers of current literature and ongoing research in topics pertaining to human and nonhuman primate evolution, biology, anatomy, genetics variation, and behavior. Credit/no credit only.

**BIO A 600 Independent Study or Research (\*)**

## Applied Mathematics

408 Guggenheim



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/applied\\_math.html](http://www.washington.edu/students/genocat/academic/applied_math.html)



Department Web page:  
[www.amath.washington.edu/](http://www.amath.washington.edu/)

The Department of Applied Mathematics is concerned with mathematical modeling and analysis of problems from the physical, biological, and social sciences, and from engineering. The department offers undergraduate and graduate courses for all interested students at the University, as well as degree programs for graduate students in applied mathematics.

### Graduate Program

Graduate Program Coordinator  
 408L Guggenheim, Box 352420  
 (206) 543-5077

The Department of Applied Mathematics offers graduate programs of study leading to the degrees of Master of Science and Doctor of Philosophy. These programs involve (1) broad training in those mathematical methods and techniques that have been found useful in applications, (2) in-depth study in at least one field of application, and (3) opportunities to explore various specialized aspects of applied mathematics.

### Master of Science, Doctor of Philosophy

*Admission Requirements:* Prospective students for the Master of Science program should hold an undergraduate degree either in mathematics with a strong background in applications or in physical, engineering, biological, or social science with a strong background in applications-oriented mathematics. Students who wish to apply to the doctoral program need to show evidence of completion of course work equivalent to that described for the master's degree, with at least a 3.40 GPA, and indication of the ability or potential to perform independent research. It is required that the Graduate Record Examination be taken and the results sent to Graduate Admissions. Three letters of recommendation are required in support of each application and should be sent directly to the department. After receiving notification of admission to the Graduate School and a registration appointment, the student should contact the department. (On the Application for Graduate School Admission form, the student should be sure to indicate the desire to enter the Department of Applied Mathematics, rather than Mathematics.)

### Master of Science

The M.S. degree program is designed to provide the student with a working knowledge of several basic areas of applied mathematics, together with exposure to at least one specific area of application. The applied mathematics areas include complex variables, ordinary and partial differential equations, applied linear algebra, numerical analysis, calculus of variations or optimization, and applied probability and statistics. The specific area of application is chosen by the student from a broad range of outside fields, including engineering, the physical, biological, and certain areas of medical science. After fulfilling the basic course requirements, the student can obtain the M.S. degree by additional course work to complete the required minimum of 36 credits for the degree. Students may elect to do an M.S. thesis in lieu of a maximum of 6 course credits. Detailed requirements for the M.S. degree are listed in the Applied Mathematics graduate program guidelines.

### Doctor of Philosophy

The Doctor of Philosophy degree in applied mathematics is primarily a research degree, not conferred as a result of course work alone. The granting of the degree is based on general proficiency and attainment in applied mathematics, together with a demonstrated ability to carry out an independent investigation which is described in a doctoral dissertation. Proficiency and attainment in applied mathematics is demonstrated by passing the General Examination which tests the student's ability to probe a new area of research and to exercise critical judgment on a technical issue of current importance in the chosen field of research. The doctoral dissertation must exhibit original mathematical contributions in a significant area of application. The Final Examination and defense of the dissertation is a research seminar presentation open to the public. The detailed requirements for the doctoral degree are listed in the Applied Mathematics graduate program guidelines.

### Financial Aid

Both research and teaching assistantships are available to full-time students who qualify. In addition, fellowship funds for the study of applied mathematics are available and awarded on a competitive basis.

### Research Facilities

Students in applied mathematics have access to a departmental computing lab equipped with a DEC Alpha server, Alpha/AXP workstations, and X-terminals, with centralized file storage. Software for scientific visualization, numerical analysis, symbolic mathematics, programming, and document preparation is available. The lab is connected to the campus network and the Internet, providing access to supercomputing facilities and other resources.

## Faculty

### Chair

Ka Kit Tung

### Professors

Baker, Marcia \* 1980, (Adjunct); MS, 1960, Stanford University; PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Bretherton, Christopher S. \* 1984; PhD, 1984, Massachusetts Institute of Technology; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology.

Bube, Kenneth P. \* 1986, (Adjunct); PhD, 1978, Stanford University; numerical analysis, partial differential equations.

Burke, James V. \* 1985, (Adjunct); PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

Criminale, William O. \* 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, mathematical physics, nonlinear mechanics, stability theory.

Durrant, Dale R. \* 1987, (Adjunct); MS, 1975, University of California (Berkeley); PhD, 1981, Massachusetts Institute of Technology; atmospheric dynamics, mesoscale meteorology, numerical simulation, mountain meteorology.

Greenbaum, Anne \* 1997, (Adjunct); PhD, 1981, University of California (Berkeley); numerical analysis.

Kevorkian, Jirair \* 1964; PhD, 1961, California Institute of Technology; partial differential equations, perturbation theory.

Kosaly, George \* 1980, (Adjunct); PhD, 1974, Eotvos Lorand University (Hungary); DSc, 1979, Hungarian Academy of Sciences; applications of stochastic processes in engineering, reacting turbulent flows.

Leveque, Randall J. \* 1985; PhD, 1982, Stanford University; numerical analysis, hyperbolic conservation laws, computational fluid dynamics.

Miura, Robert M. 1988, (Affiliate); PhD, 1966, Princeton University.

Murray, James D. \* 1988; PhD, 1956, DSc, 1968, Oxford University (UK); mathematical biology, biological pattern formation, wound healing, spread of epidemics.

Nazareth, John L. 1991, (Affiliate); PhD, 1973, University of California (Berkeley); numerical optimization.

O'Malley, Robert E. Jr. \* 1990; PhD, 1966, Stanford University; singular perturbations and asymptotic methods.

Pearson, Carl E. \* 1967, (Emeritus); PhD, 1949, Brown University; wave propagation, fluid dynamics, numerical analysis, optimization.

Riley, James J. \* 1983, (Adjunct); PhD, 1971, Johns Hopkins University; fluid mechanics, especially turbulent flows.

Rockafellar, R. T. \* 1966; PhD, 1963, Harvard University; variational analysis and optimization.

Sarachik, Edward S. \* 1984, (Adjunct); PhD, 1966, Brandeis University; atmospheric dynamics, large scale atmosphere/ocean interactions, equatorial dynamics, climate change.

Sylvester, John \* 1987, (Adjunct); PhD, 1980, New York University; partial differential equations.

Tung, Ka Kit \* 1988; PhD, 1977, Harvard University; atmospheric and geophysical fluid dynamics.

Vagners, Juris \* 1967, (Adjunct); PhD, 1967, Stanford University; dynamics, controls and optimization.

Wan, Frederic Y. \* 1983, (Affiliate); PhD, 1965, Massachusetts Institute of Technology; solid mechanics and mathematical modeling.

Watkins, David S. 1989, (Affiliate); PhD, 1974, University of Calgary (Canada); linear algebra, numerical computation.

Yeh, Harry H. \* 1983, (Adjunct); PhD, 1983, University of California (Berkeley); fluid mechanics, water wave motions, coastal and hydraulic engineering.

### Associate Professors

Adams, Loyce M. \* 1985; PhD, 1983, University of Virginia; numerical algorithms for parallel computers.

Kot, Mark \* 1989, (Affiliate); PhD, 1987, University of Arizona; mathematical ecology, nonlinear dynamics, and population biology.

Schmid, Peter J. \* 1993; PhD, 1993, Massachusetts Institute of Technology; computational fluid dynamics, hydrodynamic stability theory, transition to turbulence.

Storti, Duane W. \* 1983, (Adjunct); PhD, 1983, Cornell University; nonlinear dynamics and vibrations, dynamical systems, perturbations and bifurcations.

### Assistant Professors

Kutz, Jose Nathan 1997; PhD, 1994, Northwestern University; linear/nonlinear wave propagation, nonlinear analysis, dynamical systems.

Lewis, Mark A. 1991, (Affiliate); PhD, 1990, Oxford University (UK).

Pearson, Erik W. 1986, (Affiliate); PhD, 1983, Harvard University.

Qian, Hong 1997; PhD, 1989, Washington University; physical biochemistry of biological macromolecule, mathematical and computational biology.

Winters, Kraig B. \* 1984, (Affiliate); PhD, 1989, University of Washington.

## Course Descriptions

See page 48 for an explanation of course numbers, symbols, and abbreviations.

For graduate-level course descriptions, see the graduate and professional study volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**AMATH 401 Introduction to Methods in Applied Mathematics I (4) NW** Emphasis on acquisition of solution techniques; ideas illustrated with specific example problems arising in science and engineering. Applications of vector differential calculus, complex variables. Line-surface integrals; integral theorems; Taylor and Laurent series, contour integration. Prerequisite: MATH 324; recommended: AMATH 351, MATH 307, or MATH 351. Offered: A.

**AMATH 402 Introduction to Methods in Applied Mathematics II (4) NW** See 401. Applications of ordinary differential equations; review of elementary concepts for first and second order equations; power series and Frobenius solutions. Laplace transforms; systems of differential equations, eigenvalues. Prerequisite: either AMATH 351 or MATH 307. Offered: W.

**AMATH 403 Introduction to Methods in Applied Mathematics III (4) NW** See 401. Applications of partial differential equations; linear and quasilinear first order equations, characteristics, shocks; classification of linear second order equations; basic solution techniques for parabolic, elliptic, and hyperbolic equations; Green's functions and integral transform methods. Prerequisite: AMATH 402.

**AMATH 422 Introduction to Mathematical Biology (3) NW** Mathematical modeling in biology and medicine. Introduction to chaos and nonlinear dynamics, population models (predator-prey and competition systems), epidemic models with applications to sexually transmitted diseases and dynamic diseases, enzyme kinetics, biological oscillators and switches. Prerequisite: either AMATH 351, MATH 136, or MATH 307. Offered: W.

**AMATH 423 Mathematical Biology: Stochastic Models (3) NW** Introduction to the basics of stochastic models. Applications are taken from the biomedical sciences such as random movement of cells and molecules, activation of neurons, cancer growth and spread, population dynamics, kinetics of unimolecular reactions. Prerequisite: either AMATH 351 or MATH 307, MATH/STAT 390. Offered: Sp.

**AMATH 441 Introduction to Fluid Dynamics (3) NW** Eulerian equations of mass and motion. Surface forces. Vorticity and vortex dynamics. Water waves and interfacial waves; concept of phase and group velocities. Linear instability theory. Simple viscous flows; boundary layer theory, potential theory. Low Reynolds-number flows, application to biological fluid flows. Prerequisite: AMATH 353.

**AMATH 490 Special Topics (1-5, max. 15)** Topics of current interest in applied mathematics not covered by other undergraduate courses.

**AMATH 498 Senior Project or Thesis (1-6, max. 6)** Intended for Honors students and other advanced undergraduates completing a special project or senior thesis in applied mathematics. Offered: AWSpS.

**AMATH 499 Undergraduate Reading and Research (1-6, max. 6)** Credit/no credit. Offered: AWSpS.

## Courses for Graduates Only

**AMATH 500 Special Studies in Applied Mathematics (\* max. 12)** Lectures and discussions of topics of current interest in applied mathematics. May not be offered every quarter; content may vary from one offering to another. Prerequisite: permission of instructor.

**AMATH 501 Seminar in Applied Mathematics (1, max. 6)** Special topics and selected problems of current interest in applied mathematics. Credit/no credit only. Offered: AWSp.

**AMATH 502 Applied Mathematics Clinic (1)** The clinic provides consulting service for problems from different academic units requiring assistance in formulation, analysis, and interpretation of mathematical models. Students learn to delineate sources of difficulties, identify or devise a method of solution, and effectively communicate it to clients. Credit/no credit only. Prerequisite: AMATH 568, AMATH 569, and AMATH 584. Offered: AWSp.

**AMATH 503 Mathematical Biology I (3)** Mathematical modeling in biomedical sciences (mainly ecology, epidemiology, physiology, and zoology). Topics covered include modeling (continuous and discrete), population interactions, dynamic diseases, reaction kinetics, biological oscillators, oscillator generated wave phenomena, epidemics, and the dynamics of infectious diseases. Prerequisite: AMATH 402 or equivalent knowledge of ordinary differential equations. Offered: A.

**AMATH 505 Introduction to Fluid Dynamics (4)** Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with ATM S 505/OCEAN 511; A.

**AMATH 506 Applied Probability Statistics (4)** Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with STAT 506.

**AMATH 507 Calculus of Variations I (5)** Necessary and sufficient conditions for a weak and strong extremum. Legendre transformation, Hamiltonian systems. Constraints and Lagrange multipliers. Space-time problems with examples from elasticity, electromagnetics, and fluid mechanics. Sturm-Liouville problems. Approximate methods. Prerequisite: AMATH 351 or MATH 307; MATH 324, 327; recommended: AMATH 402 and AMATH 403 or MATH 428 and 429.

**AMATH 509 Theory of Optimal Control (3)** Trajectories obtained from ordinary differential equations with control variables. Controllability, optimality, the maximum principle. Relaxation and the existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to AMATH 507 or AMATH 515. Offered: jointly with MATH 509; even years.

**AMATH 512 Methods of Engineering Analysis (3)** Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Offered: jointly with CHEM E 512; A.

**AMATH 514 Networks and Combinatorial Optimization (3)** Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment

problems. Algorithms and applications. Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with MATH 514.

**AMATH 515 Fundamentals of Optimization (5)** Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/MATH 515.

**AMATH 516 Numerical Optimization (3)** Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic programming. Cutting planes and nonsmooth optimization. Prerequisite: AMATH 515. Offered: jointly with MATH 516.

**AMATH 517 Optimization Under Uncertainty (3)** Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications to optimal stopping, inventory control, resource management. Prerequisite: AMATH 506 (or an introduction to basic concepts of probability such as STAT 390 or 394, 395), MATH 308 and 324. Offered: jointly with MATH 517.

**AMATH 520 Special Topics in Mathematical Applications (5, max. 15)** In-depth study of an application topic in applied mathematics. Topics may include special studies in geophysical fluid dynamics, hydrodynamic stability, turbulence, analytic dynamics, solid mechanics, applied optimization, tensor analysis, stochastic analysis, and nonlinear optics and lasers. Offered: W.

**AMATH 521 Special Topics in Mathematical Biology (5, max. 15)** DNA-folding, pattern-forming systems, stochastic analysis. Prerequisite: AMATH 402 or equivalent. Offered: Sp.

**AMATH 563 Methods of Partial Differential Equations II (3)** Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

**AMATH 564 Methods of Partial Differential Equations III (3)** Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

**AMATH 567 Methods of Applied Mathematics I (5)** Complex variable and associated topics. Branch cuts, series and product expansions. Contour integration, numerical implications. Harmonic functions. Complex potential (and singularities) in physical problems. Conformal mapping; applications and examples. Fourier and Laplace transforms and applications. Recommended: 401 or equivalent. Offered: A.

**AMATH 568 Methods of Applied Mathematics II (5)** Survey of practical solution techniques for ordinary differential equations. Linear systems of equations including nondiagonal case. Nonlinear systems; stability phase plane analysis. Asymptotic expansions. Regular and singular perturbations. Recommended: 402 or equivalent. Offered: W.

**AMATH 569 Methods of Applied Mathematics III (5)**

Analytical solution techniques for linear partial differential equations. Discussion of how these arise in science and engineering. Transform and Green's function methods. Classification of second-order equations, characteristics. Conservation laws, shocks. Prerequisite: AMATH 403, AMATH 568 or MATH 428 or permission of instructor. Offered: Sp.

**AMATH 570 Advanced Methods in Applied Mathematics I (5)**

Analytical techniques of applied mathematics. Topics include systems of and nonlinear partial differential equations, asymptotics for integrals, perturbation and multiple-scale analysis, linear integral equations, calculus of variations. Prerequisite: AMATH 567, AMATH 568, AMATH 569. Offered: A.

**AMATH 571 Advanced Methods in Applied Mathematics II (5)**

Numerical techniques of applied mathematics. Topics include numerical solution of hyperbolic conservation laws, multigrid methods, Fourier and spectral methods. Prerequisite: AMATH 584, AMATH 585, AMATH 586. Offered: W.

**AMATH 572 Advanced Methods in Applied Mathematics III (5)**

Application of analytical and numerical techniques to problems in science and engineering. Topics include dynamical systems and bifurcation theory, wave propagation, wavelet analysis, stochastic processes, stochastic differential equations. Prerequisite: AMATH 571. Offered: Sp.

**AMATH 574 Nonlinear Dynamics and Chaos (3)**

Overview of ways in which complex dynamics arise in nonlinear dynamical systems. Topics include bifurcation theory, universality, Poincaré maps, routes to chaos, horseshoe maps, Hamiltonian chaos, fractal dimensions, Liapunov exponents, and the analysis of time series. Examples from biology, mechanics, and other fields. Prerequisite: AMATH 568 or equivalent.

**AMATH 577 Perturbation Theory I (3)**

Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

**AMATH 578 Perturbation Theory II (3)**

Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

**AMATH 584 Applied Linear Algebra and Introductory Numerical Methods (5)**

Numerical methods for solving linear systems of equations, linear least squares problems, matrix eigen value problems, nonlinear systems of equations, interpolation, quadrature, and initial value ordinary differential equations. Offered: A.

**AMATH 585 Approximate and Numerical Analysis II (5)**

Numerical methods for steady-state differential equations. Two-point boundary value problems and elliptic equations. Iterative methods for sparse symmetric and non-symmetric linear systems: conjugate-gradients, preconditioners. Prerequisite: AMATH 584 which may be taken concurrently.

**AMATH 586 Approximate and Numerical Analysis III (5)**

Finite-difference methods for time-dependent differential equations. Multistep methods, stiff equations, implicit methods. Hyperbolic and parabolic

differential equations. Stability and convergence theory. Prerequisite: AMATH 584 which may be taken concurrently.

**AMATH 587 Asymptotics and Special Functions (3)**

Origin and properties of higher transcendental functions; theoretical basis and applications of Laplace, Fourier, Bessel, Mellin transforms; asymptotic analysis, including methods of steepest descent and stationary phase, WKB. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

**AMATH 588 Green's Functions and Integral Equations (3)**

Review of Sturm-Liouville theory. Green's functions and integral representation of solution to PDEs. Fredholm and Volterra integral equations. Hilbert-Schmidt theory. Singular integral equations of Cauchy type. Applications to science and engineering. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

**AMATH 594 Special Topics in Numerical Analysis (2-3, max. 15)**

Various advanced topics in numerical analysis and scientific computing, such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 594.

**AMATH 595 Special Topics in Numerical Analysis (2-3, max. 15)**

Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 595.

**AMATH 596 Special Topics in Numerical Analysis (2-3, max. 15)**

Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 596.

**AMATH 600 Independent Research or Study (\*)**

Credit/no credit only.

**AMATH 700 Master's Thesis (\*)**

Credit/no credit only.

**AMATH 800 Doctoral Dissertation (\*)**

Credit/no credit only.

## Art

104 Art



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/art.html](http://www.washington.edu/students/gencat/academic/art.html)



Department Web page:  
[net.art.washington.edu](http://net.art.washington.edu)

The School of Art serves a dual role within the educational structure of the University of Washington. It is both a professional school and an academic department. As a professional school it trains students for active careers in the graphic and plastic arts; as a school of the College of Arts and Sciences it offers studio and lecture courses. All of its course offerings and its curriculum requirements are based on the underlying philosophy that an awareness and understanding of the visual arts are necessary to a liberal education, and that a liberal education is necessary to the training of a professional artist.

## Graduate Program

Graduate Program Coordinator  
104E Art, Box 353440  
(206) 685-1714 or (206) 543-0646

The School of Art offers eight art or design programs leading to the Master of Fine Arts degree: ceramics, fibers, metals, painting, photography, printmaking, sculpture, and visual communications design. Students are required to enroll for two years of full-time study (six quarters, excluding summer), earning a minimum of 63 credits of scheduled studio and class work and 9 credits of thesis for a total of 72 credits. Individual programs have specific requirements.

The thesis consists of a studio project representing a body of work, a written thesis statement, and documentation of the work in the form of slides. A selection of thesis work is exhibited at the School of Art's Master of Fine Arts Thesis Exhibition.

## Admission Requirements

Applicants for admission to the Master of Fine Arts program are required to have a Bachelor of Fine Arts degree or equivalent (determined by the quality of the applicant's work and equivalent experience, based upon the UW B.F.A. requirements) with a minimum GPA of 3.00 in the undergraduate art major.

The Graduate Record Examination is not required. Admission is on a competitive basis. Annual deadline for applications is February 1, for consideration for admission the following autumn quarter.

## Scholarships and Teaching Assistantships

School of Art scholarships are awarded annually to new and returning students, based on merit. Applicants admitted to the M.F.A. program may be offered School of Art scholarships for the coming year on an individual merit basis. Further application is not required.

The School of Art offers a limited number of teaching assistantships to incoming graduate students on an individual merit basis, as determined by each program. Enrolled graduate students may apply for a limited number of additional, competitive teaching assistantships.

## Faculty

### Chair

Christopher Ozubko

### Professors

Anderson, Judy M. \* 1988; MA, 1977, University of California (Berkeley); graphic and informational design for business and institutions, book artist.

Berger, Paul E. \* 1978; MFA, 1973, State University of New York (Buffalo); photography.

Bliquez, Lawrence J. \* 1969; PhD, 1968, Stanford University; Greek oratory, Greek historiography and historians, Greek and Roman medicine.

Bravmann, Rene A. \* 1972; PhD, 1971, Indiana University; African art.

Carraher, Ronald G. \* 1967; MA, 1961, San Jose State College; photography.

Casteras, Susan P. \* 1996; PhD, 1977, Yale University; nineteenth-twentieth century painting and sculpture, English art.

Celentano, Francis \* 1966, (Emeritus); MA, 1957, New York University; painting, drawing.

Christofides, Constantine \* 1966, (Emeritus); PhD, 1956, University of Michigan; medieval, seventeenth-century, Romanesque art and literature.

Clausen, Meredith L. \* 1979; PhD, 1975, University of California (Berkeley); twentieth-century and American architecture.

Dahn, Richard F. \* 1965, (Emeritus); MFA, 1959, Yale University; graphic design.

Dailey, Michael D. \* 1963, (Emeritus); MFA, 1963, University of Iowa; painting, drawing.

Du Pen, Everett 1945, (Emeritus); MFA, 1937, Yale University; sculpture.

Goldsmith, Layne \* 1983; MA, 1975, San Jose State College; MFA, 1979, Cranbrook Academy of Art; fiber arts and related historic and contemporary textile structures and processes.

Hildebrand, Grant \* 1964; MArch, 1964, University of Michigan; history, preservation design.

Hixson, William J. \* 1950, (Emeritus); MFA, 1950, University of Oregon; painting.

Holm, Bill \* 1968, (Emeritus); MFA, 1951, University of Washington; Northwest coast Indians.

Hu, Mary L. \* 1980; MFA, 1967, Southern Illinois University; metal design.

Hurley, Denzil 1994; MFA, 1979, Yale University; painting, drawing, theory.

Jones, Robert C. \* 1960, (Emeritus); MS, 1959, Rhode Island School of Design; painting, drawing.

Kartsonis, Anna D. \* 1983; PhD, 1982, New York University; Byzantine and medieval art.

Kehl, Richard L. \* 1962; MA, 1961, MFA, 1961, Kansas City Art Institute; painting.

Kingsbury, Martha \* 1968; PhD, 1969, Harvard University; nineteenth- and twentieth-century European and American art.

Lundin, Norman K. \* 1964; MFA, 1963, University of Cincinnati; painting, drawing.

Marshall, John C. \* 1970; MFA, 1968, Syracuse University; metal design.

Mason, Alden 1946, (Emeritus); MFA, 1947, University of Washington; painting.

Opperman, Hal N. \* 1967, (Emeritus); PhD, 1972, University of Chicago; seventeenth- and eighteenth-century European art.

Ozubko, Christopher \* 1981; MFA, 1981, Cranbrook Academy of Art; graphic design.

Pizzuto, Eugene \* 1957, (Emeritus); MFA, 1951, Cranbrook Academy of Art; painting, drawing.

Pundt, Hermann G. \* 1968, (Emeritus); PhD, 1969, Harvard University; history, historical preservation.

Silbergeld, Jerome \* 1975; PhD, 1974, Stanford University; Chinese art.

Smith, Charles W. \* 1948, (Emeritus); MFA, 1956, Cranbrook Academy of Art; sculpture.

Snow-Smith, Joanne \* 1981; PhD, 1976, University of California (Los Angeles); Italian Renaissance art.

Solberg, Ramona L. \* 1967, (Emeritus); MFA, 1957, University of Washington; art education, metal design.

Spafford, Michael C. \* 1969, (Emeritus); MA, 1960, Harvard University; painting, drawing.

Taylor, Norman J. \* 1968; MFA, 1967, MA, 1967, University of Iowa; sculpture.

Wadden, Douglas J. \* 1970; MFA, 1970, Yale University; graphic design, photography.

Walker, Jamie \* 1989; MFA, 1983, Rhode Island School of Design; ceramic arts.

Warashina, M. Patricia \* 1970, (Emeritus); MFA, 1964, University of Washington; ceramics.

Whitehill-Ward, John \* 1975; MS, 1974, Illinois Institute of Technology; graphic design.

Young, John T. \* 1984; MFA, 1978, Rhode Island School of Design; sculpture, conceptual art.

### Associate Professors

Andrews, Richard 1987, (Affiliate); MA, 1975, University of Washington.

Cabeen, Louise \* 1993; MFA, 1989, The School of Art Institute of Chicago; socially critical art with research specialties in textile history and techniques.

Failing, Patricia A. \* 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Garvens, Ellen J. 1994; MA, 1983, MFA, 1987, University of New Mexico; mixed-media photography.

Govedare, Philip B. \* 1991; MFA, 1984, Tyler School of Art; painting and drawing.

Koenig, Hazel L. \* 1967, (Emeritus); MFA, 1950, University of Washington; fiber arts.

Labitzke, Curt W. \* 1984; MFA, 1984, University of Notre Dame; printmaking; intaglio and lithography emphasizing hand drawn techniques.

Langdon, Merle K. \* 1976; PhD, 1972, University of Pennsylvania; Greek archaeology, epigraphy, topography, and history.

Oliver, Marvin E. 1974, (Adjunct); MFA, 1973, University of Washington; Northwest coast Indian art, Native American art, wood design, glass, metals.

Pawula, Kenneth J. \* 1965; MA, 1962, University of California (Berkeley); painting, drawing.

Praczkowski, Edward \* 1965, (Emeritus); MFA, 1965, Cranbrook Academy of Art; painting, drawing.

Proctor, Richard M. \* 1957, (Emeritus); MA, 1962, Michigan State University; fiber arts.

Scheier, Shirley E. \* 1986; PhD, 1985, University of Wisconsin; printmaking.

Takamori, Akio \* 1988; MFA, 1978, New York State College of Ceramics; ceramic sculpture.

Welman, Valentine S. \* 1954, (Emeritus); MFA, 1954, University of Colorado (Boulder); painting, drawing.

Wright, Robin K. \* 1990; PhD, 1985, University of Washington; Native American art, particularly Northwest coast Indian art.

### Assistant Professors

Bogel, Cynthia J. \* 1999; PhD, 1995, Harvard University; Buddhist arts, Japanese art and architecture, ritual aesthetic meaning, changing values.

Brody, David \* 1996; MFA, 1983, Yale University; painting, drawing.

Celentano, Denyce M. 1995; MFA, 1990, East Carolina University; painting and drawing.

Cheng, Karen \* 1997; MDes, 1996, University of Cincinnati; graphic design.

Collins, Jeffrey L. \* 1994; MA, 1990, Yale University; MA, 1994, Cambridge University (UK); PhD, 1994, Yale University; European Baroque art and architecture with an emphasis on Italy; American material culture.

Gale, Ann E. 1995; MFA, 1991, Yale University; figure painting.

Goettler, Christine E. \* 1998; PhD, 1991, University of Zurich (Switzerland); northern European art (late medieval to Baroque), religious/devotional art, iconoclasm.

Hallett, Christopher \* 1993; PhD, 1993, University of California (Berkeley); Egyptian, Greek, Roman art and archaeology.

Jeck, Douglas A. \* 1996; MFA, 1989, The School of Art Institute of Chicago; sculpture and ceramics.

Loewenstein, Daniel F. 1999; MFA, 1980, University of California (San Diego); studio foundations, sculpture, performance art.

Lyall, Marta 1999; MFA, 1987, The School of Art Institute of Chicago; new media.

Lynn, Billie G. 1998; MFA, 1989, University of San Francisco; sculpture.

O'Toole, Helen J. \* 1996; MFA, 1989, The School of Art Institute of Chicago; studio drawing, painting, art history.

Reed, T. Gervais 1950, (Emeritus); BA, 1949, Yale University; American, film.

Scott, George W. \* 1995; MFA, 1993, Cranbrook Academy of Art; industrial design, product design and development.

St. Pierre, Louise M. \* 1995; BFA, 1983, University of Alberta (Canada); design of products/exhibits which educate and enable children.

Wieczorek, Marek K. \* 1997; PhD, 1997, Columbia University; modern European art, Mondrian and de Stijl, critical theory.

### Lecturer

Nicholls, James Keith 1995; BArch, 1986, University of British Columbia (Canada); design, industrial design, construction technology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

**ART 421 Video Art (5, max. 15) VLPA** Prerequisite: ART 380.

**ART 428 Senior Thesis in Fiber Arts (5, max. 20) VLPA** Specialized investigation involving surface design and/or fabric structures. Prerequisite: ART 324; ART 326; ART 327.

**ART 436 Sculpture Composition (5, max. 15) VLPA** Individual compositions in various media in large scale.

**ART 440 Senior Thesis in Photography (5, max. 15) VLPA** Development of a coherent photographic theme or topic evolved over two consecutive quarters resulting in a finished thesis portfolio. Prerequisite: ART 343. Offered: AWSp.

**ART 445 Advanced Industrial Design (5) VLPA** Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 318.

**ART 446 Advanced Industrial Design (5) VLPA** Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 445.

**ART 447 Advanced Industrial Design (5) VLPA** Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 446.

**ART 450 Individual Projects in Printmaking (5, max. 15) VLPA** Individual media study within the context of group discussion and critique. Prerequisite: ART 345; ART 350.

**ART 460 Advanced Metal Design (5, max. 25) VLPA** Advanced individual projects in metal design.

**ART 463 Advanced Painting (5, max. 15) VLPA** Development of individuality in painting through creative exercises. Prerequisite: ART 360.

**ART 464 Advanced Painting/Drawing (5, max. 15) VLPA** Advanced problems in composition. Prerequisite: ART 463.

**ART 466 Publications Design (5) VLPA** Research, development, organization, design, and presentation of a complex communications document, such as a journal, annual report, or a large publication. All aspects of design, content, image creation and production are addressed in a quarter-long project. Prerequisite: ART 368; ART 378.

**ART 467 Exhibition Design (5) VLPA** Working with 3-dimensional space, students explore the integration and presentation of graphic images and typographic messages sequenced in a given space. Explores the possibilities and multi-disciplinary character of exhibition planning and design. Prerequisite: ART 466.

**ART 468 Portfolio/Exhibition Presentation (5) VLPA** Examines the relationship between problem solving in the educational and professional environments. Emphasis on effective evaluative skills in the development, presentation, discussion, revision, and resolution of individual work. Students present their work at the BFA Exhibition. Prerequisite: ART 467.

**ART 478 Information Design (5) VLPA** Explores the strategies for enhancing and visually presenting complex statistics and data. Identifies the principles underlying the successful presentation of information. Prerequisite: ART 368; ART 378.

**ART 479 Media Information Design (5) VLPA** Explores program authoring, communication, and complex information design. Assigned information-design problems are addressed using multimedia authoring tools. Design of effective user interface, navigation techniques, and enhanced content communication. Prerequisite: ART 478.

**ART 480 Senior Project/Presentation (3) VLPA** Increased opportunity for self-directed design research and study in the context of an advanced studio seminar. Investigation and integration of visual communication skills. Student present their work at the BFA Exhibition. Prerequisite: ART 479.

**ART 485 Advanced Ceramic Art (5, max. 20) VLPA** Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite: ART 353.

**ART 487 Senior Research Project, Ceramics (5) VLPA** Independent research on a topic in ceramics.

**ART 488 Senior Source Presentation, Ceramics (5) VLPA** Designed to allow ceramics majors to explore and define the primary sources of inspiration for their interest in art and why they make it.

**ART 496 Undergraduate Internship (2-5, max. 10)** Faculty supervised fieldwork in art related activities. Credit/no credit only.

**ART 497 Study Abroad-Studio Individual Projects (3-10, max. 20) VLPA**

**ART 498 Individual Projects-Painting/Sculpture (3/5, max. 15)**

**ART 499 Individual Projects-Design (3/5, max. 15)**

## Courses for Graduates Only

**ART 512 Graduate Seminar (3, max. 9)**

**ART 513 Contemporary Studio Theories and Problems (3)**

**ART 515 Photography (3-15, max. 60)**

**ART 520 Seminar in Painting (3, max. 18)** Designed as a forum for the presentation and criticism of student work as well as for discussion of contemporary directions in visual art. Credit/no credit only.

**ART 522 Sculpture (3-15, max. 60)**

**ART 525 Graduate Studio: Drawing (3, max. 15)** Supervised studio for advanced-level students from various media-based disciplines designed to develop an interest in and familiarity with aspects of drawing. Utilization of various media. Discussion of historical and contemporary issues concerning drawing.

**ART 540 Fiber Arts (3-15, max. 60)**

**ART 547 Industrial Design (3-15, max. 60)**

**ART 550 Printmaking (3-15, max. 60)**

**ART 553 Ceramic Art (3-15, max. 60)**

**ART 558 Metal Design (3-15, max. 60)**

**ART 563 Painting (3-15, max. 60)**

**ART 580 Graphic Design (3-15, max. 60)**

**ART 595 Master of Fine Arts Research Project (2-5, max. 9)** An independent research project related to and informed by the MFA student's studio work. Final project form may be a lecture, slide presentation, or paper.

**ART 600 Independent Study or Research (\*)**

**ART 700 Master's Thesis (\*)**

## Art History

209 Art



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/art\\_history.html](http://www.washington.edu/students/genocat/academic/art_history.html)



Department Web page:  
[net.art.washington.edu/SOASite/programs/AH/ahhome.html](http://net.art.washington.edu/SOASite/programs/AH/ahhome.html)

Art history is the study of the creation, style, and meaning of works of art in relation to the artists and societies that created them. The history of art involves the interaction of styles, techniques, concepts, individual personalities, and social values from many places over long periods of time. This discipline is comparative in nature and requires many different skills, derived from the study of history and culture, foreign languages and literature, iconography, stylistic analysis, and connoisseurship.

Students studying in the field of Art History can expect to develop strong writing, research, analytical, critical thinking, and problem-solving skills. Course work is designed to allow students to comprehend the social, historical, ethical, and aesthetic significance of the visual realm that is our present environment and the heritage of many cultures.

Art History graduates pursue careers in fields such as gallery and museum management, visual technology, teaching, arts administration, arts education, research, curating and restoration, interior design, and art and antique connoisseurship.

## Graduate Program

Graduate Program Coordinator  
209 Art, Box 353440  
(206) 543-4876  
[uwah@u.washington.edu](mailto:uwah@u.washington.edu)

### Master of Arts

*Admission Requirements:* (1) Bachelor of Arts degree with major in the history of art, or equivalent course work; (2) one copy of all academic transcripts (international applicants must submit two copies); (3) three letters of recommendation; (4) statement of professional objectives in the field; and (5) samples of the applicant's written work. Taking the Graduate Record Examination is required.

*Graduation Requirements:* (1) 55 credits in the thesis track or 65 credits in the non-thesis track. Of these credits, a minimum of 45 credits in the thesis track or 55 credits in the non-thesis track must be numerically graded art history courses numbered 400 and above, exclusive of thesis or practicum credits. A maximum of 10 credits in related fields, in numerically graded courses numbered 300 and above, may be approved for credit in place of art history courses. No more than 12 credits of ART H 600 may be counted toward the minimum credit requirement for the Master of Arts degree. (2) A minimum of 5 numerically graded credits must be taken in four of five major areas: African or Native American; East Asian; Ancient, Classical, and Medieval; Italian and Northern Renaissance, Baroque, and Rococo; or late eighteenth- to twentieth-century Western. (3) A minimum of 15 credits must be taken in 500-level seminars, in addition to ART H 500, Methods of Art History, and ART H 504, Methodology II, both of which must be taken within the first year of residence. At least one seminar each in a Western and a non-Western area is required. (4) A knowledge of either French or German, or of Chinese or Japanese if appropriate. Degree candidates specializing in Native American art may substitute Spanish for French or German. Candidates in the thesis track are required, in addition, to demonstrate knowledge in a second language appropriate to the student's area of study as determined by the faculty. Petitions to the Faculty Graduate Committee for exemption from the second language requirement will be considered as warranted by the needs of different fields or projects. Language requirements may be satisfied by passing graduate proficiency examinations (available in French, German, Italian, and Spanish), or by completing the third quarter of the second year of French, German, Chinese, Japanese, or other appropriate language as a graduate student at the University of Washington with a minimum grade of 3.0. Students are expected to satisfy at least one of the language requirements no later than the first quarter of residence in the program. (5) Students in the thesis track must take 10 thesis credits in ART H 700 in preparation for the written presentation and oral defense of a thesis that demonstrates the ability to conduct rigorous research, familiarity with relevant sources, and a capacity for synthesis and critical evaluation; students in the non-thesis track must take 10 practicum credits in ART H 598, a practical or theoretical program designed in conjunction with the faculty and defended by means of a final written report and oral examination.

### Doctor of Philosophy

*Admission Requirements:* (1) Prior sound preparation in art history at a general level, which usually means having acquired the Master of Arts degree in the history of art; (2) one copy of all academic transcripts (international applicants must submit two copies); (3) three letters of recommendation; (4) statement of professional objectives in the discipline; and (5) samples of written research work in art history. Taking the Graduate Record Examination is required.

*Graduation Requirements:* Minimum of 90 credits, which include: (1) 60 credits in numerically graded art history courses numbered 400 and above, beyond the Master of Arts degree or equivalent, and exclusive of dissertation credits; a maximum of 20 credits in related fields in numerically graded courses numbered 300 and above may be approved for credit in place of art history courses; a minimum of 10 credits must be in areas other than those tested by the General Examination; at least 30 credits must be in 500-level seminars; (2) a knowledge of German or French, or of Chinese or Japanese if appropriate; a research capability in a second language adjudged appropriate to the student's area of study; a knowledge of any other languages considered necessary by the faculty. Language requirements may be satisfied by passing graduate-proficiency examinations (available in French, German, Italian, and Spanish), or by completing the third quarter of second-year French, German, Chinese, Japanese, or other appropriate language as

a graduate student at the University with a minimum grade of 3.0; (3) a General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three specific fields of art history chosen from the following general areas: African, Native American, Chinese, Japanese, Ancient, Medieval, Renaissance, Baroque and eighteenth century, and Modern; no more than two fields may be selected from the same area; (4) 30 dissertation credits in ART H 800 taken after the General Examination in preparation and defense of the dissertation. These credits must be distributed over a minimum of three quarters; (5) a dissertation demonstrating original and independent investigation and achievement.

### Financial Aid

The Art History division offers certain scholarship funds, as well as teaching assistantships, for art history graduate students. A small number of grants are awarded to outstanding entering students, but it is otherwise a policy to award financial aid and assistantships only to students who have completed at least one year of graduate study.

## Faculty

### Chair

Patricia Failing

### Professors

Bliquez, Lawrence J. \* 1969; PhD, 1968, Stanford University; Greek oratory, Greek historiography and historians, Greek and Roman medicine.

Bravmann, Rene A. \* 1972; PhD, 1971, Indiana University; African art.

Casteras, Susan P. \* 1996; PhD, 1977, Yale University; nineteenth-twentieth century painting and sculpture, English art.

Clausen, Meredith L. \* 1979; PhD, 1975, University of California (Berkeley); twentieth-century and American architecture.

Hildebrand, Grant \* 1964; MArch, 1964, University of Michigan; history, preservation design.

Kartsonis, Anna D. \* 1983; PhD, 1982, New York University; Byzantine and medieval art.

Kingsbury, Martha \* 1968; PhD, 1969, Harvard University; nineteenth- and twentieth-century European and American art.

Opperman, Hal N. \* 1967, (Emeritus); PhD, 1972, University of Chicago; seventeenth- and eighteenth-century European art.

Pundt, Hermann G. \* 1968, (Emeritus); PhD, 1969, Harvard University; history, historical preservation.

Silbergeld, Jerome \* 1975; PhD, 1974, Stanford University; Chinese art.

Snow-Smith, Joanne \* 1981; PhD, 1976, University of California (Los Angeles); Italian Renaissance art.

### Associate Professors

Failing, Patricia A. \* 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Langdon, Merle K. \* 1976; PhD, 1972, University of Pennsylvania; Greek archaeology, epigraphy, topography, and history.

Oliver, Marvin E. 1974, (Adjunct); MFA, 1973, University of Washington; Northwest coast Indian art, Native American art, wood design, glass, metals.

### Assistant Professors

Bogel, Cynthia J. \* 1999; PhD, 1995, Harvard University; Buddhist arts, Japanese art and architecture, ritual aesthetic meaning, changing values.

Collins, Jeffrey L. \* 1994; MA, 1990, Yale University; MA, 1994, Cambridge University (UK); PhD, 1994, Yale University; European Baroque art and architecture with an emphasis on Italy; American material culture.

Goettler, Christine E. \* 1998; PhD, 1991, University of Zurich (Switzerland); northern European art (late medieval to Baroque), religious/devotional art, iconoclasm.

Hallett, Christopher \* 1993; PhD, 1993, University of California (Berkeley); Egyptian, Greek, Roman art and archaeology.

Wieczorek, Marek K. \* 1997; PhD, 1997, Columbia University; modern European art, Mondrian and de Stijl, critical theory.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsct/](http://www.washington.edu/students/crsct/).

*400-level courses are intensive, quite narrow in scope, and addressed to current scholarly problems. A relatively high level of sophistication is needed. In general, sound prior humanistic training and knowledge of at least one of the following are required: art of the period or region at a general level (such as that provided by the relevant 200- or 300-level course), social or cultural history of the subject area, literature and thought of the area, or an appropriate foreign language. 400-level courses are available for both undergraduate and graduate credit. Each 400-level course is accompanied by two units of ART H 599, required of graduate majors.*

**ART H 400 ART History and Criticism (2-5, max. 15) VLPA** Courses on special topics, frequently by visiting faculty, which cannot be offered on a continuing basis. Consult art history office for subjects offered.

**ART H 411 Traditional Chinese Architecture and Gardens (3) VLPA/I&S** Introduction to Chinese architecture (palaces, homes, temples, tombs), urban planning, and gardens; each area examined in terms of techniques of production, visual styles, historical development, and relationship to traditional Chinese cultural values. Recommended: some background in Chinese art, history, language, or literature. Offered: jointly with ARCH 451.

**ART H 412 Chinese Painting in the Twentieth Century (3) VLPA** Modern Chinese painting and art theories, seen in relation to China's twentieth-century struggles over nationalism and Westernization, traditionalism and modernization, individualism and the Maoist "mass line." Recommended: some background in Chinese art, history, language, or literature.

**ART H 415 Chinese Painting: The Sung Period (5) VLPA/I&S** Golden age of Chinese painting, emphasizing the monumental, romantic, and Zen Buddhist landscape painting traditions of the tenth through thirteenth centuries. Recommended: some background in Chinese art, history, language, or literature.

**ART H 416 Chinese Painting: The Yuan Period (5) VLPA/I&S** Chinese painting under Mongol rule, in the fourteenth century: a period of political and social crisis that gave rise to a revolution in painting styles. Recommended: some background in Chinese art, history, language, or literature.

**ART H 417 Later Chinese Painting: Ming, Ch'ing, and Modern Periods (5) VLPA/I&S** Major masters and traditions, esthetic attitudes, and social role of Chinese painting from the fifteenth century to the present day. Recommended: some background in Chinese art, history, language, or literature.

**ART H 420 Art of the Japanese Print (3) VLPA** Foundations of Ukiyo-e in Japanese genre from the twelfth through mid-seventeenth centuries; woodblock technique from the Heian period through the early Edo period. Emphasis on the changing styles and subject matter in Ukiyo-e Hanga from Moronobu through Kuniyoshi. Recommended: some background in Japanese art, history, language, or literature.

**ART H 429 Japanese Cinema (3) VLPA** Eleven masterpieces of Japanese cinema, studied in the context of what they reveal about Japanese culture and the art of the film. Recommended: some background in Japanese art, history, language, or literature.

**ART H 430 Chinese Cinema (5) VLPA/I&S** *Silbergeld* Chinese film, 1930s to the present, studied as a visual art form, set in relation to traditional and modern Chinese arts and literature, modern history, gender, and other social issues. Recommended: some background in Chinese art, history, language, or literature.

**ART H 432 Oceanic Art (3) VLPA/I&S** Arts of Oceania, studied through cultures of Polynesia, Micronesia, Melanesia, and Australia.

**ART H 434 Native-American Art and Ceremony of the Southern and Central Northwest Coast (3) VLPA/I&S** Examination of the role of the visual arts in the ceremonial life of the Native-American people of the central and southern Northwest Coast. Emphasis on the traditional social and religious aspects of ceremonialism, contrasts between tribal traditions, and continuing twentieth-century traditions. Recommended: some background in Native American art, history, languages, or literature.

**ART H 435 Thematic Studies in Native-American Art (3, max. 9) VLPA/I&S** *Wright* Approach to Native-American art through themes and issues. Focus varies from year to year (e.g. Shamanism in Native-American art, gender identity in Native-American art, social and political aspects of Native-American art, issues in contemporary Native-American art). Recommended: some background in Native American art, history, languages, or literature.

**ART H 436 Arts of Sub-Saharan Africa I (3) VLPA/I&S** Traditional arts of the Western Sudan and the Western Guinea coast with their archaeological antecedents. Recommended: some background in African art, history, languages, or literature.

**ART H 437 Arts of Sub-Saharan Africa II (3) VLPA/I&S** Traditional arts of the Central Guinea coast, Nigeria, Cameroon, and Gabon, from precontact times to the present. Recommended: some background in African art, history, languages, or literature.

**ART H 438 Arts of Sub-Saharan Africa III (3) VLPA/I&S** Arts of Zaire, Angola, the Swahili coast, and southern Africa. Recommended: some background in African art, history, languages, or literature.

**ART H 442 Greek Painting (3) VLPA** *Langdon* Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with CL AR 442.

**ART H 446 Greek Architecture (3) VLPA** Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with CL AR 446/ARCH 454.

**ART H 448 The Archaeology of Italy (3) VLPA** *Harmon* Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with CL AR 448.

**ART H 451 Topics in Early Christian and Byzantine Art and Architecture (3, max. 9) VLPA** Specific theme or area of early Christian and Byzantine art and architecture, such as early Christian and Byzantine mosaics or the art of Constantinople.

**ART H 452 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) VLPA/I&S** *Kartsonis* Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with RELIG 442.

**ART H 453 Art, Religion, and Politics in Byzantium, 700-1453 AD (3) VLPA/I&S** *Kartsonis* Evolution of the art of Byzantium (700-1453 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with RELIG 443.

**ART H 455 Special Studies in Gothic Art and Architecture (3) VLPA** Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and England. Offered: jointly with ARCH 455.

**ART H 462 High Renaissance Painting in Italy (3) VLPA** Painting in central and northern Italy, from about 1480 to about 1530: Leonardo, Raphael, the early Michelangelo, Sarto, Correggio, Bellini, Giorgione, and the early Titian. Recommended: some background in Italian Renaissance art or history.

**ART H 463 Italian Renaissance Sculpture (3) VLPA** From Nicola Pisano to Giambologna. Recommended: some background in Italian Renaissance art or history.

**ART H 466 High Renaissance Painting in Venice (3) VLPA** Painting in Venice, circa 1480 to circa 1580: Bellini, Carpaccio, Giorgione, Titian, Lotto, del Piombo, Tintoretto, and Veronese. Recommended: some background in Italian Renaissance art or history.

**ART H 470 English Art: 1500-1800 (3) VLPA** English art, principally painting, and, to a lesser extent, architecture. Emphasis on patronage, on the conditions that produced the decided peculiarities of English art, and on the final triumph of the native tradition. Recommended: some background in English history.

**ART H 482 Realism and Impressionism (3) VLPA** Art and the world, 1830-80: high Romanticism through Realism and Impressionism, with emphasis on painting in France. Recommended: some background in the art or history of the period.

**ART H 483 Post-Impressionism to 1918 (3) VLPA** Post-Impressionism and the great revolution of early twentieth-century art, with emphasis on painting. From the first revisions of Impressionism around 1880 to Fauvism, Cubism, Futurism, the Blaue Reiter, and Dadaism. Recommended: some background in the art or history of the period.

**ART H 484 Topics in Modern Art (3, max. 9) VLPA** Approach to art of the nineteenth and twentieth centuries through particular themes, genres, contexts, or other issues. Focus varies from year to year. Recommended: some background in the art or history of the period.

**ART H 485 Italian Futurism, Dada, Surrealism (5) VLPA** *Failing* Survey of three European early modern art movements whose ultimate objective was the collapse of bourgeois culture. Central issues: the role of art and artists in catalyzing social change, strategies for destroying public faith in logic, integration of verbal and visual signs and nonaesthetic conceptions of art. Recommended: some background in the art or history of the period.

**ART H 486 Abstract Expressionism: History and Myth (5) VLPA** Thematic and chronological survey of abstract expressionism, including major genres of critical interpretation, revisionist scholarship, and the relationship of artistic production to a larger context of visual production. Recommended: some background in the art or history of the period.

**ART H 488 American Architecture (3) VLPA** American architecture from indigenous native American traditions to the present. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 488.

**ART H 490 Nineteenth-Century Architecture (3) VLPA** From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 456.

**ART H 492 Alternative Art Forms Since 1960 (5) VLPA** Survey of "post-studio" art forms developed in the 1960s by artists who did not equate artmaking with painting, sculpture, or other traditional forms. Topics include: happenings, Fluxus, land projects, artists' video, artists, books, performance, site works, and art made for distribution on CD-ROM and on the World Wide Web.

**ART H 493 Architecture Since 1945 (3) VLPA** Theories and forms in architecture from the end of World War II to present. Includes new wave Japanese architects, recent Native-American developments, and non-Western as well as Western trends. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 459.

**ART H 495 Italian Fascism: Architecture and Power (5) VLPA/I&S** *Clausen, Sbragia* Fascism in Italy as studied within the broader European context of nationalism, imperialism, and modernization, with particular emphasis on the arts—literature, film, architecture, and urbanism. Offered: jointly with ITAL 475; A.

**ART H 497 Special Topics in Art in Rome (5, max. 10) VLPA** Topics in art and architecture in Rome and environs, studied from original works. Offered in Italy as part of the art history Seminar in Rome. Topics vary. Site visits, field trips, and individual research projects.

**ART H 498 Individual Projects, Undergraduate Practicum (2-5, max. 10)** Fieldwork or internships in art-related areas in the community. Practical experience in areas such as arts administration, gallery and museum operations, collection cataloguing, curatorial responsibilities, and art education. Credit/no credit only.

**ART H 499 Individual Projects (2-5, max. 10)**

### Courses for Graduates Only

*Most 500-level courses are specialized seminars oriented to new research, intended for graduate students in art history, but open to others who possess the necessary qualifications. Since specific content varies, all students must obtain the permission of the instructor or the art history graduate coordinator.*

**ART H 500 Methods of ART History (5)** Introduction to the specialized bibliography of art historical research and to the wide variety of approaches to art historical problems of all periods and regions.

**ART H 501 Seminar in the General Field of Art (5, max. 15)**

**ART H 504 Methods of Art History: Faculty Research (2)** Discussion and analysis of methodological issues posed in faculty research. Credit/no credit only. Offered: W.

**ART H 509 Seminar in Special Topics in ART History (5, max. 15)** Specific focus changes from quarter to quarter.

**ART H 511 Seminar in Chinese Art (5, max. 15)** Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of China.

**ART H 515 Seminar in Japanese Art (5, max. 15)** Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of Japan.

**ART H 531 Seminar in Tribal Art (5, max. 15)** Methodological and cross-disciplinary problems in the visual arts of precolonial Africa, Oceania, and America. Specific content varies.

**ART H 533 Seminar in North American Indian Art (5, max. 15)** Problems in North American Indian visual arts. Content varies.

**ART H 541 Seminar in Greek and Roman Art (5)** *Langdon* In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with CL AR 541.

**ART H 551 Seminar in Early Christian, Byzantine, and/or Medieval Art and Architecture (5, max. 15)** Problems in early Christian, Byzantine, and medieval art and architecture. Content varies. Prerequisite: permission of instructor.

**ART H 561 Seminar in Italian Renaissance Art (5, max. 15)** Problems and in-depth study of selected topics of the art of the Italian Renaissance.

**ART H 566 Seminar in North European Art (5, max. 15)** Deals with problems of style and iconography of the northern European masters of the fourteenth through seventeenth centuries.

**ART H 577 Seminar in Baroque Art (5, max. 15)** Iconographic and stylistic problems of the art of the Baroque period, with emphasis on the principal research methods, theories, and types of literature dealing with the art of the seventeenth and eighteenth centuries in Europe.

**ART H 581 Seminar in Modern Art (5, max. 15)** Art historical problems of the nineteenth and twentieth centuries.

**ART H 590 Seminar in Criticism of Contemporary Art (5, max. 15)** Contemporary art and appropriate critical methodology.

**ART H 591 Seminar in Twentieth-Century Architecture (3/5)** Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in art history, architecture, architectural history, or permission of instructor. Offered: jointly with ARCH 558.

**ART H 592 Seminar in American Architecture (5)** *Clausen* Topics vary. Offered: jointly with ARCH 529.

**ART H 598 Master's Practicum (\* max. 15)** Credit/no credit only.

**ART H 599 Reading and Writing Projects (2)** Art historical issues, methods, and materials. Required of all graduate majors registered in 400-level art history courses. Open also to graduate nonmajors.

**ART H 600 Independent Study or Research (\*)**

**ART H 700 Master's Thesis (\*)** Credit/no credit only.

**ART H 800 Doctoral Dissertation (\*)** Credit/no credit only.

## Asian American Studies

See American Ethnic Studies.

## Asian Languages and Literature

223 Gowen



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/asian\\_lang\\_lit.html](http://www.washington.edu/students/genecat/academic/asian_lang_lit.html)



Department Web page:  
[depts.washington.edu/asian/](http://depts.washington.edu/asian/)

The Department of Asian Languages and Literature offers instruction in the principal languages and literatures of Asia, including East, Southeast, Central, and South Asia. Emphasis is placed on the roles of these languages within the cultures they serve as well as on linguistic, textual, and literary analysis. Courses on Asian literature in English are offered for majors and nonmajors alike.

## Graduate Program

Graduate Program Coordinator  
225 Gowen, Box 353521  
(206) 543-4996

The Department of Asian Languages and Literature offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees with specializations in (1) the languages and literatures of China; (2) the language and literature of Japan; (3) the languages and literatures of South Asia, subsuming Sanskrit and Hindi. All graduate students in the department must affiliate themselves with one of these three programs. The department does not offer degrees or specializations in language pedagogy.

Financial aid for graduate students newly entering the department is very limited and is awarded on a competitive basis. National Resource Fellowships are awarded for the study of Chinese, Japanese, Korean, and Hindi. The department offers incoming graduate students limited opportunities for teaching assistant positions in Chinese, Japanese, Korean, and Sanskrit. Since some financial aid is wholly or partially determined by need, all prospective students are urged to submit the Free Application for Federal Student Aid (FAFSA) with the College Scholarship Service in New Jersey, and to apply for other forms of aid mentioned in the department's cover letter to prospective students.

A full range of courses in other disciplines and aspects of Asian cultures and civilizations is available from other departments and schools of the University, such as the departments of Anthropology, Art History, History, Linguistics, Comparative Literature, and Political Science, and the Henry M. Jackson School of International Studies. Students in the Department of Asian Languages and Literature are encouraged to avail themselves of these offerings to complement and supplement their language and literature studies.

## Admission Requirements

Applicants for admission should present an undergraduate major in the language and literature of specialization (four years of language training for admission to the Chinese and Japanese programs; fewer years of language acquisition may be acceptable in South Asian languages), or the background and training equivalent to such a major. Students without such a background may be qualified for admission,

but will need to acquire the program prerequisites during the earliest stages of their graduate study. Besides an application and one original set of transcripts of prior postsecondary education (international students are required to send a second original set directly to the Office of Graduate Admissions), the department requires a statement of academic goals, and three letters of recommendation addressed to the Graduate Program Coordinator.

## Degree Requirements

The research component of the Master of Arts degree may be satisfied by the writing of either a thesis or two research papers. The Doctor of Philosophy degree requires a dissertation. In addition to the language of specialization, reading knowledge of a second (usually Western) language is required for the Master of Arts degree, and of a third (usually Asian) language for the Doctor of Philosophy degree. Neither English nor, usually, the student's native language may be used to fulfill these additional requirements.

## Faculty

### Acting Chair

Michael C. Shapiro

### Professors

Boltz, William \* 1981; PhD, 1974, University of California (Berkeley); classical Chinese.

Gething, Thomas W. 1995, (Affiliate); PhD, 1966, University of Michigan; Thai and Lao language and linguistics.

Knechtges, David R. \* 1972; PhD, 1968, University of Washington; Han and Six Dynasties literature.

Norman, Jerry \* 1971, (Emeritus); PhD, 1969, University of California (Berkeley); Chinese language and linguistics, Altaic linguistics.

Salomon, Richard G. \* 1981; PhD, 1975, University of Pennsylvania; Sanskrit language and literature.

Shapiro, Michael C. \* 1970; PhD, 1973, University of Chicago; Indo-Aryan languages and linguistics.

Shih, Vincent Y. 1945, (Emeritus); PhD, 1939, University of Southern California; Chinese.

Treat, John W. \* 1983, (Affiliate); PhD, 1982, Yale University; Japanese language and literature.

Yue-Hashimoto, Anne O. \* 1980; PhD, 1966, Ohio State University; Chinese language, linguistics and dialectology.

### Associate Professors

Brandauer, Frederick P. \* 1973, (Emeritus); PhD, 1973, Stanford University; traditional Chinese vernacular fiction and modern Chinese literature.

Cooke, Joseph R. \* 1967, (Emeritus); PhD, 1965, University of California (Berkeley); Thai language and literature.

Cox, Collett D. \* 1985; PhD, 1983, Columbia University; Buddhist studies (East and South Asian), Indian philosophy and religion, comparative religion.

Kano, Tamako-Niwa \* 1962, (Emeritus); PhD, 1956, Radcliffe; Japanese language.

Lukoff, Fred 1964, (Emeritus); PhD, 1954, University of Pennsylvania; Korean language and linguistics.

Tsutsui, Michio \* 1990, (Adjunct); PhD, 1984, University of Illinois; computer-aided instruction, international communication, Japanese linguistics, technical Japanese.

### Assistant Professors

Boltz, Judith M. 1999, (Affiliate); PhD, 1985, University of California (Berkeley); Chinese narrative.

Fulton, Bruce E. 1998, (Affiliate); .PhD, 1999, Seoul National University (Korea); modern Korean literature.

Handel, Zev \* 1998; MA, 1992, PhD, 1998, University of California (Berkeley); Chinese historical phonology, Sino-Tibetan linguistics.

Kern, Adam L. \* 1998; PhD, 1997, Harvard University; early modern Japanese literature, drama, and culture (popular and visual).

Kobayashi, Motoo \* 1994; PhD, 1994, University of Washington; modern and contemporary Japanese literature, comparative literature.

Lee, Ann Sung-Hi \* 1996; PhD, 1991, Columbia University; Korean literature.

Ohta, Amy S. \* 1995; PhD, 1993, University of California (Los Angeles); applied linguistics, acquisition of Japanese as a second language, sociolinguistics.

Ohta, Kaoru \* 1995; PhD, 1994, University of California (Los Angeles); Japanese linguistics, syntax, morphology.

Pauwels, Heidi R. \* 1997; PhD, 1994, University of Washington; medieval and modern Hindi language and literature, Hinduism, Sanskrit language and literature.

### Senior Lecturer

Nguyen, Kim O. 1984; PhD, 1973, University of California (Los Angeles); Vietnamese language and literature.

### Lecturers

Bi, Nyan-Ping 2000; MA, 1988, Indiana University; Chinese language.

Dreyfuss, Jeffrey 1998; PhD, 1981, University of Michigan; Indonesian language.

Kesavathana-Dohrs, Wiworn 1989; PhD, 1989, University of Michigan; Thai language and literature.

Kim, Soohee J. 1999; PhD, 1999, University of Washington; Korean language, morphology, phonology-phonetics interface, and historical linguistics.

Matsuda, Yuki 1997; PhD, 1997, University of Southern California; Japanese language and linguistics, formal syntax and semantics, foreign language teaching.

Matsuda-Kiami, Izumi 1996; MA, 1992, University of Wisconsin; Japanese language and pedagogy.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

## Asian Languages and Literature

**ASIAN 401 Introduction to Asian Linguistics (5) VLPA** Handel, K Ohta, Shapiro Linguistic analysis, with emphasis on languages of east, southeast, south, and central Asia. Includes phonetics, phonemics, morphology, syntax, historical reconstruction, linguistic typology, comparative grammar. Survey of major languages and language families of Asia. Diverse Asian languages as subjects of linguistic analysis. Prior knowledge of linguistics not required. Recommended: two years of any Asian language.

**ASIAN 404 Writing Systems (3) VLPA** Boltz, Salomon Origin, nature, and development of writing systems. Alphabets, syllabaries, and logographic systems; relation of writing systems to spoken languages; decipherment of previously undeciphered scripts. Prerequisite: ASIAN 401. Offered: alternate years.

**ASIAN 411 Buddhist Literature (5) VLPA, I&S** Overview of major Buddhist literary traditions of India, China, and Tibet from antiquity to the end of the first millennium CE. Special focus on Indian Mahayana

literature and the historical factors that accompanied its introduction and preservation in China and Tibet. Prerequisite: either RELIG 202, or RELIG 354. Offered: W.

**ASIAN 498 Special Topics (1-5, max. 15) VLPA** Offered occasionally by permanent or visiting faculty members. Topics vary. Offered: AWSp.

## Courses for Graduates Only

**ASIAN 503 Seminar in Asian Linguistics (1-5, max. 15)** *Handel, AS Ohta, K Ohta* Topics vary. Prerequisite: permission of instructor. Offered: AWSp.

**ASIAN 510 Teaching Assistant Training Workshop (3)** *AS Ohta* Introduction to issues and methods of teaching Asian languages in American college classrooms. Recommended for all new teaching assistants. Prerequisite: concurrent registration in ASIAN 518 and permission of instructor. Offered: A.

**ASIAN 518 Foreign Language Teaching Methodology (2)** *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

**ASIAN 585 Seminar in Buddhism (3, max. 27)** *Cox* Systems and history of Buddhist thought. Original and secondary sources are used. Combines the methods of specialists in south, central, and east Asian Buddhism with those of historians of religion and philosophy. Prerequisite: permission of instructor. Offered: AWSp.

**ASIAN 600 Independent Study or Research (\*)** Offered: AWSpS.

**ASIAN 700 Master's Thesis (\*)** Offered: AWSpS.

**ASIAN 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Chinese

**CHIN 411 Fourth-Year Chinese (5) VLPA** *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 313. Offered: A.

**CHIN 412 Fourth-Year Chinese (5) VLPA** *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 411. Offered: W.

**CHIN 413 Fourth-Year Chinese (5) VLPA** *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 412. Offered: Sp.

**CHIN 421 Business Chinese I (5) VLPA** *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 313. Offered: A.

**CHIN 422 Business Chinese II (5) VLPA** *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 421. Offered: W.

**CHIN 423 Business Chinese III (5) VLPA** *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include interna-

tional business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 422. Offered: Sp.

**CHIN 443 Structure of Chinese (5) VLPA** *Yue-Hashimoto* Outline of the major grammatical structures of Chinese. Focus on learning and teaching problems. Prerequisite: either CHIN 313 or CHIN 334. Offered: W.

**CHIN 451 First-Year Classical Chinese (5) VLPA** *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 213. Offered: A.

**CHIN 452 First-Year Classical Chinese (5) VLPA** *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 451. Offered: W.

**CHIN 453 First-Year Classical Chinese (5) VLPA** *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 452. Offered: Sp.

**CHIN 461 History of Chinese Literature (5) VLPA** *Knechtges* Chinese literature from earliest times to the end of the Six Dynasties. Offered: A.

**CHIN 462 History of Chinese Literature (5) VLPA** *Knechtges* Chinese literature from the T'ang to the end of the Song. Offered: W.

**CHIN 463 History of Chinese Literature (5) VLPA** *Knechtges* Chinese literature from the Yuan to recent times. Offered: Sp.

**CHIN 470 Advanced Readings in Modern Chinese (5) VLPA** Reading and translation of scholarly articles and selections in the humanities and social sciences. Prerequisite: CHIN 413. Offered: A.

**CHIN 482 Advanced Readings in Modern Chinese (5) VLPA** Modern texts in the original, mainly works published since the beginning of the twentieth century. Focus on literature, primarily short story and essay. Offered: W.

**CHIN 496 Special Studies in Chinese (5, max. 15) VLPA** Topics vary.

**CHIN 499 Undergraduate Research (3-5, max. 15)** For Chinese language and literature majors. Offered: AWSpS.

## Courses for Graduates Only

**CHIN 532 Studies in Chinese Phonology (3)** *Handel* Sources and methods in the study of Chinese phonology; medieval period. Offered: W.

**CHIN 540 Seminar on Chinese Linguistics (3, max. 9)** *Handel, Yue-Hashimoto* Advanced topics in Chinese linguistics. Subject emphasis varies from year to year. Offered: Sp.

**CHIN 541 Seminar in Chinese Grammar (3, max. 9)** *Boltz, Yue-Hashimoto* Problems of theory and analysis of Chinese grammar, both synchronic and diachronic, modern and classical. Prerequisite: CHIN 443.

**CHIN 542 Chinese Historical Phonology (3)** *Handel* Introduction to Chinese historical phonology; emphasis on the Middle Chinese period. Prerequisite: ASIAN 401 and permission of instructor.

**CHIN 551 Second-Year Classical Chinese (5)** *Knechtges* Problems of grammar, rhetoric, and textual criticism. Early literary texts. Offered: A.

**CHIN 552 Second-Year Classical Chinese (5)** *Knechtges* Problems of grammar, rhetoric, and textual criticism. Later literary texts. Offered: W.

**CHIN 553 Second-Year Classical Chinese (5)** *Boltz* Continuation of 551, 552. Intermediate level readings in Han and pre-Han historical and philosophical texts. Prerequisite: CHIN 551 and CHIN 552. Offered: Sp.

**CHIN 554 Readings in Chinese Prose (5)** *Knechtges* Selected readings in the fu of the Han, Wei, Chin, and North-South Dynasties period. Offered: alternate years.

**CHIN 555 Readings in Chinese Prose (5)** *Knechtges* Selected readings in parallel prose (*pian*ti wen). Offered: alternate years.

**CHIN 556 Readings in Chinese Prose (5)** *Knechtges* Selected readings in *guwen* prose of the T'ang and Sung periods. Offered: alternate years.

**CHIN 557 Introduction to Chinese Philology and Textual Criticism (5)** *Boltz* Principles and methods of textual criticism and philological analysis of ancient Chinese texts. Study of both manuscripts and transmitted texts. Emphasis on Han and pre-Han documents; specific texts vary. Prerequisite: two years of classical Chinese and ASIAN 401. Offered: alternate years; W.

**CHIN 558 Seminar in Chinese Lexicology and Grammatonymy (3)** *Boltz* Study of the Chinese script, lexicographical history, and lexicological and etymological analysis. Prerequisite: two years of classical Chinese, ASIAN 401. Offered: alternate years.

**CHIN 559 Methods and Materials (5)** *Knechtges* Introduction to the basic reference works and methods of research in Chinese language and literature. Includes a history of Sinology, survey of basic bibliographies, dictionaries, atlases, catalogs, journals, literary collections, concordances, and other sources. Prerequisite: CHIN 551, CHIN 552. Offered: alternate years; A.

**CHIN 560 Proseminar in Chinese (3-5)** *Boltz, Knechtges* Methods and materials in the study of Chinese texts. Problems in textual analysis and Chinese literary history. Prerequisite: CHIN 553 and one of CHIN 554, CHIN 555, and CHIN 556.

**CHIN 561 Studies in Chinese Literature (5)** *Knechtges* Literature before Ch'in. Prerequisite: permission of instructor. Offered: W.

**CHIN 562 Studies in Chinese Literature (5)** *Knechtges* Poetry of the T'ang and Sung periods. Prerequisite: permission of instructor. Offered: Sp.

**CHIN 563 Studies in Chinese Literature (5)** *Knechtges* Literary theory and criticism. Prerequisite: permission of instructor.

**CHIN 573 Seminar in Chinese Poetry (5, max. 15)** Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite: permission of instructor. Offered: alternate years; W.

**CHIN 574 Seminar in Six Dynasties Literature (5, max. 15)** *Knechtges* Directed study of selected works of Six Dynasties. Subject emphasis varies each year. Prerequisite: permission of instructor. Offered: alternate years; Sp.

**CHIN 580 Readings in Vernacular Chinese Fiction (5, max. 15)** Directed study of selected works of premodern vernacular Chinese narrative, with an emphasis on Ming and Ch'ing fiction. Introduction to various critical approaches to the study of Chinese narrative. Offered: A.

**CHIN 582 Topics in Chinese Literature and Cultural Studies (5, max. 15)** Directed study of aspects of twentieth-century Chinese literary and popular cultures. Provides both historical coverage and a

grounding in various theoretical and methodological problems. Topics include print culture, cinema, popular music, as well as aspects of material culture; emphasis varies. Prerequisite: permission of instructor. Offered: W.

**CHIN 583 Seminar in Modern Chinese Literature (5)** Directed study of selected works of modern Chinese literature. Primary focus on the novel, short story, and essay. Offered: Sp.

**CHIN 590 Readings in the Thirteen Classics (5)** *Boltz* Selected readings from the Thirteen Classics, and from their associated exegetic and hermeneutic traditions. Readings and emphases vary from year to year. Prerequisite: two years of Classical Chinese and CHIN 557. Offered: alternate years.

## Hindi

**HINDI 401 Advanced Hindi (5) VLPA** Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: A.

**HINDI 402 Advanced Hindi (5) VLPA** Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: W.

**HINDI 403 Advanced Hindi (5) VLPA** Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: Sp.

**HINDI 404 Derivational Morphology of Hindi/Urdu (3) VLPA** *Shapiro* A systematic introduction to the derivational morphology of Hindi/Urdu. Sanskrit, Persian, Arabic, and English elements in Hindi/Urdu. Treatment of derivational prefixes and suffixes, stem alternations, and methods of compound formation. Prerequisite: HINDI 323. Offered: alternate years; W.

**HINDI 421 Survey of Modern Hindi Literature (3) VLPA** *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative short stories. Prerequisite: HINDI 403.

**HINDI 422 Survey of Modern Hindi Literature (3) VLPA** *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative poems. Prerequisite: HINDI 403.

**HINDI 423 Survey of Modern Hindi Literature (3) VLPA** *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative novels. Prerequisite: HINDI 403.

**HINDI 431 Advanced Conversational Hindi (2, max. 8) VLPA** Conversational practice in contemporary Hindi. Prerequisite: HINDI 323. Offered: Sp.

**HINDI 451 Advanced Hindi Readings (3, max. 9) VLPA** Readings in Modern Standard Hindi prose texts drawn from diverse disciplines. Prerequisite: HINDI 403. Offered: W.

**HINDI 499 Undergraduate Research (3-5, max. 15)** Primarily for Hindi language and literature majors. Offered: AWSpS.

## Courses for Graduates Only

**HINDI 501 Studies in Medieval Braj Literature (3, max. 9)** *Pauwels* Introduction to the Braj dialect of Hindi and its literature. Prose readings and selected poetry by Surdas, Raskhan, Bihari, and others. Prerequisite: HINDI 403 or equivalent. Offered: A.

**HINDI 502 Studies in Medieval Avadhi Literature (3, max. 9)** *Pauwels* Introduction to the Avadhi dialect of Hindi and its literature. Readings from Ramcaritmanas of Tulsidas and Padmavat of Muhammad Malik Jayasi. Prerequisite: HINDI 403 or equivalent. Offered: W.

**HINDI 503 Studies in Medieval Sant Literature (3, max. 9)** *Shapiro* Introduction to the language and literature of Sant poets. Readings include Guru Nanak's Japuji and excerpts from Kabir's Granthavali. Prerequisite: HINDI 403 or equivalent.

**HINDI 504 Studies in Medieval Rajasthani Literature (3)** *Pauwels* Introduction to the literary language of Rajasthan. Reading of extracts from representative selections from Rajasthani literature. Prerequisite: HINDI 403 or equivalent.

## Indian

**INDN 401 Pali (3) VLPA** *Cox, Salomon* Introduction to Pali language and literature. Prerequisite: SNKRT 303.

**INDN 402 Pali (3) VLPA** *Cox, Salomon* Introduction to Pali language and literature.

**INDN 403 Introduction to Written Urdu (3) VLPA** Modern written Urdu for students with at least elementary knowledge of Hindi. Prerequisite: HINDI 313.

**INDN 404 Readings in Urdu Literature (3, max. 18) VLPA** Readings in Urdu prose and poetry. Urdu prose composition. Prerequisite: INDN 403.

**INDN 410 Prakrit (3, max. 6) VLPA** *Salomon* Introduction to the various Prakrit or Middle Indo-Aryan dialects (Gandhari, Magadhi, Maharashtri, Sauraseni) from literary, canonical, and inscriptional sources. Prerequisite: SNKRT 303.

**INDN 411 First-Year Intensive Bengali (15)** *Salomon* Study of modern Standard Bengali, including reading, writing, and conversation. Introduction to Bengali script. Offered: S.

**INDN 499 Undergraduate Research (3-5, max. 15)** Primarily for South Asian language and literature majors. Offered: AWSp.

## Courses for Graduates Only

**INDN 590 Special Topics in Indology (1-5, max. 12)** Studies in selected research topics in South Asian languages and literatures. Prerequisite: graduate standing and permission of instructor. Offered: Sp.

## Japanese

**JAPAN 421 Fourth-year Japanese for Professional and Academic Purposes I (5) VLPA/I&S** Class discussion, oral presentations, reading, and composition on topics related to the Japanese language and present-day Japan. Includes readings from Japanese newspapers and magazines. Conducted in Japanese. Prerequisite: JAPAN 313.

**JAPAN 422 Fourth-year Japanese for Professional and Academic Purposes II (5) VLPA/I&S** Class discussion, oral presentations, reading, and composition on topics related to the Japanese language and present-day Japan. Includes readings from Japanese newspapers and magazines. Conducted in Japanese. Prerequisite: JAPAN 421.

**JAPAN 423 Fourth-year Japanese for Professional and Academic Purposes III (5) VLPA/I&S** Class discussion, oral presentations, reading, and composition on topics related to the Japanese language and present-day Japan. Includes readings from Japanese newspapers and magazines. Conducted in Japanese. Prerequisite: JAPAN 422.

**JAPAN 431 Readings in Modern Japanese Literature (5) VLPA** Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax. Prerequisite: JAPAN 313.

**JAPAN 432 Readings in Modern Japanese Literature (5) VLPA** Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

**JAPAN 433 Readings in Modern Japanese Literature (5) VLPA** Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

**JAPAN 440 Introduction to Japanese Linguistics (5) VLPA** *AS Ohta, K Ohta* Overview of major topics in the linguistic description of Japanese: phonology, morphology, syntax, history, dialects, sociolinguistics, and the writing system. Elementary training in phonological, morphological, and syntactic analysis of Japanese. Prerequisite: JAPAN 313; recommended: introductory linguistics course.

**JAPAN 442 Morphology and Syntax of Japanese (5) VLPA** *K Ohta* Morphological and syntactic analysis of the Japanese language. Reading of research literature, training in analysis of Japanese language data, and contrastive analysis of Japanese with other languages. Prerequisite: JAPAN 313; JAPAN 440; LING 400.

**JAPAN 443 Topics in Japanese Sociolinguistics (5) VLPA/I&S** *AS Ohta* Methodology and theory of sociolinguistic analysis. Reading of research literature and training in analysis of Japanese language data. Prerequisite: JAPAN 313 which may be taken concurrently; recommended: JAPAN 343.

**JAPAN 445 Foreign Study: Fourth-Year Japanese (1-15, max. 20) VLPA** For participants in study abroad programs in Japan who complete 400-level language courses in approved programs in Japan. Evaluation by department/faculty required.

**JAPAN 460 Topics in Japanese Popular Culture and Literature (5) VLPA** Critical reading and analysis of multi-media texts related to various genres and aspects of popular culture and literature in Japan. Covers film and manga in particular. Primary texts in Japanese original. Prerequisite: JAPAN 313.

**JAPAN 471 Classical Japanese Grammar (5) VLPA** Introduction to classical grammatical forms and translation of classical literary texts. Prerequisite: JAPAN 313. Offered: A.

**JAPAN 472 Classical Japanese Grammar (5) VLPA** Introduction to classical grammatical forms and translation of classical literary texts. Prerequisite: JAPAN 471. Offered: W.

**JAPAN 473 Readings in Classical Japanese Literature (5) VLPA** Readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite: JAPAN 472. Offered: Sp.

**JAPAN 499 Undergraduate Research (3-5, max. 15)** For Japanese language and literature majors. Offered: AWSpS.

## Courses for Graduates Only

**JAPAN 531 Advanced Readings in Modern Japanese Literature (5)** *Kobayashi* Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

**JAPAN 532 Advanced Readings in Modern Japanese Literature (5)** *Kobayashi* Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

**JAPAN 533 Advanced Readings in Modern Japanese Literature (5)** *Kobayashi* Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

**JAPAN 540 Seminar on Japanese Linguistics (3, max. 15)** *K Ohta* Problems in the history and structure of the Japanese language. Topics vary each quarter, according to the needs and interests of the students. Prerequisite: JAPAN 440 or permission of instructor.

**JAPAN 571 Advanced Readings in Classical Japanese Literature (5)** Continued readings in classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

**JAPAN 580 Development of Modern Japanese Fiction (5, max. 15)** Reading and translation of major works of modern fiction in the original, with emphasis on the chronological development of modern prose style. Offered: A.

**JAPAN 590 Seminar in Japanese Literature (5, max. 15)** Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite: permission of instructor. Offered: Sp.

## Korean

**KOREAN 411 Readings in Contemporary Korean (5) VLPA** Completes the introduction to Korean writing in mixed script of 311, 312, 313. Prerequisite: KOREAN 313. Offered: A.

**KOREAN 412 Readings in Contemporary Korean (5) VLPA** Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: W.

**KOREAN 413 Readings in Contemporary Korean (5) VLPA** Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: Sp.

**KOREAN 415 Social Science Literature in Korean (3) VLPA** Readings in selections from contemporary Korean publications in social science topics. Prerequisite: KOREAN 413. Offered: A.

**KOREAN 416 Readings in Korean Literature (3) VLPA** Reading of various literature texts which may include pre-modern Korean narrative and poetry as well as modern literature and drama. Prerequisite: KOREAN 413. Offered: W.

**KOREAN 417 Readings in Korean Journals (3) VLPA** Selections from Korean newspapers, news magazines, and other journals. Prerequisite: KOREAN 413. Offered: Sp.

**KOREAN 499 Undergraduate Independent Study (3-5, max. 15)** For students who have completed 417 or equivalent. Offered: AWSpS.

## Courses for Graduates Only

**KOREAN 531 Advanced Readings in Modern Korean Literature (5)** *Lee* Literature and literary criticism in Korean. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

**KOREAN 532 Advanced Readings in Traditional Vernacular Korean Literature (5)** *Lee* Readings in traditional Korean vernacular literature, including poetry, sung narrative, and fiction. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

## Sanskrit

**SNKRT 401 Intermediate Sanskrit (5) VLPA** *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Prerequisite: SNKRT 303. Offered: A.

**SNKRT 402 Intermediate Sanskrit (5) VLPA** *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Offered: W.

**SNKRT 403 Intermediate Sanskrit (5) VLPA** *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Offered: Sp.

**SNKRT 411 Advanced Sanskrit (3, max. 9) VLPA** *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Prerequisite: SNKRT 403. Offered: A.

**SNKRT 412 Advanced Sanskrit (3, max. 9) VLPA** *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Offered: W.

**SNKRT 413 Advanced Sanskrit (3, max. 9) VLPA** *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Offered: Sp.

**SNKRT 491 Vedic Studies (3) VLPA** *Salomon* Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture. Prerequisite: SNKRT 303.

**SNKRT 492 Vedic Studies (3) VLPA** *Salomon* Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture.

**SNKRT 499 Undergraduate Research (3-5, max. 15)** Primarily for Sanskrit language and literature majors. Offered: AWSp.

## Courses for Graduates Only

**SNKRT 550 Seminar on Sanskrit Literature (3, max. 9)** *Salomon* Detailed study of selected authors, periods, or traditions, within the context of Indian literary history. Prerequisite: SNKRT 403 or permission of instructor.

**SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9)** *Cox, Potter, Salomon* Intensive reading and analysis of Hindu or Buddhist philosophical texts. Prerequisite: SNKRT 494 or permission of instructor. Offered: AWSp.

**SNKRT 570 Seminar in Indian Epigraphy and Paleography (3, max. 6)** *Salomon* Introduction to the study of inscriptions and other original documents in Sanskrit and Prakrit languages and in Kharosthi, Brahmi, and derived scripts. History of writing in India and development of Indic scripts. Methods of critical evaluation of inscriptions as sources of political and cultural history. Prerequisite: SNKRT 403.

**SNKRT 581 Readings in Buddhist Texts (3, max. 9)** *Cox* Interpretation of original sources. Texts vary from year to year. Prerequisite: ability to study sources in the original languages, an introduction to Buddhist thought, and permission of instructor.

## Thai

**THAI 401 Intermediate Thai (5) VLPA** *Kesavatana-Dohrs* Continuation of 303. Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 303. Offered: A.

**THAI 402 Intermediate Thai (5) VLPA** *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 401. Offered: W.

**THAI 403 Intermediate Thai (5) VLPA** *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 402. Offered: Sp.

**THAI 410 Accelerated Reading and Writing (5) VLPA** *Kesavatana-Dohrs* Accelerated Thai for fluent speakers who do not read or write Thai. Emphasis on reading and writing through Intermediate Thai. Credit/no credit only.

**THAI 499 Undergraduate Research (3-5, max. 25)** For Thai language and literature majors. Offered: AWSp.

## Tibetan

**TIB 411 Readings in Tibetan (3) VLPA** Selections from various Tibetan materials. Prerequisite: TIB 313.

**TIB 412 Readings in Tibetan (3) VLPA** Selections from various Tibetan materials.

**TIB 413 Readings in Tibetan (3) VLPA** Selections from various Tibetan materials. Prerequisite: TIB 313.

**TIB 415 Readings in Tibetan Literature (3) VLPA** Reading of selections from Tibetan religious literature. May be taken in any sequence. Prerequisite: TIB 413.

**TIB 416 Readings in Tibetan Literature (3) VLPA** Reading of selections from Tibetan religious literature. May be taken in any sequence.

**TIB 417 Readings in Tibetan Literature (3) VLPA** Reading of selections from Tibetan religious literature. May be taken in any sequence.

**TIB 499 Undergraduate Research (3-5, max. 15)** For Asian languages and literature majors.

## Courses for Graduates Only

**TIB 511 Advanced Literary Tibetan (3, max. 9)** Reading of manuscripts and xylographs with emphasis on biographical, historical, and religious material. Prerequisite: TIB 413 or equivalent.

**TIB 512 Advanced Literary Tibetan (3, max. 9)** Reading of manuscripts and xylographs with emphasis on biographical, historical, and religious material. Prerequisite: TIB 413 or equivalent.

**TIB 513 Advanced Literary Tibetan (3, max. 9)** Reading of manuscripts and xylographs with emphasis on biographical, historical, and religious material. Prerequisite: TIB 413 or equivalent.

**TIB 531 Buddhist Tibetan (3, max. 9)** Reading and analysis of Tibetan Buddhist texts and associated literature. Selections vary each quarter and may be taken out of sequence. Prerequisite: TIB 413 or permission of instructor.

**TIB 532 Buddhist Tibetan (3, max. 9)** Reading and analysis of Tibetan Buddhist texts and associated literature. Selections vary each quarter and may be taken out of sequence. Prerequisite: TIB 413 or permission of instructor.

**TIB 533 Buddhist Tibetan (3, max. 9)** Reading and analysis of Tibetan Buddhist texts and associated literature. Selections vary each quarter and may be taken out of sequence. Prerequisite: TIB 413 or permission of instructor.

**TIB 541 Introduction to Tibetan Philology (3)** Philological methods in the study of Tibetan texts, blockprints as well as hand-written manuscripts. Specific examples taken from historical, religious, and autobiographical writings. Emphasis on historical philology and semasiology. Prerequisite: TIB 413 or TIB 417 and permission of instructor.

## Vietnamese

**VIET 496 Special Studies in Vietnamese (3-5, max. 15)** *Nguyen* Topics vary. Emphasizes improving language skills for research. Primarily for Southeast Asian Studies majors. Offered: AWP.

## Asian Studies

See International Studies.

## Astronomy

C319 Physics-Astronomy Building



General Catalog Web page:  
[www.washington.edu/students/gencaf/academic/astronomy.html](http://www.washington.edu/students/gencaf/academic/astronomy.html)



Department Web page:  
[www.astro.washington.edu](http://www.astro.washington.edu)

Modern research in astronomy and astrophysics encompasses a large number of disciplines and specialties, and the faculty members of the Department of Astronomy are active in many of these areas. Research areas of the department include planetary astronomy, stellar structure and evolution, interstellar matter, x-ray sources, galactic structure, extragalactic astronomy, galactic dynamics, quasars and galactic nuclei, and theoretical and observational cosmology. The department is part of a consortium of universities which operates a 3.5-meter optical/infrared telescope located on Sacramento Peak, New Mexico, and is a partner in the innovative Sloan Digital Sky Survey. Students also have access to a variety of national facilities, such as the Kitt Peak and Cerro Tololo observatories and the Very Large Array. A variety of research is conducted with satellite instruments such as the Hubble Space Telescope. The department operates a well-instrumented 30-inch telescope at the Manastash Ridge Observatory near Ellensburg. Data analysis and theoretical research are conducted on the department's cluster of SUN and SGI computers, and on a variety of UW and national supercomputer facilities. Undergraduate majors often assist faculty members in acquisition, reduction, and interpretation of data.

## Graduate Program

Graduate Program Coordinator  
C308 Physics-Astronomy, Box 351580  
(206) 543-7683

## Master of Science, Doctor of Philosophy

A series of graduate courses in solar system, stellar, galactic, and extragalactic astrophysics is offered. The heart of the graduate program is the collaboration of students and faculty members in research at the frontiers of astronomy. Students work collaboratively with members of the faculty to develop the techniques and insight necessary for successful research, and, subsequently, to define a thesis topic. The student's thesis research may be purely theoretical or use observational material (obtained through the facilities of either the University of Washington or one of the national observatories) or a combination. Active research programs are being carried out in the areas of stellar interiors, stellar atmospheres, planetary atmospheres and surfaces, x-ray sources, interplanetary dust, interacting binary stars, extragalactic astronomy, gravitation, interstellar matter, dark matter, cosmology, relativistic astrophysics, and computational astrophysics.

## Admission Qualifications

Most, though not all, entering students have a bachelor's degree in physics. Entering students are not required to have a background in astronomy, although some knowledge of general astronomy is expected of those to whom a teaching assistantship is to be offered. Undergraduates interested in a graduate program in astronomy are urged to concentrate on preparation in physics and mathematics before entering.

## Assistantships

Normally all students making satisfactory academic progress receive financial support. More than three-quarters of the department's graduate students hold fellowships or research assistantships. A number of teaching assistantships are available, primarily in the elementary astronomy courses.

## Faculty

### Chair

Craig J. Hogan

### Professors

Adelberger, Eric G. \* 1972, (Adjunct); PhD, 1967, California Institute of Technology; experimental nuclear physics.

Anderson, Scott F. \* 1988, (Research); PhD, 1985, University of Washington; quasars and active galaxies, x-ray astronomy.

Balick, Bruce \* 1975; PhD, 1971, Cornell University; radio astronomy, ionized nebulae, peculiar galaxies.

Bardeen, James M. \* 1976, (Adjunct); PhD, 1965, California Institute of Technology; general relativity, theoretical astrophysics.

Bohm, Karl-Heinz \* 1967, (Emeritus); PhD, 1954, University of Kiel (Germany); stellar atmospheres, star formation.

Bohm-Vitense, Erika H. \* 1968, (Emeritus); PhD, 1951, University of Kiel (Germany); stellar atmospheres, pulsating stars.

Boynton, Paul E. \* 1970; PhD, 1967, Princeton University; high-energy astrophysics, astronomy.

Brownlee, Donald E. \* 1965; PhD, 1971, University of Washington; origin of the solar system, comets, interplanetary dust.

Haxton, Wick C. \* 1984, (Adjunct); PhD, 1976, Stanford University; theoretical physics, nuclear physics.

Hodge, Paul W. \* 1965; PhD, 1960, Harvard University; extragalactic astronomy, interplanetary dust.

Hogan, Craig J. \* 1990; PhD, 1980, Cambridge University (UK); astrophysical cosmology, especially the origin of astronomical structures in the expanding universe.

Jacobsen, Theodore S. 1979, (Emeritus); PhD, 1926, University of California (Berkeley); astronomy.

Lake, George Russell \* 1985; PhD, 1980, Princeton University; stellar dynamics, galaxy structure and formation, cosmology, computational astrophysics.

Margon, Bruce H. \* 1980; PhD, 1973, University of California (Berkeley); galactic and extragalactic x-ray astronomy, optical counterparts of x-ray sources.

Stubbs, Christopher \* 1981; PhD, 1988, MSc, 1988, University of Washington; observational cosmology and gravitation.

Sullivan, Woodruff T. III \* 1973; PhD, 1971, University of Maryland; radio astronomy, galactic and extragalactic structure, history of astronomy.

Szkody, Paula \* 1982; PhD, 1975, University of Washington; cataclysmic variables, photometry, spectroscopy.

Wallerstein, George \* 1965, (Emeritus); PhD, 1958, California Institute of Technology; chemical composition of stars, peculiar stars, interstellar matter.

### Associate Professors

Hawley, Suzanne \* 1999, (Research); PhD, 1989, University of Texas (Austin); stellar astronomy.

Quinn, Thomas R. \* 1993, (Research); PhD, 1986, Princeton University; solar system dynamics and galaxy formation.

### Assistant Professors

Dalcanton, Julianne \* 1998; PhD, 1995, Princeton University; evolution and formation of galaxies.

Gonzalez, Guillermo \* 1987, (Research); PhD, 1993, University of Washington; stellar evolution, star formation, planetary systems.

Richardson, Derek C. \* 1996, (Research); PhD, 1993, Cambridge University (UK); solar system dynamics.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ASTR 421 Stellar Observations and Theory (3) NW** Observations and theory of the atmospheres, chemical composition, internal structure, energy sources, and evolutionary history of stars. Prerequisite: PHYS 224; PHYS 225; PHYS 228.

**ASTR 422 Interstellar Material (3) NW** Description and physics of the matter between the stars. Physical conditions, distribution, evolution, and motions of interstellar atoms, molecules, and dust grains. Exchange of energy and matter between stars and interstellar material. Prerequisite: either ASTR 322 or ASTR 421; PHYS 321; PHYS 324.

**ASTR 423 High-Energy Astrophysics (3) NW** High-energy phenomena in the universe. Includes supernova, pulsars, neutron stars, x-ray and gamma-ray sources, black holes, cosmic rays, quasi stellar objects, active galactic nuclei, diffuse background radiations. Radiative emission, absorption processes, and models derived from observational data. Prerequisite: PHYS 224; PHYS 225.

**ASTR 480 Introduction to Astronomical Data Analysis (5) NW** Hands-on experience with electronic imaging devices (CCDs) and software for image reduction and analysis. Introduction to operating systems, reduction software, and statistical analysis with applications to CCD photometry. Prerequisite: ASTR 323.

**ASTR 481 Introduction to Astronomical Observation (5) NW** Theory and practice of obtaining optical data at a telescope. Preparation, obtaining data with a CCD on a telescope, and subsequent data analysis for completion of a research project. Prerequisite: ASTR 480.

**ASTR 497 Topics in Current Astronomy (1-3, max. 9) NW** Recent developments in one field of astronomy or astrophysics.

**ASTR 499 Undergraduate Research (\* max. 15)** Special astronomical problems and observational projects, by arrangement with instructor.

## Courses for Graduates Only

**ASTR 500 Seminar in Elementary Astronomy Instruction (1, max. 5)** Seminar in the preparation of lecture and workshop materials with emphasis on demonstration, visual aids, and the evaluation of students' progress. Credit/no credit only.

**ASTR 507 Physical Foundations of Astrophysics I (3)** Thermodynamics from an astronomer's point of view: black body radiation, basic radiative transfer, equation of state, degenerate gases, crystallization at high density.

**ASTR 508 Physical Foundations of Astrophysics II (3)** Introduction to astronomical hydrodynamics and magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma.

**ASTR 509 Physical Foundations of Astrophysics III (3)** Potential theory as applied to astrophysical systems. Orbits. Integrals of motion. Equilibrium and stability of stellar systems. Encounters of Stellar Systems. Kinetic theory of collisional systems. Applications of stellar dynamics to star clusters, galaxies, and large-scale structure.

**ASTR 510 Nuclear Astrophysics (3)** Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with PHYS 554; A.

**ASTR 511 Galactic Structure (3)** Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure and evolution of galaxies.

**ASTR 512 Extragalactic Astronomy (3)** Types of galaxies. Integrated properties, content, and dynamics. Extragalactic distance scale, groups and clusters. Radio sources. Observational cosmology.

**ASTR 513 Cosmology and Particle Astrophysics (3)** Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with PHYS 555.

**ASTR 521 Stellar Atmospheres (3)** Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 421 or equivalent.

**ASTR 522 Stellar Atmospheres (3)** Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 421 or equivalent.

**ASTR 531 Stellar Interiors (4)** Physical laws governing the temperature, pressure, and mass distribution in stars. Equation of state, opacity, nuclear energy generation, computational methods. Models of main sequence stars and star formation. Prerequisite: PHYS 421 or equivalent.

**ASTR 532 Stellar Evolution (3)** Theoretical and observational approaches to stellar evolution. Structure of red giants, supernovae, and white dwarfs. Observations of star clusters and the chemical composition of stars as they relate to the theory of stellar structure. Prerequisite: ASTR 531.

**ASTR 541 Interstellar Matter (3)** Physical conditions and motions of neutral and ionized gas in interstellar space. Interstellar dust, magnetic fields, formation of grains, clouds, and stars. Prerequisite: modern physics or permission of instructor.

**ASTR 555 Planetary Atmospheres (3)** Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. Offered: jointly with ATM S 555/GPHYS 555.

**ASTR 557 Origin of the Solar System (3)** Nebular and nonnebular theories of the solar system origin; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; physical and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with GEOL 557/GPHYS 557.

**ASTR 561 High Energy Astrophysics (3)** Observed properties of supernovae, x-ray stars, radio sources, quasars. Theories explaining such objects. Origin of cosmic rays.

**ASTR 576 Astronomy Colloquium (1, max. 20)** Current research topics in astronomy and astrophysics. Credit/no credit only. Prerequisite: permission of department.

**ASTR 597 Topics in Observational Astrophysics (1-5, max. 20)** Credit/no credit only.

**ASTR 598 Topics in Theoretical Astrophysics (1-5, max. 20)** Credit/no credit only.

**ASTR 600 Independent Study or Research (\*)**

**ASTR 700 Master's Thesis (\*)**

**ASTR 800 Doctoral Dissertation (\*)**

## Atmospheric Sciences

408 Atmospheric Sciences-Geophysics



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/atmos\\_sci.html](http://www.washington.edu/students/genocat/academic/atmos_sci.html)



Department Web page:  
[www.atmos.washington.edu](http://www.atmos.washington.edu)

## Graduate Program

Graduate Program Coordinator  
408B Atmospheric Sciences-Geophysics, Box 351640  
(206) 543-6471  
[advise@atmos.washington.edu](mailto:advise@atmos.washington.edu)

### Master of Science, Doctor of Philosophy

Admission to the graduate program requires a baccalaureate degree in physical science, engineering, or mathematics, or its equivalent, as well as the Graduate Record Examination. The program of graduate study varies with each individual.

During the first year of graduate study, most students concentrate on developing a strong background in the fundamentals that underlie the atmospheric sciences and on getting a broad understanding of the wide range of problems encountered in the atmosphere. A qualifying examination is given toward the end of the first year of graduate study, as soon as possible after the student has completed 24 credits, including 12 credits in courses numbered 500 and above. All students desiring to proceed toward the Ph.D. degree must take this examination, and students desiring the Master of Science degree may elect to take it. This examination tests understanding of the fundamental aspects of the atmospheric sciences and of the relevant mathematics and physics. Physical reasoning, rather than factual information, is stressed. Those who pass the examination with distinction are encouraged to work toward the Ph.D. degree; those who pass continue toward the Master of Science degree. Students whose objective is the Master of Science degree may elect to submit a written-thesis proposal in lieu of the qualifying examination.

Research assistantships and a few teaching assistantships are available to full-time students. Applications are made through the department office.

## Faculty

### Chair

James R. Holton

### Professors

Badgley, Franklin \* 1953, (Emeritus); MS, 1948, PhD, 1951, New York University; atmospheric turbulence and diffusion.

Baker, Marcia \* 1980; MS, 1960, Stanford University; PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Breidenthal, Robert E. \* 1980, (Adjunct); PhD, 1979, California Institute of Technology; turbulence, mixing, combustion, vorticity, bluff body flows.

Bretherton, Christopher S. \* 1984; PhD, 1984, Massachusetts Institute of Technology; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology.

Brown, Robert A. \* 1971, (Research); MS, 1962, University of California (Berkeley); PhD, 1969, University of Washington; geophysical fluid dynamics, planetary boundary layers, air-sea interaction, remote sensing.

Businger, Joost A. \* 1958, (Emeritus); PhD, 1954, University of Utrecht (Netherlands); boundary layer meteorology, air-sea interaction, atmospheric turbulence.

Charlson, Robert J. \* 1962, (Emeritus); MS, 1959, Stanford University; PhD, 1964, University of Washington; atmospheric chemistry, aerosol physics, aerosol/cloud/climate interaction and instrumentation.

Covert, David S. \* 1975, (Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry, aerosol instrumentation, aerosol physics, chemistry, optics.

Durrant, Dale R. \* 1987; MS, 1975, University of California (Berkeley); PhD, 1981, Massachusetts Institute of Technology; atmospheric dynamics, mesoscale meteorology, numerical simulation, mountain meteorology.

Fleagle, Robert G. \* 1948, (Emeritus); MS, 1944, PhD, 1949, New York University; air-sea interaction, science policy.

Gammon, Richard H. \* 1985, (Adjunct); PhD, 1970, Harvard University; atmospheric, marine, and environmental chemistry; biogeochemical cycles, global climate change.

Grenfell, Thomas C. \* 1968, (Research); MS, 1968, University of Chicago; PhD, 1972, University of Washington; atmospheric radiation, radiative transfer, remote sensing, sea-ice-snow optics, microwave theory.

Harrison, Don Edmunds \* 1985, (Affiliate); MS, 1973, PhD, 1977, Harvard University; ocean circulation modeling, large-scale atmosphere-ocean interaction, climate diagnostics/dynamics.

Hartmann, Dennis L. \* 1977; PhD, 1975, Princeton University; climate change, dynamic meteorology, radiation and remote sensing.

Hegg, Dean A. \* 1975, (Research); MS, 1976, PhD, 1979, University of Washington; atmospheric chemistry, cloud physics.

Hobbs, Peter V. \* 1963; PhD, 1963, University of London; Imperial College; aerosol/cloud/precipitation physics, atmospheric chemistry, air pollution, mesoscale meteorology.

Holton, James R. \* 1965; PhD, 1964, Massachusetts Institute of Technology; dynamic meteorology, middle atmosphere meteorology.

Houze, Robert A. \* 1972; MS, 1969, PhD, 1972, Massachusetts Institute of Technology; mesoscale meteorology, cloud physics and dynamics, radar meteorology, tropical meteorology.

Jaffe, Daniel A. \* 1997, (Adjunct); MS, 1983, PhD, 1987, University of Washington; atmospheric chemistry, urban and global air pollution, environmental education.

Katsaros, Kristina B. \* 1959, (Affiliate); PhD, 1969, University of Washington; air-sea interaction, radiative surface fluxes, remote sensing.

LaChapelle, Edward R. \* 1955, (Emeritus); ScD, 1967, University of Puget Sound; snow-ice physics.

Leovy, Conway B. \* 1967, (Emeritus); PhD, 1964, Massachusetts Institute of Technology; climatic role of clouds, planetary atmospheres and astrobiology, upper-atmosphere circulation.

Mass, Clifford F. \* 1981; PhD, 1978, University of Washington; synoptic and mesoscale meteorology.

Maykut, Gary \* 1969, (Research); PhD, 1969, University of Washington; polar air-sea-ice interaction, radiative transfer in ice and snow.

Overland, James E. \* 1983, (Affiliate); MS, 1971, University of Washington; PhD, 1973, New York University; arctic and North Pacific climate variability, sea ice.

Plant, William J. 1991, (Affiliate); PhD, 1972, Purdue University; remote sensing, atmosphere-ocean interaction.

Radke, Lawrence F. \* 1964, (Affiliate); MS, 1966, PhD, 1968, University of Washington; cloud/aerosol physics, optical and microwave remote sensing, airborne instrumentation/applications.

Reed, Richard J. \* 1954, (Emeritus); DSc, 1949, Massachusetts Institute of Technology; weather analysis and prediction, numerical modeling.

Rhines, Peter B. \* 1984; PhD, 1967, Cambridge University (UK); the circulation of the oceans and evolution of climate.

Sarachik, Edward S. \* 1984; PhD, 1966, Brandeis University; atmospheric dynamics, large scale atmosphere/ocean interactions, equatorial dynamics, climate change.

Tillman, James E. 1971, (Research); MS, 1961, Massachusetts Institute of Technology; Mars meteorology, humidity and temperature instrumentation, planetary boundary layers.

Tung, Ka Kit \* 1988, (Adjunct); PhD, 1977, Harvard University; atmospheric and geophysical fluid dynamics.

Untersteiner, Norbert \* 1957, (Emeritus); PhD, 1950, University of Innsbruck (Austria); air-sea-ice interaction, polar climatology, sea ice physics.

Wallace, John M. \* 1966; PhD, 1966, Massachusetts Institute of Technology; atmospheric general circulation, climate variability, climate change.

Warren, Stephen G. \* 1981; MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow, and sea ice, Antarctic climate.

### Associate Professors

Bates, Timothy S. \* 1990, (Affiliate); MS, 1978, PhD, 1988, University of Washington; oceanic and atmospheric chemistry, air-sea exchange of gases and particles, aerosols and climate.

Battisti, David S. \* 1983; MS, 1981, PhD, 1988, University of Washington; large-scale atmosphere-ocean dynamics, climate dynamics, tropical circulation, arctic climate.

Bond, Nicholas A. 1997, (Affiliate); PhD, 1986, University of Washington; air-sea interaction, boundary layers, coastal and marine meteorology.

Chen, Shuyi S. \* 1991, (Affiliate); MS, 1985, University of Oklahoma; PhD, 1990, Pennsylvania State University; mesoscale dynamics and numerical modeling, atmospheric deep convection, tropical meteorology.

Colman, Bradley R. 1999, (Affiliate); ScD, 1984, Massachusetts Institute of Technology; operational weather analysis and forecasting, coastal meteorology and oceanography

Ferek, Ronald J. \* 1985, (Research); MS, 1978, PhD, 1982, Florida State University; atmospheric chemistry, aerosol-cloud interactions, marine aerosols, biomass burning emissions.

Ghan, Steven J. 1993, (Affiliate); MS, 1981, PhD, 1988, Massachusetts Institute of Technology; clouds/aerosol/tropospheric chemistry, climate modeling.

Harrison, Halstead \* 1971, (Emeritus); PhD, 1960, Stanford University; atmospheric chemistry, dispersion modeling, radiative transfer.

Locatelli, John D. 1969, (Research); BS, 1967, University of Washington; cloud and precipitation physics, synoptic and mesoscale meteorology.

Rothrock, David A. \* 1970, (Adjunct); PhD, 1969, Cambridge University (UK); physical oceanography, polar oceanography, polar ice remote sensing and modeling.

Smull, Bradley F. 1996, (Research); PhD, 1986, University of Washington; mesoscale and radar meteorology, tropical meteorology, large-scale atmosphere-ocean interaction.

### Assistant Professors

Alexander, M. Joan \* 1992, (Affiliate); MS, 1989, PhD, 1992, University of Colorado (Boulder); atmospheric gravity waves, middle atmosphere dynamics, planetary atmospheres.

Hakim, Gregory J. \* 1999; MS, 1993, PhD, 1997, State University of New York (Albany); synoptic and mesoscale meteorology; atmospheric dynamics; rotating, stratified turbulence.

Kamenkovich, Igor V. 1998, (Research); PhD, 1996, Massachusetts Institute of Technology; atmosphere-ocean coupled modeling, thermohaline circulation.

Mantua, Nathan J. 1998, (Affiliate); PhD, 1994, University of Washington; large-scale climate variability and predictability, the El Niño/Southern Oscillation.

Yuter, Sandra Ellyn \* 1990, (Research); PhD, 1996, University of Washington; physical meteorology, mesoscale meteorology, radar and remote sensing.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ATM S 431 Atmospheric Physics (5) NW** Energy transfer processes: solar and atmospheric radiation, turbulence, and boundary layer structure. Applications. Prerequisite: either ATM S 340 or PHYS 224. Offered: A.

**ATM S 441 Atmospheric Motions I (3) NW** Basic equations governing atmospheric motions and their elementary applications; circulation and vorticity; dynamics of midlatitude disturbances. Prerequisite: either AMATH 353 or MATH 309; MATH 324. Offered: A.

**ATM S 442 Atmospheric Motions II (5) NW** Wave dynamics, numerical prediction, development of midlatitude synoptic systems, and general circulation. Includes laboratory exercises. Prerequisite: ATM S 441. Offered: W.

**ATM S 451 Instruments and Observations (5) NW** Principles of operating instruments for measuring important atmospheric parameters (e.g., temperature, humidity, aerosol concentration). Concepts of sensitivity, accuracy, representativeness, time re-

sponse. Manipulation of output data including signal processing and statistical analysis. Experimental design and implementation of the design in actual field experiments is included. Prerequisite: ATM S 350. Offered: Sp.

**ATM S 452 Weather Forecasting and Advanced Synoptic Meteorology (5) NW** Basic forecasting techniques. Application of numerical modeling and statistical approaches. Structure, evolution, and forecasting of convective systems. Radar applications. Diurnal and topographically-forced circulations. Aviation meteorology. Laboratories include extensive practice in forecasting and surface map analysis. Prerequisite: ATM S 370; ATM S 442. Offered: Sp.

**ATM S 458 Global Atmospheric Chemistry (4) NW** Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with CHEM 458; A.

**ATM S 460 Water in the Environment (3) NW Baker, Raymond, Waddington, Warren** Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136 and PHYS 123; PHYS 133. Offered: jointly with GPHYS 460 and PHYS 460. Offered: A.

**ATM S 480 Air-Quality Modeling (3) NW** Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Prerequisite: either CEE 381, ATM S 458, or CHEM 458. Offered: jointly with CEE 480; W.

**ATM S 492 Readings in Meteorology or Climatology (\*)** Credit/no credit only. Offered: AWSpS.

### Courses for Graduates Only

**ATM S 501 Fundamentals of Physics and Chemistry of the Atmosphere (5)** Fundamentals of hydrostatics, thermodynamics, radiation, cloud physics, and atmospheric chemistry. Offered: A.

**ATM S 502 Introduction to Synoptic Meteorology (3)** Overview of weather systems; atmospheric observations and data assimilation. Elementary manual and computer-aided synoptic analysis techniques. Interpretation of satellite and ground-based observations. Kinematics. Fronts and frontogenesis; life cycles of extratropical cyclones; related mesoscale phenomena. Numerical weather prediction; interpretation of forecast products. Offered: Sp.

**ATM S 505 Introduction to Fluid Dynamics (4)** Eulerian equations for mass, motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress, strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high, low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH 505/OCEAN 511; A.

**ATM S 508 Geochemical Cycles (4)** Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523 and CHEM 523.

**ATM S 509 Geophysical Fluid Dynamics I (4)**

Dynamics of rotating stratified fluid flow in the atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincaré, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasigeostrophy. Prerequisite: ATM S/AMATH 505/OCEAN 511. Offered: jointly with OCEAN 512; W.

**ATM S 510 Physics of Ice (3)**

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Prerequisite: permission of instructor. Offered: jointly with GPHYS 510; alternate years; W.

**ATM S 511 Formation of Snow and Ice Masses (3)**

Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with GPHYS 511; alternate years; A.

**ATM S 512 Dynamics of Snow and Ice Masses (3)**

Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with GPHYS 512; alternate years; Sp.

**ATM S 513 Structural Glaciology (3)**

Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with GPHYS 513; alternate years; W.

**ATM S 514 Ice and Climate Modeling (3)**

Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with GPHYS 514; alternate years.

**ATM S 520 Atmospheric Sciences Colloquium (1, max. 15)**

Seminars on current research in advanced topics related to atmospheric sciences, conducted by faculty and visiting professors/scientists. Includes presentation of doctoral dissertations by department graduate students. For Atmospheric Sciences graduate students only. Credit/no credit only. Prerequisite: permission of department. Offered: AWSp.

**ATM S 521 Seminar in Atmospheric Dynamics (\*)**

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**ATM S 523 Seminar in Clouds and Precipitation (\*)**

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: AW.

**ATM S 524 Seminar in Energy Transfer and Remote Sensing (\*)**

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: ASp.

**ATM S 525 Seminar Topics in Atmospheric Chemistry (1-3, max. 6)**

Seminar for atmospheric scientists, chemists, and engineers in problems associated with the chemical composition of the atmosphere. Topics range from the natural system to urban pollution and global atmospheric change.

Faculty lectures and student participation. Prerequisite: CEE 301 or permission of instructor. Offered: jointly with CEE 553; W.

**ATM S 532 Atmospheric Radiation: Shortwave (3)**

Principles of radiative transfer in planetary atmospheres with emphasis on single and multiple scattering of visible and infrared radiation. Applications to atmosphere and surface energy balance and remote sensing. Prerequisite: PHYS 323 or permission of instructor. Offered: jointly with GPHYS 532; alternate years.

**ATM S 533 Atmospheric Radiation: Longwave (3)**

Principles of radiative energy exchange in planetary atmospheres with emphasis on emission and absorption of infrared and microwave radiation. Applications to atmospheric and surface energy balance and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with GPHYS 533; Sp.

**ATM S 534 Remote Sensing of the Atmosphere and Climate System (3)**

Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications to research. Prerequisite: ATM S 532 or ATM S 533. Offered: jointly with GPHYS 534; alternate years

**ATM S 535 Cloud Microphysics and Dynamics (3)**

Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with GPHYS 535; W.

**ATM S 536 Mesoscale Storm Structure and Dynamics (3)**

Techniques of observing storm structure and dynamics by radar and aircraft, observed structures of precipitating cloud systems, comparison of observed structures with cloud models. Prerequisite: ATM S 535 or GPHYS 535. Offered: alternate years; Sp.

**ATM S 542 Synoptic and Mesoscale Dynamics (3)**

Quasi-geostrophic theory, baroclinic instability, symmetric instability, tropical disturbances, frontogenesis, orographic disturbances, convective storms. Prerequisite: ATM S 509/OCEAN 512 and AMATH 402 or equivalents. Offered: Sp.

**ATM S 545 General Circulation of Atmosphere (3)**

Requirements of the global angular momentum, heat, mass, and energy budgets upon atmospheric motions as deduced from observations. Study of the physical processes through which these budgets are satisfied. Prerequisite: ATM S 509/OCEAN 512 or permission of instructor. Offered: A.

**ATM S 547 Boundary Layer Meteorology (3)**

Turbulence, turbulent fluxes, averaging. Convection and shear instability. Monin-Obukhov similarity theory, surface roughness. Wind profiles. Organized large eddies. Energy fluxes at ocean and land surfaces, diurnal cycle. Convective and stable stratified boundary layers. Cloud-topped boundary layers. Remote sensing. Boundary layer modeling and parameterization. Prerequisite: ATM S 505, AMATH 505, or OCEAN 511. Offered: alternate years; Sp.

**ATM S 551 Atmospheric Structure and Analysis I: Synoptic Scale Systems (4)**

Extratropical cyclones and cyclogenesis. Jet streams. Upper waves in the westerlies. Diagnosis of vertical motions. Fronts and frontogenesis. Prerequisite: ATM S 502 and ATM S 509/OCEAN 512. Offered: alternate years; A.

**ATM S 552 Objective Analysis (3)**

Review of objective analysis techniques commonly applied to atmospheric problems; examples from the meteorological literature and class projects. Superposed epoch analysis, cross-spectrum analysis, filtering, eigenvector analysis, optimum interpolation techniques. Offered: alternate years; W.

**ATM S 555 Planetary Atmospheres (3)** Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. Offered: jointly with ASTR 555/GPHYS 555; alternate years.

**ATM S 556 Planetary-Scale Dynamics (3)**

Zonally symmetric circulations, planetary waves, equatorial waves, dynamics of the middle atmosphere, trace constituent transport, nonlinear aspects of atmospheric flows. Prerequisite: ATM S 542 or permission of instructor. Offered: alternate years; Sp.

**ATM S 558 Atmospheric Chemistry (3)**

Photochemistry of urban, rural, and marine tropospheric air, and of the natural and perturbed ozone in the middle atmosphere. Unity of the chemistries in these apparently different regimes. Prerequisite: ATM S 458 or ATM S 501 or CHEM 457 or permission of instructor. Offered: alternate years; Sp.

**ATM S 560 Atmosphere/Ocean Interactions (3)**

Observations and theory of phenomena of the coupled atmosphere-ocean system. El Niño/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512. Offered: jointly with OCEAN 560; alternate years; Sp.

**ATM S 571 Advanced Physical Climatology (3)**

Physical processes that determine the climate of Earth and its past and future changes. Greenhouse effect. Climate modeling. Radiative and dynamical feedback processes. Orbital parameter theory. Critical analysis of climate change predictions. Prerequisite: permission of instructor. Offered: A.

**ATM S 575 Large Scale Dynamics of the Tropical Atmosphere (3)**

Observations and underlying dynamics of large-scale tropical circulations. Factors that determine regions of large-scale persistent precipitation in the tropics, thermal forcing of atmospheric circulations by these regions, and temporal variability of the forcing and response. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512, 542. Offered: alternate years; W.

**ATM S 581 Numerical Modeling of Atmospheric Flows I (3)**

Numerical methods for initial value problems of atmospheric science and fluid dynamics. Finite difference methods, spectral and pseudo-spectral methods, finite element methods. Stability, accuracy, numerical dispersion and numerical dissipation. Computer models constructed to illustrate behavior of each method. Prerequisite: familiarity with partial differential equations and FORTRAN.

**ATM S 582 Numerical Modeling of Atmospheric Flows II (3)**

Topics of current interest including: efficient time differencing, semi-implicit and multiple time-step techniques. Semi-lagrangian schemes. Treatment of poorly resolved gradients. Flux-corrected transport. Positive definite advection schemes. Aliasing error and nonlinear instability. Wave permeable boundary conditions. Credit/no credit only. Prerequisite: ATM S 581. Offered: alternate years.

**ATM S 591 Special Topics (1-4, max. 9)**

Lecture series on topics of major importance in the atmospheric sciences. Prerequisite: permission of instructor.

**ATM S 600 Independent Study or Research (\*)**

Credit/no credit only. Offered: AWSpS.

**ATM S 700 Master's Thesis (\*)**

Offered: AWSpS.

**ATM S 800 Doctoral Dissertation (\*)**

Offered: AWSpS.

## Biology

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**BIOL 401 Cell Biology (5) NW** *Bakken, Hille, Wakimoto, Wright* Selected topics in molecular cell biology. Strong emphasis on understanding original experiments that describe the functions of the cell. Prerequisite: either BIOL 202, BIOL 355, or GENET 371; either CHEM 221, CHEM 224, CHEM 239, or CHEM 337; either BIOL 355, GENET 372, ZOOL 301, ZOOL 485, BIOC 405, or BIOC 440.

**BIOL 402 Cell Biology Laboratory (3) NW** *Shellenbarger* Practice in modern methods (restriction enzyme digestion, blotting, hybridization, immunochromatography, density gradient centrifugation, electrophoresis) and other methods currently used to study plant and animal cells, nucleic acids, and proteins. Includes practice in scientific style writing. Prerequisite: BIOL 401, which may be taken concurrently.

**BIOL 405 Cellular and Molecular Biology of Human Disease (3) NW** *Wakimoto* Concepts of cellular and molecular biology as applied to human disease. Emphasis on current experimental approaches to investigate disease mechanisms and the contributions of model systems. Selected topics in cancer biology, viral induced disease, gene therapy. Prerequisite: BIOL 202; either BIOC 405, BIOC 440, BIOL 355, BIOL 401, GENET 371, GENET 372, ZOOL 301, ZOOL 455, or ZOOL 485.

**BIOL 438 Biological Monitoring and Assessment (5) NW** *Karr* Explores the technical questions (conceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools—existing and needed—to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with FISH 438.

**BIOL 454 Evolutionary Mechanisms (4) NW** *Kingsolver, Schemske* Evolutionary change as determined by mutation, selection, drift and other mechanisms. Effects of the genetic system, isolating mechanisms, and population structure on speciation. Examples of microevolutionary and macroevolutionary changes from the diversity of life. For advanced undergraduate and graduate students in biological sciences. Prerequisite: either BIOL 102 or BIOL 203.

**BIOL 470 Biogeography (4) NW** Analysis of historical and ecological determinants of current and past distributions of organisms. Integrates techniques developed by taxonomists, paleontologists, geologists, evolutionists, ecologists, and biogeographers to elucidate relationships between geographical distributions and continental drift, ecological interactions, climate, and dispersal abilities of organisms. Recommended: one year college biology; background in ecology and evolution.

**BIOL 472 Principles of Ecology (5) NW** Population biology, interactions between species in biological communities, relationship of community to environment, physiological ecology, principles of natural selection. Prerequisite: either BIOL 102 or BIOL 203.

**BIOL 473 Limnology (3) NW** *Schindler* Biological, physical, and chemical features of lakes and other inland waters. Prerequisite: either BIOL 102 or BIOL 203.

**BIOL 475 Limnology Laboratory (2) NW** *Schindler* Examination of biota of fresh waters, survey of limnological methods, and analysis of data. Prerequisite: BIOL 473, which may be taken concurrently.

**BIOL 476 Conservation Biology (5) NW** *Boersma* Explores biological, managerial, economic, and ethical concepts affecting survival of species. Applications of ecology, biogeography, population genetics, and social sciences for the preservation of species in the face of widespread global habitat modification, destruction, and other human activities. Prerequisite: either BIOL 102 or BIOL 203.

**BIOL 477 Marine Conservation (3) NW** Terrestrially based concepts of conservation biology applied to marine systems. Human activities affecting the marine environment including fishing and pollution; influence of legal and cultural frameworks; and ecosystem management. Prerequisite: BIOL 476.

**BIOL 490 Undergraduate Seminar (1-3, max. 6) NW** Supervised readings and group discussion of selected topics of broad biological significance. Prerequisite: BIOL 102, BIOL 202, or BIOL 203.

**BIOL 491 Special Topics in Biological Science for Teachers (3-9, max. 9) NW** Study of selected areas of biology. Designed to enhance the skills and background of K-12 teachers. Credit/no credit only. Recommended: teaching experience.

**BIOL 492 The Teaching of Biology (2)** Basic course in the teaching of biology in the secondary school. Designed to help preservice teachers identify useful laboratory techniques, materials, and content for the teaching of pre-college biology. Special attention to current issues in biology education. Required for biology student in Teacher Certification Program.

**BIOL 493 Study Abroad - Advanced Biology (1-15, max. 15) NW** For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit does not apply to major requirements without approval.

**BIOL 496 Peer Teaching Assistants in Biology (1-5, max. 10)** Direct experience in the classroom, typically teaching a lab section of BIOL 100. Peer Teaching Assistants attend lectures and weekly preparation meetings and gain in-depth background on the subject material as well as training in teaching techniques and approaches. Credit/no credit only. Prerequisite: either BIOL 102 or both BIOL 202 and BIOL 203. Offered: AWSp.

**BIOL 497 Special Topics in Biology (1-5, max. 10) NW**

**BIOL 498 Library Research (1-5, max. 10)**

**BIOL 499 Undergraduate Research (1-5, max. 15)**

### Courses for Graduates Only

**BIOL 501 Advanced Cytology (1-5, max. 5)** Detailed study of the structure and function of the cell.

**BIOL 508 Cell Biology (3, max. 6)** Four to five topics of current interest in cell biology selected by the enrollees.

**BIOL 520 Computers in Biology Instruction (2)** *Palka* Review and evaluation of software for undergraduate instruction in biology. Discussions on usefulness of different types of programs, e.g., simulations and interactive tutorials. Generation of new ideas and approaches for increasing use of computers in biology instruction. Credit/no credit. Credit/no credit only. Prerequisite: graduate student in biological or biomedical sciences.

**BIOL 581 Biology of Drosophila Seminar (1, max. 12)** Weekly presentation by participants of classical literature, current literature, and research in the molecular biology, developmental biology, neurobiology, and genetics of *Drosophila*. Prerequisite: permission of instructor. Offered: AWSp.

**BIOL 585 Methods and Problems in Development (3)** *Schubiger, Comai, Kimelman* Special topics in development. Integrates classical and current approaches. Developmental genetics, experimental embryology, molecular mechanisms of developmental regulation, and gene function in cell determination and differentiation in developing systems. Prerequisite: BIOL 455 or equivalent.

**BIOL 586 Analysis of Development (3, max. 6)** Analysis of structural, physiological, and molecular levels of developmental processes, including gametogenesis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Prerequisite: ZOOL 456 and BIOC 442.

**BIOL 591 Problems in Biological Instruction (1-3, max. 3)**

## Botany

426 Hitchcock



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/botany.html](http://www.washington.edu/students/genecat/academic/botany.html)



Department Web page:  
[depts.washington.edu/botweb/](http://depts.washington.edu/botweb/)

Botany is concerned with the function and structure of plants, algae and fungi, their ecology and evolution, classification, physiology, development, and genetics. Emphasis is placed both on organismal and on cellular and molecular biology. Special courses and programs in botany of the Pacific Northwest are shared with related departments.

### Graduate Program

Graduate Program Coordinator  
430 Hitchcock, Box 355325  
(206) 543-1942  
[botweb@u.washington.edu](mailto:botweb@u.washington.edu)

The Department of Botany offers programs of graduate study leading to the Master of Science and Doctor of Philosophy degrees. Each program takes into consideration the background and interests of the student.

### Research Facilities

Special departmental facilities include a herbarium containing vascular plants, bryophytes, algae and fungi, a modern greenhouse, algae and fungal culture collections, growth chambers and rooms, modern instrumentation, and a scanning electron microscope center. The Friday Harbor Laboratories on San Juan Island offer opportunities for the study of marine botany. The great variety of habitats in the Pacific Northwest provide excellent opportunities for field investigations.

### Special Requirements

A prospective graduate student is expected to have had the equivalent of an undergraduate major in biological science, with training in chemistry (at least through organic chemistry), and background in general botany and genetics. Calculus and/or statistics are recommended.

### Financial Aid

Teaching assistantships and fellowships are awarded to selected applicants by March of each year. Students should inquire about research assistantships, training grants and other sources of support.

## Faculty

### Chair

Joseph F. Ammirati

### Professors

Ammirati, Joseph F. \* 1979; MA, 1967, San Francisco State; PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.

Bendich, Arnold J. \* 1970; PhD, 1969, University of Washington; chromosome structure in mitochondria, chloroplasts, and bacteria.

Bliss, Lawrence C. \* 1978, (Emeritus); PhD, 1956, Duke University; physiological plant ecology and ecosystem development and function, arctic, alpine environments.

Cattolico, Rose A. \* 1975; PhD, 1973, State University of New York (Stony Brook); plastid replication, nucleic acid biochemistry in synchronized unicellular algae.

Cleland, Robert E. \* 1964; PhD, 1957, California Institute of Technology; plant physiology, plant hormones.

Del Moral, Roger \* 1968; PhD, 1968, University of California (Santa Barbara); plant ecology, community structure, succession.

Dunwiddie, Peter W. 1998, (Affiliate); PhD, 1983, University of Washington.

Ebrey, Thomas 2000, (Research); PhD, 1968, University of Chicago; phototransaction in biology, halo bacteria.

Hall, Benjamin D. \* 1963; MA, 1956, PhD, 1959, Harvard University; yeast molecular genetics and molecular evolution of gene expression in eukaryotes.

Halperin, Walter \* 1968, (Emeritus); PhD, 1965, University of Connecticut; plant physiology, developmental anatomy, embryogenesis.

Haskins, Edward F. \* 1966, (Emeritus); PhD, 1965, University of Minnesota; cytology, ultrastructure of microorganisms, especially slime molds.

Hinckley, Thomas M. \* 1980, (Adjunct); PhD, 1971, University of Washington; forest tree physiology and autecology, subalpine ecosystems, water stress problems.

Kruckeberg, Arthur R. \* 1950, (Emeritus); PhD, 1950, University of California (Berkeley); evolution, flora of PNW, edaphic ecology, conservation.

Leopold, Estella B. \* 1976; PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environment.

Nester, Eugene W. \* 1962, (Adjunct); PhD, 1959, Case Western Reserve University; genetics and biochemistry of bacterial-plant cell interactions, tumorigenesis.

Schemske, Douglas W. \* 1989; PhD, 1977, University of Illinois; evolutionary biology, plant population biology and coevolution.

Tsukada, Matsuo \* 1969; PhD, 1961, Osaka City University (Japan); interpretation of Quaternary events from palynological and kindred data.

Van Volkenburgh, Elizabeth \* 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.

Waaland, J. Robert \* 1969; PhD, 1969, University of California (Berkeley); biology of marine algae.

Walker, Richard B. \* 1948, (Emeritus); PhD, 1948, University of California (Berkeley); plant physiology, mineral nutrition, water relations.

Whisler, Howard C. \* 1963, (Emeritus); PhD, 1961, University of California (Berkeley); mycology, aquatic fungi, slime-molds and phycocyanes, development.

### Associate Professors

Bradshaw, Harvey D. \* 1984, (Adjunct Research); PhD, 1984, Louisiana State University; plant molecular biology and genetic modification of poplars.

Comai, Luca \* 1989; PhD, 1980, University of California (Davis); chromatin, functional genomics, polyploidy.

Hamilton, Clement Wilson \* 1985, (Adjunct); PhD, 1985, Washington University; landscape plant selection, taxonomy of horticultural and tropical plants.

Mandoli, Dina F. \* 1987, (Research); PhD, 1983, Stanford University; development and photomorphogenesis in giant unicell using genetics, physiology and molecular biology.

Olmstead, Richard G. \* 1996; PhD, 1988, University of Washington; plant molecular systematics, plant phylogeny and macroevolution.

Rodriguez, Russell 1995, (Affiliate); PhD, 1983, Oregon State University.

### Assistant Professors

Maron, John L. \* 1998; PhD, 1996, University of California (Davis); plant population biology, plant-consumer interactions, conservation biology.

Torii, Keiko \* 1999; PhD, 1993, University of Tsukuba (Japan); arabidopsis developmental genetics, receptor-mediated signal transduction.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**BOTANY 428 Molecular and Cellular Biology of Plants (3) NW** *Bendich, Cattolico, Comai* Structure and function of the nucleus, the organelles, and their genomes. Review of the techniques used in cellular and molecular biology such as tissue culture, cell fractionation, nucleic acid characterization, genetic engineering, and genome mapping. Prerequisite: either BIOL 101 or BIOL 203. Offered: W.

**BOTANY 429 Plant Nuclear and Cytoplasmic Genetics (3) NW** *Bendich, Comai* Covers genetic aspects specific to plants and algae, including chromosome structure, genome mapping, transposon biology, genes for floral and vegetative development, genetic engineering, ploidy levels, and cytoplasmic genetics. Prerequisite: either BIOL 101 or BIOL 203; either GENET 371 or GENET 372. Offered: Sp.

**BOTANY 441 Morphology and Anatomy of Land Plants (5) NW** *Halperin* Comparative morphology and anatomy of land plants. Derivation of morphological structures and basis for current classification schemes examined using living and fossil organisms. Laboratories emphasize live plants native to the Pacific Northwest. Prerequisite: either BIOL 102 or BIOL 203. Offered: A.

**BOTANY 443 Origins of Our Modern Floras (5) NW** *Leopold* Evolution and biogeographic development of modern forest taxa and associations. Late Cenozoic forests (last 60 million years) of western North American environments, emphasizing geologic and climatic shifts that have shaped temperate and tropical vegetation. Three required weekend field trips. Prerequisite: BOTANY 113; either BIOL 102 or BIOL 203. Offered: A.

**BOTANY 445 Marine Botany (8) NW** Survey of plants represented in marine environments; natural history; ecology, distribution, habitat, adaptation, and trophic interrelationships. Prerequisite: either

BIOL 102 or BIOL 203; ZOO 430, which may be taken concurrently. Offered: at Friday Harbor Laboratories; Sp.

**BOTANY 446 Phycology (5) NW** *Cattolico, Waaland* Study of major algal groups emphasizing form, function, reproduction, and distribution. Topics include evolution, phylogeny, and classification. Economically useful and ecologically important algae emphasized. Prerequisite: either BIOL 102 or BIOL 203. Offered: Sp.

**BOTANY 455 Vegetation of Western Washington (5) NW** *del Moral* Vegetation of western Washington, including mature, seral, and weedy vegetation. Recognition of landscape patterns, sight identification of common and indicator species, classification of major community types, and uses of native species in landscape design. Four weekend field trips required. Recommended: either BOTANY 113 or BOTANY 354. Offered: even years; Sp.

**BOTANY 456 Plant Community Ecology (5) NW** *del Moral* Development of plant community theory; theory of vegetation structure and typical identification; numerical methods for vegetation description and pattern analysis; gradient analysis; competition in complex systems; vegetation dynamics; niche theory. Laboratory emphasizes field and computer methods. Three weekend field trips required. Prerequisite: either BOTANY 354 or BOTANY 455. Offered: odd years; Sp.

**BOTANY 458 Alpine Plant Ecology (5) NW** Structure of plant communities in alpine regions of the Pacific Northwest. Characteristics of physical environment which influence species adaptation and distribution. Influence, impact of humans and criteria for preservation and/or management of alpine areas. Three weekend field trips required. Prerequisite: either BIOL 102 or BIOL 203. Offered: S.

**BOTANY 461 General Mycology (5) NW** *Ammirati, Whisler* General survey of the fungi with emphasis on life cycles, structure, physiology, economic importance. Prerequisite: either BIOL 102 or BIOL 203. Offered: A.

**BOTANY 462 Mushrooms and Related Fungi (5) NW** *Ammirati* General biology, ecology, and classification of mushrooms, polypores, puffballs, and other related basidiomycetes. Emphasis on Pacific Northwest species. Prerequisite: either BIOL 102 or BIOL 203.

**BOTANY 490 Undergraduate Seminar (1-3, max. 6) NW** Presentation and discussion of undergraduate research, including honors projects, and selected topics in botany and related biological sciences. Offered: AWSp.

**BOTANY 496 Peer Teaching Assistantships in Botany (1-5, max. 5)** Direct experience in the classroom, typically teaching a lab section of an undergraduate course. Peer TA's attend lectures and weekly preparation meetings and gain in-depth background in the subject material as well as training in teaching techniques and approaches. Offered: AWSpS.

**BOTANY 498 Special Problems in Botany (1-15, max. 15)** Students with suitable background in botany may enroll for special study in phycology, anatomy, ecology, mycology, morphology, paleobotany, physiology, or taxonomy. Offered: AWSpS.

## Courses for Graduates Only

**BOTANY 502 Teaching Assistant Orientation (2)** Theory and practice of effective teaching in the laboratory. Students study the theory of being an effective teaching assistant in biological laboratories and receive direct experience in the laboratory setting. Credit/no credit only. Offered: A.

**BOTANY 505 Modern Botany (2, max. 4)** For incoming graduate students in botany and certain interdisciplinary programs. Reviews recent advances in modern botany, covering molecular, cellular, organismal, and community areas.

**BOTANY 511 Scanning Electron Microscopy and Energy Dispersive Spectroscopy (2/3)** *JR Waaland* Principles and practice of scanning electron microscopy and energy dispersive spectroscopy applied to biological and non-biological materials. Includes sample preparation, critical point drying, sputter coating, SEM operation, photomicrography, backscattered electron imaging, SEM alignment and performance maximization, x-ray microanalysis, x-ray dot maps, and quantitative x-ray microanalysis. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 520 Seminar (1, max. 18)** Credit/no credit only. Offered: AWPSP.

**BOTANY 521 Topics in Plant Physiology (1-3, max. 10)** *Cleland, Torii, Van Volkenburgh* Modern trends and methods in plant physiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 523 Selected Topics in Mycology (1-3, max. 10)** *Ammirati* Selected topics from all phases of mycology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 524 Topics in Phycology (1-3, max. 10)** *Cattolico, Waaland* Topics from all phases of phycology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 525 Topics in Plant Ecology (1-3, max. 10)** *del Moral, Maron* Selected topics from various phases of plant ecology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 527 Advanced Topics in Plant Molecular Systematics and Evolution (1-3, max. 10)** *Hall, Olmstead* In-depth discussion of topics which emphasize molecular level systematics and evolution. Credit/no credit only. Prerequisite: permission of instructor. Offered: on demand.

**BOTANY 529 Topics in Plant Molecular Biology (1-3, max. 10)** *Bendich, Comai, Torii* Discussions of recent trends in plant molecular biology, genetics, and development. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 530 Topics in Plant Population Ecology (1-3, max. 10)** *Schemske* Discussions of recent developments in plant population biology and ecology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 545 Marine Phycology (9)** *Waaland* Morphology, life histories, systematics, and ecology of marine algae, with emphasis on the local flora. Prerequisite: 10 credits of biological sciences or permission of the Director of Friday Harbor Laboratories. Offered: at Friday Harbor; S.

**BOTANY 549 Advanced Phycology (9)** *Waaland* Varied marine algal flora of the San Juan region. Topic changes from year to year. Individual research projects. Prerequisite: BOTANY 545 or equivalent and permission of the Director of Friday Harbor Laboratories. Offered: at Friday Harbor.

**BOTANY 575 Transport Processes in Plants (3)** *Van Volkenburgh* Analysis of pathways and mechanisms of water, ion, and sugar transport in higher plants, from abiochemical understanding of membrane properties, water potential, and electrophysiology to whole plant control of water status, nutrient transport, and carbon allocation. Prerequisite: BOTANY 371 and BOTANY 372 or permission of instructor; recommended: 441. Offered: on demand.

**BOTANY 597 Advanced Reading in Botany (1-3, max. 12)** Reading and evaluation of subject matter in plant, algal, and fungal biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 598 Field Studies in Botany (1-6, max. 12)** Field studies of plants, algae or fungi. Emphasis on methods and techniques for gathering and evaluating field data. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 599 Laboratory Studies in Botany (1-6, max. 12)** Laboratory studies of plants, algae, and/or fungi. Emphasis on methods, procedures, and evaluating research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**BOTANY 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWPSP.

**BOTANY 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWPSP.

**BOTANY 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWPSP.

## Canadian Studies

See International Studies.

## Chemistry

109 Bagley



General Catalog Web page:

[www.washington.edu/students/genecat/academic/chemistry.html](http://www.washington.edu/students/genecat/academic/chemistry.html)



Department Web page:

[www.chem.washington.edu](http://www.chem.washington.edu)

Chemistry is a branch of natural science that deals principally with the properties of substances, the changes they undergo, and the natural laws that describe these changes.

## Graduate Program

Graduate Program Coordinator  
109D Bagley, Box 351700  
(206) 543-4787  
[graduate@chem.washington.edu](mailto:graduate@chem.washington.edu)

The Master of Science and Doctor of Philosophy programs are designed to lead to positions of leadership and independent investigation in research institutes, industrial laboratories, and government agencies, and as teachers, researchers, or administrators in colleges and universities in chemistry or allied fields.

Students can pursue research in the following areas of chemistry: analytical, bioinorganic, bioorganic, biophysical, environmental, inorganic, medicinal, nuclear, organic, organometallic, physical, polymer, process analytical, and theoretical.

Thesis research for the Master of Science degree and dissertation research for the Doctor of Philosophy degree will constitute an original contribution of knowledge worthy of report in the scientific literature.

## Master of Science

**Admission Requirements:** Baccalaureate degree with major in chemistry or allied sciences; Graduate Record Examination.

**Graduation Requirements:** With Thesis—36 approved credits with 18 in courses at the 500 level or above; 21 credits in courses at the 400 or 500 level taken for numerical grade; 9 credits in thesis research. Without Thesis—Same as with thesis, except that additional course work may be substituted for the required research. Minimum GPA of 3.00 required for both degrees.

## Doctor of Philosophy

**Admission Requirements:** Same as for the Master of Science degree.

**Graduation Requirements:** 18-27 credits of approved courses at the 400 or 500 level, with a total minimum GPA of 3.00; candidacy examinations covering area of specialization; dissertation.

## Faculty

### Chair

Paul B. Hopkins

### Professors

Andersen, Niels H. \* 1968; PhD, 1967, Northwestern University; peptide secondary structure and protein folding, fold design and stability, biophysical NMR.

Anderson, Arthur G. \* 1946, (Emeritus); MS, 1942, PhD, 1944, University of Michigan; chemistry of nonclassical aromatic compounds and novel heterocycles.

Borden, Weston T. \* 1972; PhD, 1968, Harvard University; molecular orbital theory of organic molecules and reactions, synthesis of unnatural products.

Callis, James B. \* 1973; PhD, 1970, University of Washington; instrumentation development, process analytical chemistry, non-invasive clinical chemistry.

Campbell, Charles T. \* 1989; PhD, 1979, University of Texas (Austin); physical chemistry, analytical chemistry, surfaces, chemisorption, catalysis, biosensors.

Charlson, Robert J. \* 1962, (Emeritus); MS, 1959, Stanford University; PhD, 1964, University of Washington; atmospheric chemistry, aerosol physics, aerosol/cloud/climate interaction and instrumentation.

Christian, Gary D. \* 1972; PhD, 1964, University of Maryland; electroanalysis, flow injection analysis, process control.

Dalton, Larry R. \* 1998; PhD, 1971, Harvard University; materials chemistry focused on producing next-generation opto-electronic materials.

Drobny, Gary P. \* 1981; PhD, 1981, University of California (Berkeley); solid state nuclear magnetic resonance, biophysics, biomaterials.

Engel, Thomas \* 1980; PhD, 1969, University of Chicago; surface chemistry and catalysis.

Epiotis, Nicholas \* 1972; PhD, 1972, Princeton University; applied quantum chemistry.

Floss, Heinz G. \* 1987; PhD, 1961, Technical University of Munich (Germany); bioorganic and natural products chemistry.

Gammon, Richard H. \* 1985; PhD, 1970, Harvard University; atmospheric, marine, and environmental chemistry; biogeochemical cycles, global climate change.

Gelb, Michael H. \* 1985; PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry, molecular and cellular biology.

Gouterman, Martin \* 1966, (Emeritus); PhD, 1958, University of Chicago; electronic spectra and luminescence of porphyrins, oxygen pressure sensing by luminescence quenching.

Gregory, Norman W. \* 1946, (Emeritus); PhD, 1943, Ohio State University; structure and thermodynamic properties of inorganic substances, vaporization reactions.

Hakomori, Sen-itiroh \* 1967, (Adjunct); MD, 1951, DMedSc, 1956, Tohoku University (Japan); role of glycosphingolipids in defining antigenicity, cellular interaction, and signal transduction.

Halsey, George D. \* 1951, (Emeritus); PhD, 1948, Princeton University; surface absorption/interaction of rare gases, solid solutions of rare gases, catalysis, colloids.

Heinekey, Dennis M. \* 1991; PhD, 1982, University of Alberta (Canada); organometallic chemistry of the transition metals.

Hopkins, Paul B. \* 1982; PhD, 1982, Harvard University; organic synthesis, bioorganic and nucleic acid chemistry.

Jonsson, Hannes \* 1988; PhD, 1985, University of California (San Diego); theory and simulations of atomic scale structure and dynamics in liquids, glasses, and crystals.

Klevit, Rachel E. \* 1983, (Adjunct); DPhil, 1981, Oxford University (UK); structure/function of breast cancer proteins; protein NMR, mass spectrometry, other spectroscopies.

Kowalski, Bruce \* 1973, (Emeritus); PhD, 1969, University of Washington; analytical chemometrics, computerized instrumentation for process monitoring and control.

Krohn, Kenneth A. \* 1981, (Adjunct); PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Kwiram, Alvin L. \* 1970; PhD, 1963, California Institute of Technology; molecular structure/dynamics in the solid state with emphasis on excited states, magnetic resonance.

Lingafelter, Edward C. \* 1939, (Emeritus); PhD, 1939, University of California (Berkeley); crystal and molecular structure of coordination compounds.

Mayer, James M. \* 1984; PhD, 1982, California Institute of Technology; inorganic, bioinorganic, organometallic transition metal chemistry; synthesis and reaction mechanisms.

Murray, James W. \* 1973, (Adjunct); PhD, 1973, Massachusetts Institute of Technology; marine geochemistry, aquatic chemistry.

Norman, Joe G. Jr. \* 1972; PhD, 1972, Massachusetts Institute of Technology; chemical education, interdisciplinary education.

Olmstead, Marjorie A. \* 1991, (Adjunct); PhD, 1985, University of California (Berkeley); experimental condensed-matter physics, surface and interface physics.

Palczewski, Krzysztof \* 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Parson, William W. \* 1971, (Adjunct); PhD, 1965, Case Western Reserve University; spectroscopic and computational studies of energy capture and electron transfer in photosynthesis.

Pocker, Yeshayau \* 1961, (Emeritus); PhD, 1953, University College, London (UK); DSc, 1960, University of London (UK); organic reaction mechanisms, chemical and enzymatic catalysis, metalloenzymes, Alzheimer proteins.

Rabinovitch, B. Seymour \* 1948, (Emeritus); PhD, 1942, McGill University (Canada); chemical dynamics, energy relaxation, properties of silver surfaces.

Raucher, Stanley \* 1975; PhD, 1973, University of Minnesota; new methods in synthetic organic chemistry, total synthesis of natural products.

Reid, Brian R. \* 1980; PhD, 1965, University of California (Berkeley); biophysical chemistry.

Reinhardt, William P. \* 1991; PhD, 1968, Harvard University; theoretical chemistry, atomic physics, applications to computational thermodynamics, quantum fluids

Robinson, Bruce H. \* 1980; PhD, 1975, Vanderbilt University; magnetic resonance, molecular dynamics, polymer dynamics, nonlinear response theory.

Ruzicka, Jaromir \* 1984; PhD, 1963, Technical University of Prague (Czech); analysis via flow injection for research in biotechnology and industrial applications.

Schubert, Wolfgang M. \* 1947, (Emeritus); PhD, 1947, University of Minnesota; mechanism/steric course of organic reactions, substituent and solvent effects, acid-base catalysis.

Schurr, J. Michael \* 1966; PhD, 1965, University of California (Berkeley); dynamics, structures, and energetics of linear and supercoiled DNAs; laser optical and NMR methods.

Slutsky, Leon J. \* 1961; PhD, 1957, Massachusetts Institute of Technology; lattice dynamics, kinetics of conformational change, physical absorption.

Stuve, Eric M. \* 1985, (Adjunct); MS, 1979, PhD, 1983, Stanford University; electrochemical surface science, fuel cell engineering.

Trager, William F. \* 1972, (Adjunct); PhD, 1965, University of Washington; medicinal chemistry, bioanalytical chemistry drug metabolism.

Turecek, Frantisek \* 1990; PhD, 1977, Charles University (Czechoslovakia); mass spectrometry of transient intermediates, organometallics and enzyme reactions.

Vandenbosch, Robert \* 1963, (Emeritus); PhD, 1957, University of California (Berkeley); nuclear fission and nuclear reaction mechanisms, atomic and molecular clusters, C60.

Yager, Paul \* 1987, (Adjunct); PhD, 1980, University of Oregon; physical chemistry and applications of biomembranes.

Zoller, William H. \* 1984; PhD, 1969, Massachusetts Institute of Technology; analytical, environmental, and nuclear chemistry.

### Associate Professors

Crittenden, Alden L. \* 1947, (Emeritus); PhD, 1947, University of Illinois; mass spectra, solid electrode polarography.

Goldberg, Karen 1995; PhD, 1988, University of California (Berkeley); synthetic and mechanistic organometallic chemistry.

Kahr, Bart E. \* 1997; PhD, 1988, Princeton University; mechanisms of crystal growth, structures of disordered and mixed crystals, crystal optics.

Kovacs, Julia A. \* 1988; PhD, 1986, Harvard University; synthesis, structure, and reactivity of biologically relevant transition-metal complexes.

Lybrand, Terry Paul \* 1990, (Adjunct); PhD, 1984, University of California (San Francisco); molecular modeling, computer simulation of biomacromolecules, development of simulation analysis.

Macklin, John W. \* 1968; PhD, 1969, Cornell University; spectrometric studies of electrode surface adsorbates, condensed phase materials and solutions.

Reid, Philip J. 1995; PhD, 1992, University of California (Berkeley); chemical reaction dynamics in solution.

Sasaki, Tomikazu \* 1989; PhD, 1985, Kyoto University (Japan); design and synthesis of functional proteins and protein mimetics.

Stenkamp, Ronald E. \* 1978, (Adjunct); PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, blood clotting proteins, streptavidin.

Synovec, Robert E. \* 1986; PhD, 1986, Iowa State University; chemical analysis by high speed gas chromatography, liquid chromatography, surface tension.

Woodman, Darrell J. \* 1965; PhD, 1965, Harvard University; peptide synthesis, heterocyclic compounds, chemistry of ketoketenimines, computers in education.

### Assistant Professors

Beeson, Craig C. \* 1996; PhD, 1993, University of California (Irvine); chemistry and biochemistry of the immune system.

Prezhdo, Oleg \* 1998; PhD, 1997, University of Texas (Austin); excitation dynamics of condensed-phase chemical systems.

Sigurdsson, Snorri Th. \* 1996, (Research); , PhD, 1993, University of Washington; nucleic acids chemistry, RNA catalysts (ribozymes), RNA structure and function.

Simon, Julian A. \* 1996, (Affiliate); PhD, 1991, Columbia University; identification and characterization of new anticancer agents.

Xia, Younan \* 1997; PhD, 1996, Harvard University; materials chemistry and nanotechnology.

### Senior Lecturers

Nyasulu, Frazier W. 1991; PhD, 1985, University of Salford (UK); chemical education, electroanalytical chemistry, electro depositions.

Selfe, Sara 1983; PhD, 1983, University of Washington; chemical education, retention of underrepresented minorities and women in science and mathematics.

Wiegand, Deborah H. 1990; PhD, 1990, Northern Illinois University; chemical education, electrochemistry on liquid/liquid interfaces.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CHEM 410 Radiochemistry Laboratory (2) NW** Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiation, radiochemical and tracer techniques. Prerequisite: either 1.7 in CHEM 155, 1.7 in both CHEM 160 and CHEM 161, or 1.7 in CHEM 162; recommended: CHEM 418. Offered: alternate years.

**CHEM 414 Chemistry of the Main Group Elements (3) NW** The elements and their compounds in relation to the periodic system. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 452 or CHEM 457, either CHEM 453 or CHEM 455. Offered: alternate years.

**CHEM 415 The Chemical Bond (3) NW** Nature of the chemical bond. Simple bonding theories, molecular orbital methods, symmetry, and group theory. Includes computer exercises in which students perform ab initio calculations. Prerequisite: either CHEM 453 or CHEM 455. Offered: W.

**CHEM 416 Transition Metals (3) NW** Survey of selected key topics in the chemistry of the transition metals, including emphasis on the structure, bonding, and reactivity of major classes of compounds. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 453 or CHEM 455 which may be taken concurrently. Offered: A.

**CHEM 417 Organometallic Chemistry (3) NW** Chemistry of the metal-carbon bond for both main group and transition metals. Structure and reactivity with applications to organic synthesis and catalysis. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: W.

**CHEM 418 Nuclear Chemistry (3) NW** Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, stellar nucleosynthesis, applications of radioactivity. Prerequisite: either CHEM 452 or CHEM 455. Offered: alternate years.

**CHEM 419 Bioinorganic Chemistry (3) NW** Description of transition metal-containing systems found in biology. Structural and electronic properties and reactivity of metalloproteins, metalloenzymes, and metallocofactors. Methods used to probe and model metal sites by spectroscopic and synthetic techniques. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: Sp.

**CHEM 426 Instrumental Analysis (3) NW** Introduction to modern instrumental methods of chemical analysis, including chromatography, optical and mass spectroscopy, electrochemistry and flow injection analysis. Basic concepts of transducers, spectrometers, mass analysis, separation sciences, and computerized data acquisition and reduction. Includes laboratory. Prerequisite: CHEM 321. Offered: Sp.

**CHEM 427 Principles of Modern Wet Analysis (3) NW** Sampling and sample dissolution, multiple chemical equilibria, pH and electrochemical measurement, reagent-based kinetic enzyme assays and immunoassays. Principles of process, environmental, clinical, and biotechnological assays. Separations and flow injection. Prerequisite: either CHEM 223, CHEM 237, or CHEM 335; CHEM 321.

**CHEM 429 Chemical Separation Techniques (3) NW** Introduction to modern separation techniques such as gas chromatography, high-performance liquid chromatography, electrophoresis, and field flow fractionation. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either CHEM 241, CHEM 321, or CHEM 346. Offered: W.

**CHEM 433 Theoretical Organic Chemistry—Predictions and Experimental Tests (3) NW** Molecular orbital theory in organic chemistry. Woodward-Hoffmann rules, aromaticity, concerted reactions, photochemical transformations, and reactions of electron-deficient species. Prerequisite: either CHEM 239 or CHEM 337. Offered: alternate years.

**CHEM 435 Introductory Biophysical Chemistry (3) NW** Survey of the statics and dynamics of biophysical and biochemical processes. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 452 or CHEM 455, either of which may be taken concurrently; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; W.

**CHEM 436 Bioorganic Chemistry—Enzymes and Natural Products (3) NW** Enzyme chemistry and inhibition, including modes of biological catalysis, stereochemistry, enzyme characterization and kinetics, and design and principles of enzyme inhibitors. Also major classes of natural products, their chemistry, biological activity, biosynthesis, physiological role, and ecological significance. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; Sp.

**CHEM 437 Organic and Bioorganic Chemistry of Nucleic Acids in Proteins (3) NW** Chemistry of DNA, RNA, peptides, and proteins. Solid phase chemical synthesis. Manual and automated sequencing. Conformational analysis. Peptide mimetics and protein design. Interaction of DNA with drugs and toxins. Triple helices and antisense oligonucleotides. Prerequisite: either CHEM 239 or CHEM 337.

**CHEM 452 Physical Chemistry for Biochemists I (3) NW** General equilibrium thermodynamics emphasizing biochemical applications: ligand binding, biological oxidation-reduction reactions, membranes, active transport, colligative properties, and surface tension. No more than the number of credits indicated can be counted toward graduation from the following course groups: 355, 452 (4 credits); 452, 456 (3 credits). Prerequisite: either CHEM 155, CHEM 160, or CHEM 162; either MATH 125, MATH 128, or MATH 134; either PHYS 115 or PHYS 122. Offered: AW.

**CHEM 453 Physical Chemistry for Biochemists II (3) NW** Continuation of 452. Includes transport properties, enzyme kinetics, introduction to quantum mechanics, spectroscopy, and classical statistical mechanics. Prerequisite: either CHEM 452 or CHEM 456; either MATH 126, MATH 129, or MATH 135; either PHYS 116 or PHYS 123. Recommended: MATH 307; MATH 308. Offered: WSp.

**CHEM 455 Physical Chemistry (3) NW** Introduction to quantum chemistry and spectroscopy. Theory of quantum mechanics presented at an elementary level and applied to the electronic structure of atoms and molecules and to molecular spectra. Prerequisite: either CHEM 155, CHEM 160, or CHEM 162; either MATH 126, MATH 129, or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: ASpS.

**CHEM 456 Physical Chemistry (3) NW** Chemical thermodynamics. Laws of thermodynamics presented with applications to phase equilibria, chemical equilibria, and solutions. No more than the number of credits indicated can be counted toward graduation from the following course groups: 452, 456 (3 credits). Prerequisite: either CHEM 155, CHEM 160, or CHEM 162; either MATH 126, MATH 129, or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307. Offered: WS.

**CHEM 457 Physical Chemistry (3) NW** Introduction to statistical mechanics, kinetic theory, and chemical kinetics. Prerequisite: CHEM 455; either CHEM E 326 which may be taken concurrently or CHEM 456. Offered: WSp.

**CHEM 458 Global Atmospheric Chemistry (4) NW** Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with ATM S 458; A.

**CHEM 460 Spectroscopic Molecular Identification (3) NW** Basic theory of spectral techniques—infrared and ultraviolet/visible spectroscopy, NMR, and mass spectrometry—with emphasis on spectral interpretation skills needed for the elucidation of structure, conformation, and dynamics in organic and biological chemistry. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: CHEM 455. Offered: A.

**CHEM 461 Physical Chemistry Laboratory (2-3) NW** Physical measurements in chemistry. Vacuum techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisite: either CHEM 155, CHEM 161, CHEM 162, or CHEM E 436; either CHEM 453, CHEM 457, or both CHEM 452 and CHEM 455; either PHYS 117 or PHYS 131; recommended: PHYS 132; PHYS 133. Offered: AWSpS.

**CHEM 462 Techniques of Synthetic Organic Chemistry (2-3) NW** Laboratory techniques of synthetic organic chemistry. Vacuum distillation, multi-step synthesis, air sensitive reagents, photochemistry, chromatography, and separation techniques. Prerequisite: either CHEM 242 or CHEM 347; CHEM 460 which may be taken concurrently. Offered: A.

**CHEM 463 Spectroscopic Techniques for Structural Identification (2) NW** Laboratory techniques of spectroscopic analysis for structural determination using UV, IR, NMR, mass spectroscopy. Prerequisite: CHEM 460. Offered: W.

**CHEM 464 Computers in Data Acquisition and Analysis (3) NW** Introduction to use of the computer in the chemistry laboratory. Principles of microcomputers and their use for such problems as data acquisition, noise reduction, and instrument control. Prerequisite: either CHEM 453 or CHEM 455; MATH 136, or both MATH 307 and MATH 308. Offered: Sp.

**CHEM 465 Computations in Chemistry (3) NW** Computer calculations on color graphics workstations applied to problems in chemistry. Numerical methods and algorithms for calculating classical dynamics, quantum wavefunctions, wavepacket propagation, chemical kinetics. Use of computer programs for calculating electronic wavefunctions, molecular conformations, simulations of liquids and solids. Prerequisite: either CHEM 453 or CHEM 457 which may be taken concurrently. Offered: W.

**CHEM 471 Physical Chemistry of Macromolecules (3) NW** Classical hydrodynamic methods, and modern optical correlation and pulse techniques for studying dynamical motions and conformations of macromolecules, especially biopolymers, in solution. Cooperative thermal transitions, optical properties, and polyelectrolyte effects. Prerequisite: either CHEM 452 or CHEM 456; either CHEM 453 or CHEM 457. Offered: alternate years; W.

**CHEM 473 Workshop in the Teaching of Chemistry (\* max. 15) NW** Individual or group study project on the improvement of instruction in chemistry for K-6 teachers. Credit/no credit only. Prerequisite: either CHEM 120, CHEM 140, CHEM 142, or CHEM 145. Offered: S.

**CHEM 475 Honors Physical Chemistry (3) NW** Introduction to quantum chemistry, spectroscopy. Theory of quantum mechanics applied more rigorously than in CHEM 455. Application of quantum mechanics to electronic structure of atoms and molecules. Computer software used to solve problems. Prerequisite: either CHEM 155, CHEM 160, or CHEM 162; either MATH 126, MATH 129, or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: A.

**CHEM 476 Honors Physical Chemistry (3) NW** For chemistry and biochemistry majors and otherwise qualified students. Chemical Thermodynamics. Similar in scope to CHEM 456 with the study of more complicated systems. Emphasis on using computer software to solve problems. Prerequisite: CHEM 475. Offered: W.

**CHEM 477 Honors Physical Chemistry (3) NW** For chemistry and biochemistry majors or otherwise qualified students. Statistical mechanics, kinetic theory, and chemical kinetics including statistical interpretations of kinetics and transport phenomena. Prerequisite: CHEM 475; either CHEM E 426, which may be taken concurrently or CHEM 476. Offered: Sp.

**CHEM 496 Research Seminar for Undergraduates (1, max. 2) NW** Formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Prerequisite: BIOC 396 or CHEM 396. Offered: jointly with BIOC 496Sp.

**CHEM 498 Teaching Chemistry (3) NW** Training in teaching chemistry laboratory and quiz sections. For chemistry and biochemistry majors, especially those planning graduate work or secondary education. Covers teaching strategies, student diversity, learning styles, grading, and interaction with students and faculty. Credit/no credit only. Offered: A.

**CHEM 499 Undergraduate Research and Report Writing (\* max. 12)** Research in chemistry and/or study in the chemical literature. Credit/no credit only. Offered: AWSpS.

### Courses for Graduates Only

**CHEM 501 Readings in Chemistry (1, max. 9)** Individual meetings with faculty to discuss readings (journal articles, book chapters, proceedings) in the chemical sciences. Credit/no credit only. Offered: AWSpS.

**CHEM 502 Practical NMR Methods for Biological and Organic Structure Elucidation (4)** Theory of NMR (rotating frame formalism, multi-pulse experiments, relaxation phenomena, 2D experiments) as applied to structural and dynamic problems in organic and biological chemistry. Provides basis for experiment selection and spectrum interpretation. A more advanced treatment of NMR than 460. Prerequisite: CHEM 224, CHEM 239, or CHEM 337; recommended: CHEM 460 or equivalent, CHEM 435 or CHEM 455. Offered: W.

**CHEM 508 Advanced Inorganic Chemistry (3, max. 9)** Discussion of selected applications of physical techniques to the study of inorganic molecules. Topics include group theory, magnetic resonance spectroscopy (NMR and ESR), vibrational spectroscopy (IR and Raman), electronic spectroscopy, magnetism, and electrochemistry. Offered: A.

**CHEM 510 Current Problems in Inorganic Chemistry (1-3, max. 12)** Primarily for doctoral candidates in inorganic chemistry. Current topics (e.g., bioinorganic, advanced organometallic, materials and solid state, advanced inorganic spectroscopy). See department for instructor and topics during any particular quarter. Offered: Sp.

**CHEM 520 Current Problems in Analytical Chemistry (1-3, max. 12)** Primarily for doctoral candidates in analytical chemistry. Current topics (e.g., flow injection analysis, mass spectrometry, and advanced radiochemistry). See department for instructor and topics during any particular quarter. Offered: AW.

**CHEM 522 Atomic and Molecular Analytical Spectroscopy (3)** Quantitative analysis of atomic and molecular species, using all forms of electromagnetic radiation, electrons, and gaseous ions. Offered: alternate years.

**CHEM 523 Geochemical Cycles (4)** Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523 and ATM S 508.

**CHEM 526 Chemometrics (3, max. 9)** Mathematical and statistical methods for experimental design, calibration, signal resolution, and instrument control and optimization. Offered: alternate years.

**CHEM 530 Advanced Organic Chemistry (3)** Fundamental aspects of organic structures and transformations. Structure and basicity of carbanions, substitution reactions, elimination reactions, nucleophilic addition and addition/elimination reactions, condensation reactions, structure and rearrangements of carbocations, electrophilic addition, electrophilic substitutions, neighboring group effects. Prerequisite: CHEM 337. Offered: A.

**CHEM 531 Advanced Organic Chemistry (3)** Synthetic organic chemistry. Discussion of practical methods for the synthesis of complex organic molecules with an emphasis on strategy and the control of stereochemistry. Prerequisite: CHEM 530. Offered: W.

**CHEM 532 Advanced Organic Chemistry (3)** Chemical Biology. Application of chemical methods to the study of biological processes that occur in cells. Prerequisite: CHEM 530 and CHEM 531. Offered: Sp.

**CHEM 540 Current Problems in Organic Chemistry (1-3, max. 12)** Primarily for doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See department for instructor and topic during any particular quarter.

**CHEM 550 Introduction to Quantum Chemistry (3)** Origins and basic postulates of quantum mechanics, solutions to single-particle problems, angular momentum and hydrogenic wave functions, matrix methods, perturbation theory, variational methods. Prerequisite: CHEM 455. Offered: A.

**CHEM 551 Introduction to Quantum Chemistry (3)** Electronic structure of many-electron atoms and molecules, vibration and rotation levels of molecules, effects of particle exchange, angular momentum and group theory, spectroscopic selection rules. Prerequisite: CHEM 550. Offered: W.

**CHEM 552 Statistical Mechanics (3)** General theorems of statistical mechanics, relation of the equilibrium theory to classical thermodynamics, quantum statistics, theory of imperfect gases, lattice statistics and simple cooperative phenomena, lattice dynamics and theory of solids, liquids, solutions, and polymers, time-dependent phenomena and mechanisms of interaction. Prerequisite: CHEM 455 and CHEM 456 (concurrent registration permitted) or equivalent. Offered: Sp.

**CHEM 553 Statistical Mechanics (3)** General theorems of statistical mechanics, relation of the equilibrium theory to classical thermodynamics, quantum statistics, theory of imperfect gases, lattice statistics and simple cooperative phenomena, lattice dynamics and theory of solids, liquids, solutions, and polymers, time-dependent phenomena and mechanisms of interaction. Prerequisite: CHEM 552. Offered: A.

**CHEM 560 Current Problems in Physical Chemistry (1-3, max. 12)** Primarily for doctoral candidates in physical chemistry. A discussion of topics selected from active research fields. See department for instructor and the topic during any particular quarter.

**CHEM 561 Macromolecules (3, max. 9)** Physical chemistry of macromolecules and biopolymers. Topics include solution thermodynamics, hydrodynamic properties, molecular weight distributions, optical and electro-optic techniques, chain configuration statistics, cooperative phenomena, theory of rubber elasticity, and polyelectrolytes. Offered: alternate years.

**CHEM 575 Molecular Modeling Methods (4)** Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with BIOEN 575.

**CHEM 580 Topics in Chemistry (1, max. 3)** General topics of interest relating to chemistry. Credit/no credit only.

**CHEM 581 Topics in Inorganic Chemistry (3, max. 18)** Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

**CHEM 582 Topics in Analytical Chemistry (3, max. 18)** Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

**CHEM 583 Topics in Organic Chemistry (3, max. 18)** Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

**CHEM 585 Topics in Physical Chemistry (3, max. 18)** Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

**CHEM 590 Seminar in General Chemistry (1, max. 18)** For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

**CHEM 591 Seminar in Inorganic Chemistry (1, max. 18)** For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

**CHEM 592 Seminar in Analytical Chemistry (1, max. 18)** For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

**CHEM 593 Seminar in Organic Chemistry (1, max. 18)** For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

**CHEM 595 Seminar in Physical Chemistry (1, max. 18)** For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

**CHEM 600 Independent Study or Research (\*)** Prerequisite: permission of coordinator. Offered: AWSpS.

**CHEM 700 Master's Thesis (\*)** Prerequisite: permission of coordinator. Offered: AWSpS.

**CHEM 800 Doctoral Dissertation (\*)** Prerequisite: permission of coordinator. Offered: AWSpS.

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## Chicano Studies

See American Ethnic Studies.

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## China Studies

See International Studies.

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## Classics

218 Denny

 *General Catalog Web page:*  
[www.washington.edu/students/genccat/academic/Classics.html](http://www.washington.edu/students/genccat/academic/Classics.html)

 *Department Web page:*  
[depts.washington.edu/clasdept/](http://depts.washington.edu/clasdept/)

Classics embraces the ancient Greek and Roman civilizations from prehistoric times to the Middle Ages. The department is concerned with the Greek and Latin languages and their literatures, including poetry, drama, history, philosophy, rhetoric, and political theory, as well as with classical art and archaeology.

*Classical Seminar in Rome:* During spring quarter, the department offers instruction in classics for advanced undergraduate majors and graduate students at the University of Washington Rome Center, located in the Palazzo Pio on the Campo de' Fiori.

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## Graduate Program

Graduate Program Coordinator  
218 Denny, Box 353110  
(206) 543-2266  
[clasdept@u.washington.edu](mailto:clasdept@u.washington.edu)

The Department of Classics offers programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The M.A. degree may be in Greek, Latin, or Classics (a combination of Greek and Latin). The Ph.D. degree requires both Greek and Latin.

The program of formal instruction has been designed to ensure comprehensive and thorough training in the basic disciplines needed for teaching and research. The department offers courses in the major writers and periods of literature, philosophy, and history, in classical art and archaeology, and in Greek and Latin linguistics. The courses in Greek and Latin literature include many works on the Ph.D.-degree reading list. Seminars introduce research techniques through the

study of more specialized topics, which vary from quarter to quarter. Students may include in their programs courses and seminars given by other departments in such subjects as ancient philosophy, ancient and medieval history, comparative literature, and linguistics. A brochure, *The Graduate Program in Classics*, available from the department, gives additional information.

The Suzzallo Library has an extensive classics collection. The department's seminar room in Denny Hall, which is available to graduate students for their study and research, contains an excellent noncirculating library with such reference works as Pauly-Wissowa, *L'Année Philologique*, the *Thesaurus Linguae Latinae*, the *Müller Handbuch* series, the Teubner and Oxford texts, commentaries on the classical authors, standard collections of inscriptions and fragments, and a number of important serials. The department also possesses an Ibycus scholarly computer and a license for the *Thesaurus Linguae Graecae*, *Thesaurus Linguae Latinae*, *Perseus*, and other databases.

Applicants for admission to the M.A. program should present an undergraduate major or its equivalent in Greek, Latin, or Classics. Prospective aspirants for the Ph.D. degree should have had two years of upper-division study in both languages, but may be admitted with less preparation in one language if their preparation in the other language is exceptionally strong. Admission to the Ph.D. program may be granted after completion of the requirements for the M.A. degree.

The M.A. degree requires a minimum of 27 credits in courses or seminars in Greek or Latin or both, and in related subjects approved by the department; a reading knowledge of French, German, or Italian; either an acceptable thesis or 9 additional credits in approved graduate courses and seminars and a research paper.

The Doctor of Philosophy degree requires a minimum of 72 credits in courses or seminars in Greek, Latin, and related subjects approved by the department; a reading knowledge of German and either French or Italian; Greek and Latin prose composition; translation examinations on Greek and Latin; examinations in two special authors and one field of classical studies; an oral General Examination; dissertation; and Final Examination. Graduate students must have teaching experience before completing requirements for their terminal degree.

A number of teaching assistantships are available. Assistants teach sections of elementary Latin and Greek, a course in Latin and Greek derivatives, hold discussion sections in classical literature in translation, or assist faculty members with other courses. The teaching load is four to six hours a week throughout the academic year.

## Faculty

### Chair

Stephen E. Hinds

### Professors

Bliquez, Lawrence J. \* 1969; PhD, 1968, Stanford University; Greek oratory, Greek historiography and historians, Greek and Roman medicine.

Clauss, James J. \* 1984; PhD, 1983, University of California (Berkeley); Latin poetry and prose, Hellenistic literature, Latin literature of the Empire.

Halleran, Michael R. \* 1983; PhD, 1981, Harvard University; Greek literature, especially tragedy; Greek intellectual history.

Harmon, Daniel P. \* 1973; PhD, 1968, Northwestern University; Greek and Roman religion, Latin poetry, archaic Rome, classical linguistics.

Hinds, Stephen E. \* 1992; PhD, 1985, St Johns College (UK); Latin poetry, literary criticism and theory.

MacKay, Pierre A. \* 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post-classical and Byzantine Greek literature, numismatics.

McDiarmid, John B. \* 1949, (Emeritus); PhD, 1940, Johns Hopkins University; Greek literature and philology.

Pascal, Paul \* 1953, (Emeritus); PhD, 1953, University of North Carolina; Latin literature and paleography, medieval Latin.

### Associate Professors

Blondell, Ruby \* 1985; PhD, 1984, University of California (Berkeley); Greek and Roman philosophy and literature.

Connors, Catherine M. \* 1990; PhD, 1989, University of Michigan; Roman epic, ancient novel, women in Greek and Roman antiquity.

Gowing, Alain M. \* 1988; PhD, 1988, Bryn Mawr College; Latin and Greek historiography, Latin literature of the Empire.

Langdon, Merle K. \* 1976; PhD, 1972, University of Pennsylvania; Greek archaeology, epigraphy, topography, and history.

### Assistant Professors

Connolly, Joy P. \* 1997; PhD, 1997, University of Pennsylvania; ancient rhetoric, feminist theory, imperial literature.

Lape, Susan \* 1998; PhD, 1998, Princeton University; political theory, Hellenistic history, drama, cultural studies.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Classical Archaeology

**CL AR 442 Greek Painting (3) VLPA** *Langdon* Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with ART H 442.

**CL AR 446 Greek Architecture (3) VLPA** *Langdon* Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ARCH 454/ART H 446.

**CL AR 448 The Archaeology of Italy (3) VLPA** *Harmon* Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with ART H 448.

### Courses for Graduates Only

**CL AR 541 Seminar in Greek and Roman Art (3) VLPA** *Langdon* In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with ART H 541.

## Classical Linguistics

### Courses for Graduates Only

**CL LI 501 Comparative Phonology of Greek and Latin (5)** *Harmon* Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

**CL LI 506 Italic Dialects (5)** *Harmon* Principal remains of the non-Latin languages and dialects of ancient Italy.

### Classics Courses in English

**CLAS 424 The Epic Tradition (5) VLPA** *Clauss, Halleran, MacKay* Ancient and medieval epic and heroic poetry of Europe in English: the *Iliad*, *Odyssey*, and *Aeneid*; the *Roland* or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies according to instructor's preference. Offered: jointly with C LIT 424.

**CLAS 427 Greek and Roman Tragedy in English (5) VLPA** *Halleran, Lape* Study of the development of Greek and Roman tragedy, with extensive readings in representative plays of Aeschylus, Sophocles, Euripides, and Seneca.

**CLAS 428 Greek and Roman Comedy in English (3) VLPA** *Lape* Readings from the comedies of Aristophanes, Plautus, and Terence.

**CLAS 430 Greek and Roman Mythology (3/5) VLPA** *Clauss, Connors, Gowing, Halleran, Hinds* Principal myths found in classical and later literature. Offered: AWSp.

**CLAS 432 Classical Mythology in Film (3/5) VLPA** *Clauss* Comparison and discussion of classical myths and modern films inspired by them. Promotes access to the reading of classical mythology. Analyzes significant differences between ancient literary and modern cinematographic representations of the myth.

**CLAS 435 The Ancient Novel (3) VLPA** *Connolly, Connors, Lape* Reading and discussion of the principal Greek and Roman novels, the earliest European prose fiction, with attention to earlier literature and to imperial culture.

**CLAS 445 Greek and Roman Religion (3) VLPA/I&S** *Harmon, Langdon* Religion in the social life of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Many lectures illustrated by slides. Recommended: RELIG 201. Offered: jointly with RELIG 445.

**CLAS 496 Special Topics (2-5, max. 15) VLPA** Offered occasionally by visitors or resident faculty.

**CLAS 520 Seminar (5, max. 45)** Advanced comparative work on Greek and Latin materials studied in both original languages.

**CLAS 700 Master's Thesis (\*)**

**CLAS 800 Doctoral Dissertation (\*)**

### Greek

**GREEK 413 The Pre-Socratic Philosophers (3) VLPA** *Blondell*

**GREEK 414 Plato (3) VLPA** *Blondell, Lape, MacKay*

**GREEK 415 Aristotle (3) VLPA** *Blondell, Lape, MacKay*

**GREEK 422 Herodotus and the Persian Wars (3) VLPA** *Bliquez, Langdon, MacKay*

**GREEK 424 Thucydides and the Peloponnesian War (3) VLPA** *Bliquez, Langdon, Lape*

**GREEK 426 Attic Orators (3) VLPA** *Bliquez, Langdon, Lape, MacKay*

**GREEK 442 Greek Drama (3) VLPA** *Halleran*

**GREEK 443 Greek Drama (3) VLPA** *Halleran*  
Offered: alternate years.

**GREEK 444 Greek Drama (3) VLPA** *Halleran*

**GREEK 449 Greek Epic (3) VLPA** *Halleran, MacKay*

**GREEK 451 Lyric Poetry (3) VLPA** *Blondell, Halleran*

**GREEK 453 Pindar: The Epinician Odes (3) VLPA** *Halleran*

**GREEK 461 Early Greek Literature (3-5, max. 15) VLPA** Readings and discussion of selected authors of the early Greek period.

**GREEK 463 Hellenistic Greek Literature (3-5, max. 15) VLPA** *Clauss* Readings and discussion of selected authors of the Hellenistic Age.

**GREEK 490 Supervised Study (\* max. 18)** Special work in literary and philosophical texts for graduates and undergraduates.

### Courses for Graduates Only

**GREEK 500 Grammar and Composition (5) VLPA** *Bliquez, Blondell, MacKay* Translation of passages from English to Greek for the purpose of acquiring advanced knowledge of the grammar and the style of the classical tongue.

**GREEK 501 Homer (5)** *Halleran* Readings from the *Iliad* or the *Odyssey*.

**GREEK 503 Aristophanes (5)** *Bliquez, Lape* Select comedies.

**GREEK 512 Greek Tragedy (5, max. 10)** *Halleran* Aeschylus, Sophocles, and/or Euripides.

**GREEK 515 Greek Epigraphy (5)** *Langdon, Lape* Selected inscriptions from various Greek states and sanctuaries and evidence they provide for religious and social practices, literature, and political history. Classification and editing of inscriptions, and epigraphical techniques.

**GREEK 520 Seminar (5, max. 45)** *Bliquez, Blondell, Clauss, Halleran, Harmon, Langdon, Lape, MacKay*

**GREEK 590 Supervised Study (\* max. 18)** Prerequisite: permission of graduate program coordinator.

**GREEK 600 Independent Study or Research (\*)**

### Latin

**LATIN 401 Medieval Latin Literature to 1200 (3) VLPA** *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

**LATIN 402 Later Medieval and Renaissance Latin Literature (3) VLPA** *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

**LATIN 412 Lucretius (3) VLPA** *Blondell, Clauss*

**LATIN 414 Seneca (3) VLPA** *Blondell, Connolly*

**LATIN 422 Livy (3) VLPA** *Clauss, Gowing*

**LATIN 423 Cicero and Sallust (3) VLPA** *Clauss, Connolly, Gowing*

**LATIN 424 Tacitus (3) VLPA** *Clauss, Gowing*

**LATIN 447 Roman Lyric (3) VLPA** *Clauss, Harmon*

**LATIN 449 Roman Elegy (3) VLPA** *Connolly, Harmon, Hinds*

**LATIN 451 Roman Satire (3) VLPA** *Connors*

**LATIN 457 Roman Drama (3) VLPA** *Connors*

**LATIN 458 Roman Epic (3) VLPA** *Clauss, Connors, Harmon, Hinds*

**LATIN 461 Latin Literature of the Republic (3-5, max. 15) VLPA** Readings and discussion of selected authors from the era of the Roman Republic.

**LATIN 462 Latin Literature of the Augustan Age (3-5, max. 15) VLPA** Readings and discussion of selected authors from the Augustan era.

**LATIN 463 Latin Literature of the Empire (3-5, max. 15) VLPA** Readings and discussion of selected authors from the Roman Empire.

**LATIN 465 Roman Topography and Monuments (5, max. 10) VLPA** *Clauss, Gowing, Harmon* Study of the material remains of ancient Rome from the archaic period through the imperial age. Reading of source materials and inscriptions in Latin. Conducted in Rome. Offered: Sp.

**LATIN 490 Supervised Study (\* max. 18)** Special work in literary and philosophical texts for graduates and undergraduates.

### Courses for Graduates Only

**LATIN 500 Grammar and Composition (5) VLPA** *Clauss, Gowing, Hinds* Translation of passages from English to Latin for the purpose of acquiring advanced knowledge of the grammar and style of the classical tongue.

**LATIN 501 Vergil (5)** *Clauss, Harmon, Hinds* The *Aeneid*.

**LATIN 502 Horace (5)** *Clauss, Harmon* *Odes* and/or *Epistles*.

**LATIN 503 Plautus and Terence: Early Republican Literature (5)** *Blondell, Connors*

**LATIN 506 Cicero (5)** *Gowing* Select speeches, with attention to rhetorical theory and/or letters.

**LATIN 508 Silver Latin Literature (5)** *Connolly, Connors, Hinds* Selections from Martial, Lucan, and Petronius.

**LATIN 510 Roman Historians (5, max. 10)** *Clauss, Gowing* Caesar, Livy, and/or Tacitus.

**LATIN 512 Augustan Poetry (5, max. 10)** *Clauss, Connolly, Connors, Harmon, Hinds* Vergil's *Eclogues* and *Georgics*, Roman elegiac poetry, and/or Ovid's *Metamorphoses* and *Amores*.

**LATIN 520 Seminar (5, max. 45)** *Blondell, Clauss, Connors, Gowing, Halleran, Harmon, Hinds*

**LATIN 565 Seminar in Rome (5, max. 10)** *Clauss, Gowing, Harmon* Study of selected topics and authors in Latin literature. Conducted in Rome.

**LATIN 590 Supervised Study (\* max. 18)** Prerequisite: permission of graduate program coordinator.

**LATIN 600 Independent Study or Research (\*)**

## Communications

102 Communications



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/communications.html](http://www.washington.edu/students/genocat/academic/communications.html)



Department Web page:  
[carmen.artsci.washington.edu/cmu/](http://carmen.artsci.washington.edu/cmu/)

## Graduate Program

Graduate Program Coordinator  
102E Communications, Box 353740  
(206) 543-7269  
[cmuinfo@u.washington.edu](mailto:cmuinfo@u.washington.edu)

The School of Communications offers programs leading to the degrees of Master of Arts, Doctor of Philosophy, and Master of Communications.

The Master of Arts degree program provides training in research and scholarship and can be either preparation for doctoral study or a terminal degree. A thesis is required.

The Doctor of Philosophy degree program is designed to develop conceptual and methodological capabilities in a substantive area of communication. Substantive scholarly interests represented in the School may be found in the faculty listing below. Doctoral students are expected to apply these capabilities as apprentice scholars in the teaching and research functions of the School.

The Master of Communications degree program offers the practicing professional communicator an opportunity to develop a substantive specialty in conjunction with the academic study of communication.

A foreign language, if appropriate to the student's program of study, may be required in the M.A. and Ph.D. programs.

### Special Requirements

Students are admitted to programs in the autumn quarter only. All foreign and Ph.D. students must attend full time. February 15 is the deadline for all applicants who wish to be considered for departmental teaching or research assistantships. All required application materials must be received by that date. For all others, the application deadline is April 1.

Applicants for all programs must submit official transcripts of all previous study, results of the Graduate Record Examination (from a test taken within the past five years), a letter of intent linking the applicant's research and vocational objectives to an available graduate program, three letters of recommendation and, where applicable, evidence of fluency in English. The minimum acceptable TOEFL score is 580. Elementary statistics is a prerequisite for the methods courses required of all M.A. and Ph.D. students, but can be taken once enrolled.

## Faculty

### Chair

Charles A. Giffard

### Professors

Baldasty, Gerald J. \* 1974; MA, 1974, University of Wisconsin; PhD, 1978, University of Washington; communications history, media and gender, race, government-press relations.

Bassett, Edward P. \* 1989, (Emeritus); PhD, 1967, University of Iowa; telecommunication technologies and information dissemination, public opinion, environment.

Bennett, W. Lance \* 1974; MPhil, 1973, PhD, 1974, Yale University; American politics, comparative politics, political communication, mass media, political culture.

Edelstein, Alex S. \* 1955, (Emeritus); PhD, 1958, University of Minnesota; comparative communication research, public opinion, propaganda, international communication.

Giffard, Charles A. \* 1978; PhD, 1968, University of Washington; international communication systems, news flow, editing and reporting.

Lang, Gladys Engel \* 1984, (Emeritus); PhD, 1954, University of Chicago; political effects of mass media, sociology of art, political movements and crowd behavior.

Lang, Kurt \* 1984, (Emeritus); PhD, 1953, University of Chicago; political and social effects of the media on mass communication.

Pember, Don R. \* 1969; PhD, 1969, University of Wisconsin; mass media law, First Amendment history.

Shadel, Willard F. 1963, (Emeritus); MA, 1953, University of Michigan; broadcasting.

Stamm, Keith R. \* 1973; PhD, 1968, University of Wisconsin; communities and newspapers, political communication, communication and environmental problems.

Stewart, John R. \* 1969, (Adjunct); PhD, 1970, University of Southern California; philosophy of qualitative research and interpersonal communication.

Whitehill-Ward, John \* 1975, (Adjunct); MS, 1974, Illinois Institute of Technology; graphic design.

Yerxa, Fendall Winston \* 1965, (Emeritus); BA, 1936, Hamilton College; editorial journalism.

### Associate Professors

Bowen, Lawrence \* 1973; PhD, 1974, University of Wisconsin; commercial communications, media research, consumer information-seeking and -processing behaviors.

Bowes, John E. \* 1974; PhD, 1971, Michigan State University; man-machine communication, public opinion, international communication.

Chan, Anthony B. \* 1990; PhD, 1980, York University (Canada); Pacific rim communication systems, Canadian studies, China studies, Asian cinema.

Cranston, Patricia \* 1954, (Emeritus); MA, 1954, University of Texas (Austin); broadcast journalism, history, writing and production of docudramas.

Fearn-Banks, Kathleen A. 1990; MS, 1965, University of California (Los Angeles); crisis communications, history.

Jackson, Kenneth M. \* 1974, (Emeritus); PhD, 1970, University of Washington; institutional communications, media research, mass media and public policy, cultural communications.

Kielbowicz, Richard B. \* 1984; PhD, 1984, University of Minnesota; communication history/law, impact of technology on press and society, Canadian media.

Manusov, Valerie L. \* 1993, (Adjunct); PhD, 1989, University of Southern California; the interplay between communication behaviors and cognitions in interpersonal interactions.

Parks, Malcolm R. \* 1978, (Adjunct); PhD, 1976, Michigan State University; communication theory, interpersonal communication, research methods.

Rivenburgh, Nancy \* 1989; MS, 1982, Boston University; PhD, 1991, University of Washington; international communications, the media, intercultural relations and identity, international news.

Samuelson, Merrill \* 1962, (Emeritus); PhD, 1960, Stanford University; research methods, processes of reading, patterns in reader selection of new stories.

Simpson, Roger A. \* 1968; PhD, 1973, University of Washington; communication history, law of communication, media economics, editorial journalism.

Underwood, Douglas M. \* 1987; MA, 1974, Ohio State University; newspaper economics and management, press and politics, literature and journalism.

### Assistant Professors

Domke, David S. \* 1998; PhD, 1996, University of Minnesota; political cognition and elites' interaction with news media in social change.

Gastil, John W. \* 1997, (Adjunct); PhD, 1994, University of Wisconsin; political participation and deliberative forms of democratic decision making.

Kawamoto, Kevin Y. \* 1992; PhD, 1997, University of Washington; new media technologies, computer-mediated communication, computer crime.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CMU 400 History of Media Technology and Regulation (5) I&S** Impact of pre-1980s media technologies—printing, telecommunications, broadcasting, photography, and more—on individuals and institutions, especially government, business, and the mass media. How laws and policies have changed to govern new media forms.

**CMU 401 Telecommunication Policy and Convergent Media (5) I&S** Examines contemporary media and telecommunications industries since 1980 and their accelerating convergence. Attention given to economic, policy, and mass use issues. Review of major industry leaders, promising technologies, and new services. Social issues, government initiatives, and new legislation covered for both North American and international markets. Recommended: CMU 301.

**CMU 402 New Media as Virtual Communities (5) I&S** Technologically-mediated virtual communities considered through analysis of historical precedents and influences and through an exploration of the concept of community. Issues include a focus on social interactions; the social, political, economic, and technological contexts of virtual communities and the limits for their sustenance.

**CMU 403 Visual Literacy for Mass Communication (5) VLPA/I&S** Overview of how we apprehend, interpret, and understand visual content of traditional and evolving media forms. Emphasis on analytic methods, the aesthetic characteristics of media forms and how visuals are utilized and understood. Several perspectives considered, including historical, cultural, and critical. Recommended: CMU 300.

**CMU 404 New Media Criticism (5) VLPA/I&S** Examines critically the content of new media forms, contrasting them with traditional media. Stresses influences of social, economic, political, and technological forces on content and developing strategies for critical analysis.

**CMU 418 Issues in Mass Communication (5, max. 10) I&S** Topics vary.

**CMU 420 Comparative Media Systems (5) I&S** Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with SIS 419/POL S 468.

**CMU 421 Intercultural Communication (5) I&S** Investigates intercultural communication theory and its application for varying levels of human interaction: interpersonal, intergroup, and international. Recommended: SP CMU 384. Offered: jointly with SP CMU 478.

**CMU 422 Culture in International Communications Research (5) I&S** Examines research that deals with or compares data from different countries, cultures, or sub-cultures. For methodological issues and potential pitfalls due to variability in language, culture, geo-political orientation.

**CMU 423 Communications and Development (5) I&S** Examines both theory and application involved in using communications media as a tool for addressing political, social, and economic development issues. Utilizes a case study approach to look at localized applications of traditional and new communications tools in the pursuit of sustainable development.

**CMU 424 Canadian Media Systems (5) I&S** Structure and operation of Canadian mass media and telecommunications industries. Impact of United States media on Canadian culture. Role of domestic media in lives of minorities. Laws and policies governing communications. Offered: jointly with SISCA 424.

**CMU 425 European Media Systems (5) I&S** Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contemporary economic, social, political, and cultural milieu in which they operate. Offered: jointly with EURO 425.

**CMU 426 International Media Images (5) I&S** Ways in which media construct images of international peoples and events. Develops a set of critical tools for assessing media portrayals of international affairs and cultures.

**CMU 427 International Communications Law and Policy (5) I&S** Examines the international and comparative aspects of traditional press law, broadcast regulation, and telecommunications policy. Also examines freedom of the press in international reporting and the efforts of countries to limit foreign media influences within their borders.

**CMU 428 Asian Media Systems (5) I&S** Examines the media systems and communication policies in selected Asian countries. Identifies and analyzes the cultural, economic, historical, and political parameters that influence these media.

**CMU 429 Chinese Communications Systems (5) I&S** Analyzes the economic, historical, intellectual, social, and political foundations of communications systems in the region of Chinese Asia: China, Hong Kong, Singapore, and Taiwan. Focus primarily on print and broadcast journalism.

**CMU 430 Canadian Documentary Film Traditions (5) VLPA/I&S** History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with SISCA 430.

**CMU 440 Mass Media Law (5) I&S** Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to press coverage of the judicial system. Offered: jointly with POL S 461.

**CMU 441 United States Media History (5) I&S** Development of mass communication in the United States with emphasis on role of mass media in politics, economics, gender, and race.

**CMU 442 Public Opinion and the Mass Media: Processes and Methods (5) I&S** Considers public opinion in the United States as formed and affected by the mass media. Two themes stressed are historical and institutional use of public opinion and the political influence of the media. Attention given to public opinion measurement by the mass media, political candidates, and governmental institutions.

**CMU 444 Public Relations and Society (5) I&S** Overview of issues, strategies, and role of public relations professionals in various areas of American society, including media relations, government relations, community affairs, and consumer relations.

**CMU 445 Communication Theory (5) I&S** Centrality of communication and mass communication in behavior and society. Problems of, and questions about, communicative effectiveness. Theoretical principles applicable to communicative effectiveness. Communication's six contributions to effective behavior.

**CMU 451 Mass Media and Culture (5) VLPA/I&S** Empirical and theoretical framework for analyzing role of mass media in cultural change. Historical and contemporary cases consider ethnic, gender, class, and urban-rural conflicts and cultural roles of sports, elections, and national rituals. Focus on visual electronic media.

**CMU 452 Crisis Communications (5) I&S** Study of the functions of communications professionals during crises. Covers public relations professionals as advocates for organizations and companies in crisis and the news media as advocates of the mass public. Discussion of cases.

**CMU 460 Special Reporting Topics (4) I&S** Topics vary.

**CMU 461 Computer-Assisted Journalism (5) I&S** Introduction to computer-assisted journalism and other advanced reporting techniques. Includes hands-on electronic data analysis, exploration of on-line investigative tools, and the fashioning of electronically-retrieved information into news stories. Students examine ethical and technical challenges these tools present to media and society. Offered: AWSpS.

**CMU 462 Magazine Writing (5) I&S** Techniques of writing and marketing the full-length magazine article.

**CMU 463 Copy Editing and Design (5) I&S** Focus on editing copy for publications, covering grammar and style, production methods, news criteria, use of wire services, headlines, make-up and design, pagination, and online publication.

**CMU 465 Legislative Reporting (12) I&S** Coverage of Washington legislature for a daily newspaper. Selected students live in Olympia, interview legislative delegations, report on committee and floor sessions, and attend and report on gubernatorial and other press conferences.

**CMU 467 Journalism and Literature (5) VLPA/I&S** Explores the relationship between journalism and fiction writing in the United States. Examines writers who began their careers as journalists and forged a fiction-writing philosophy related to what they learned in journalism. Readings in fiction and journalism.

**CMU 468 Journalism Ethics (5) I&S** *Simpson* Provides a method and substantive context based on ethical theory, media history, and value systems analysis for analyzing and resolving dilemmas raised by journalistic practices.

**CMU 469 Intellectual Foundations of American Journalism (5) I&S** Examines the thinkers and philosophers who have influenced modern journalism. Studies the main ideas in the development of world thought and their impact on today's journalists. Explores the role communications systems have played in the creation of the world's cultures.

**CMU 470 Communications and the Environment (5) I&S** Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with ENVIR 470.

**CMU 476 Models and Theories in Speech Communication (5) I&S** Examination of selected theories and models of speech communication from the behavioral sciences, as well as of criteria applicable to them. Emphasis on the nature and function of theories and models, especially as these relate to basic principles underlying the scientific, interpretive, and critical study of speech communication phenomena. Offered: jointly with SP CMU 476.

**CMU 489 Ethnicity, Gender, and Media (5) I&S** Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with AES 489/WOMEN 489.

**CMU 498 Undergraduate Research in Communications (1-5, max. 10)** Research and individual study. Prerequisite: permission of instructor.

### Courses for Graduates Only

**CMU 500 Seminar in Theory of Communication (5)** Procedures for analyzing concepts and theoretical material to provide basis for one's research. How to make productive use of the literature. Procedures for theorizing about empirical findings and generalizations. Typologies, models, theories, laws, and working hypotheses. Prerequisite: permission of instructor.

**CMU 501 Development of Mass Communication (5)** Institutions of mass communication. Political and social roles.

**CMU 502 Mass Communication Process and Its Effects (5)** Analytic approach to conceptualization and research in the field since 1900.

**CMU 503 Research Methods (5)** Introduces and compares basic methods of research in communications.

**CMU 505 Communication and Politics (5)** Primary literature dealing with communication and American political behavior. Prerequisite: CMU 421.

**CMU 506 Critical Theory Applications in Mass Communication (5)** Major approaches in critical theory: Marxism, psychoanalysis, structuralism, and semiology. Synthesizes these approaches by viewing the "cultural studies" tradition. Assesses critical theory through empirical study of network television in the United States and the United Kingdom.

**CMU 507 Theories and Criticism of Communications Technologies (5)** Potential of the computer for use in behavioral science. Prerequisite: elementary programming, elementary statistics.

**CMU 508 Communication Research (5)** Basic methodological questions in communication research. Foundations in history and philosophy of science. Prerequisite: permission of instructor.

**CMU 511 Seminar in Communication Research (5, max. 15)** Individual research projects undertaken collectively within a given area of study, under direction of faculty member. Prerequisite: permission of instructor.

**CMU 512 Content Analysis (5)** Content analysis as a technique for making inferences from texts, including traditional, manual methods of analysis and computer coding.

**CMU 513 Survey Research Methods in Communications (5)** Faculty-directed project in survey research in which basic principles of survey design, including sampling, observation, measurement, data analysis, and data interpretation, are all applied. Prerequisite: elementary statistics or permission of instructor.

**CMU 515 Field Seminar in Communication Historiography (5)** Readings in communications history.

**CMU 516 Communications History Research Methods (5)** Development of the historical approach to communications research. Study of historical methods, bibliography, and criticism.

**CMU 517 Seminar in Communications History (5)** Topical research seminar in communications history.

**CMU 518 Seminar in Special Topics in Mass Communications (5, max. 10)**

**CMU 519 Seminar in Government and Mass Communications (5)** Legal problems of mass communication, institutions, and media operations.

**CMU 521 Seminar in Media Structure (5)** Directed independent research into structural aspects of American mass communications. Prerequisite: graduate standing.

**CMU 550 Advanced Communication Methods (1-3, max. 3)** Directed individual projects at a level acceptable by print or broadcast media. Advanced techniques of research and production analyzed and applied. Open only to students seeking the Master in Communications degree.

**CMU 571 Seminar in Regional Communication Systems (5)** Communication as a factor in economic, sociocultural, and political relations among nations of a region. Focus varies with specialization of instructor. Consult graduate secretary for details. Interdisciplinary focus.

**CMU 575 Seminar in International Communication Systems (5)** International communications and contemporary issues that affect the functioning of global communication systems. Interdisciplinary focus.

**CMU 577 Seminar in International Communications Research (5)** Methodological issues particular to the design or analysis of research that deals with data from different countries, cultures, or sub-cultures. Prerequisite: CMU 503 or equivalent.

**CMU 579 Seminar in Media and Foreign Policy (5)** The role of communications media in how nations interact. The media as source, actor, and catalyst in international affairs. Interdisciplinary focus.

**CMU 581 Seminar in Public Opinion and Communication (5)** Conceptual and methodological approaches to public opinion and communication as historical and behavioral phenomena. United States and international perspectives.

**CMU 586 Telecommunications Structure and Policies (5)** Structures and policies governing the functioning of communication technologies and data flow: United States and international perspectives. Interdisciplinary approach.

**CMU 589 Gender, Race, and Media (5)** Analysis of the role of media in construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with SP CMU 527 and WOMEN 589.

**CMU 593 Communications Colloquium: Current topics in Communications Research (1)** Presentations, mostly by faculty, on current research in the School of Communications. Students read articles and discuss them with authors. Offered: A.

**CMU 596 Effective Teaching of Communications (1, max. 3)** Development of effective teaching and professional skills. Emphasizes interactive teaching, leading discussions, lecturing, planning courses, evaluating resource materials, grading and evaluation, teaching philosophies, and effective classroom management and communications. Required of all graduate students who accept teaching assistantships. Credit/no credit only.

**CMU 597 Practicum in Communication Research (1-3, max. 6)** Student participation in faculty-directed research projects.

**CMU 598 Selected Readings (1-5, max. 10)** Prerequisite: permission of supervisory committee chairperson.

**CMU 600 Independent Study or Research (\*)** Prerequisite: permission of supervisory committee chairperson.

**CMU 700 Master's Thesis (\*)**

**CMU 800 Doctoral Dissertation (\*)**

## Comparative Literature

B531 Padelford



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/comp\\_lit.html](http://www.washington.edu/students/genocat/academic/comp_lit.html)



Department Web page:  
[depts.washington.edu/complit/](http://depts.washington.edu/complit/)

The comparative literature program works across national and regional boundaries to explore the relationships among multiple literary traditions. Comparative literature also focuses on the relationship of literature to the other arts and to fields of knowledge such as philosophy, anthropology, history, or cultural studies. Departmental courses deal with a range of topics in literary and cultural studies, from specific investigations of the patterns of influence and reception across national traditions to the general study of literary theory and criticism.

## Graduate Program

Graduate Program Coordinator  
B405 Padelford, Box 354330  
(206) 543-1488

The Department of Comparative Literature offers a program of study with faculty members from the following participating departments: Asian Languages and Literature, Classics, English, French and Italian Studies, Germanics, Near Eastern Languages and Civilization, Scandinavian Studies, Slavic Languages and Literatures, Spanish and Portuguese Studies, and Women Studies. Study in this program leads to a Master of Arts or Doctor of Philosophy degree. Students concentrate on graduate courses in comparative literature and specialize in two or more national literatures of major interest to them, studied in the original language. With permission, a Ph.D. aspirant may choose as a third area of study a field outside of literature (e.g., philosophy, religion, art, political thought). On receiving the advanced degree, the student is qualified for teaching and research in comparative and general literature, as well as the language and literature of specialization.

## Special Requirements

Applicants for the M.A. program are required to have a B.A. degree in comparative literature, English, or any foreign language, or an equivalent background; applicants for the Ph.D. program are required to have an M.A. in one of the above areas. M.A. students are required to demonstrate advanced competence in one foreign language and a basic reading knowledge of a second. Ph.D. students are required to demonstrate advanced competence in two foreign languages and a basic reading knowledge of a third. Advanced competence usually must be demonstrated upon admission to the program, and the reading knowledge is required before M.A. or Ph.D. examinations are administered. Language competence is evaluated by comparative literature faculty through departmental examinations or by evidence of completion of satisfactory advanced (400- or 500-level) course work in the language.

## Financial Aid

The department awards teaching assistantships annually to qualified students and provides up to five years of support toward the Ph.D. to students who enter with a B.A. Teaching assistantships can be assigned in Comparative Literature, Cinema Studies, or in any of the national literature departments affiliated with Comparative Literature.

## Ph.D. Program in Theory and Criticism

This is a joint-doctoral program with eleven participating doctoral programs (Asian Languages and Literature; Classics; Comparative Literature; Drama; English; Germanics; French and Italian Studies; Scandinavian Studies; Slavic Languages and Literatures; Spanish and Portuguese Studies; and Speech Communication). The program combines the doctoral program in one of the participating departments with an additional set of courses in theory and criticism into an integrated course of study. The purpose is to broaden a student's perspective and to increase awareness of different critical approaches to literature and related fields. Study in this program leads to a Ph.D. in the respective major field and theory and criticism.

## Admission Requirements

Applicants must have been admitted to one of the participating departments and have received a Master's degree in a subject represented by these departments or in a related field.

## Faculty

### Chair

Gary J. Handwerk

### Professors

Adams, Hazard S. \* 1977, (Emeritus); MA, 1949, PhD, 1953, University of Washington; romanticism, history of literary theory, Anglo-Irish literature.

Ammerlahn, Hellmut H. \* 1968; PhD, 1965, University of Texas (Austin); Goethe, eighteenth to early twentieth century, comparative literature.

Behler, Diana I. \* 1971; PhD, 1970, University of Washington; romanticism, nineteenth century, comparative literature.

Borch-Jacobsen, Mikkel \* 1986; Doct, 1981, University of Strasbourg (France); French twentieth-century literature, theory and criticism, psychoanalysis.

Brown, Jane K. \* 1988; PhD, 1971, Yale University; seventeenth, eighteenth and nineteenth century, comparative literature.

Brown, Marshall J. \* 1988; PhD, 1972, Yale University; eighteenth- and nineteenth-century literature, literary theory, music and literature.

Handwerk, Gary J. \* 1984; PhD, 1984, Brown University; literary theory, English and Irish nineteenth- and twentieth-century narrative.

Hruby, Antonin F. \* 1961, (Emeritus); PhD, 1946, Charles University (Czechoslovakia); medieval literature, comparative literature.

Jaeger, C. Stephen \* 1985; PhD, 1970, University of California (Berkeley); medieval German and Latin literature, medieval intellectual history, comparative literature.

Jones, Frank W. 1955, (Emeritus); PhD, 1941, University of Wisconsin; MA, 1955, Oxford University (UK); translation, twentieth-century theatre, poetry.

Leiner, Jacqueline \* 1963, (Emeritus); DresLe, 1969, University of Strasbourg (France); modern French literature.

Leiner, Wolfgang \* 1963, (Emeritus); PhD, 1955, University of Saarlandes (Germany); seventeenth- and twentieth-century French and Italian literature.

Modiano, Raimonda \* 1978; PhD, 1973, University of California (San Diego); romanticism.

Reinert, Otto \* 1956, (Emeritus); PhD, 1952, Yale University; comparative literature, eighteenth-century literature.

Rossel, Sven H. \* 1974, (Affiliate); PhD, 1968, University of Copenhagen (Denmark); Danish language and literature, medieval literature; European pre-romanticism, romanticism, symbolism.

Shapiro, Steven \* 1984; PhD, 1981, Yale University; literary theory, romantic poetry, post-modernism.

Staten, Henry J. \* 1998; PhD, 1978, University of Texas (Austin); 19th- and 20th-century British literature, history of criticism.

Steele, Cynthia 1986; PhD, 1980, University of California (San Diego); Latin American literature and cultural studies; Mexican literature, film, and photography.

Steele, Birgitta \* 1973, (Emeritus); PhD, 1960, University of Washington; Scandinavian drama and film, children's literature, comparative literature.

Vance, Eugene \* 1990; PhD, 1964, Cornell University; French, English, and Italian medieval literature; history of rhetoric; sacred art; age of Augustine.

Wang, Ching-Hsien \* 1971; PhD, 1971, University of California (Berkeley); Chinese poetry and comparative literature.

Webb, Eugene \* 1966; PhD, 1965, Columbia University; modern English, French, and German literature, comparative religion.

Ziadeh, Farhat J. \* 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

### Associate Professors

Collins, Douglas P. \* 1980; PhD, 1978, University of Missouri; twentieth-century French literature.

Dubois, Thomas A. \* 1990; PhD, 1990, University of Pennsylvania; Nordic folklore and mythology, Finnish, Sami.

Ellrich, Robert J. \* 1964, (Emeritus); PhD, 1960, Harvard University; eighteenth-century French literature.

Fisher, Alan S. \* 1968; PhD, 1969, University of California (Berkeley); Renaissance, seventeenth- and eighteenth-century literature, history of literary criticism.

Geist, Anthony L. \* 1987; PhD, 1978, University of California (Berkeley); twentieth-century Spanish literature: ideology and literary form, cultural studies, film.

Kapetanac, Breda \* 1975, (Emeritus); LittD, 1966, University of Zagreb (Yugoslavia); theory of comparative literature, 19th and 20th century European literature.

Konick, Willis \* 1950; PhD, 1964, University of Washington; Russian literature, nineteenth-century European literature, cinema studies.

McLean, Sammy K. \* 1967, (Emeritus); PhD, 1963, University of Michigan; Western drama, twentieth-century poetry, psychoanalysis and literature, literary translation, comparative literature.

Searle, Leroy F. \* 1977; MA, 1968, PhD, 1970, University of Iowa; twentieth-century literature, critical theory, American studies.

Sehmsdorf, Henning K. \* 1967, (Emeritus); PhD, 1968, University of Chicago; folklore and mythology, Norwegian language and literature, comparative literature.

Vaughan, Miceal F. \* 1973; PhD, 1973, MA, 1973, Cornell University; medieval language and literature.

Warne, Lars G. \* 1975, (Emeritus); PhD, 1974, University of California (Berkeley); Swedish language and literature, Scandinavian novel, comparative literature.

### Assistant Professors

Bean, Jennifer M. 1998; PhD, 1998, University of Texas (Austin); film studies, American literature and culture, studies in gender and sexuality.

Crnkovic, Gordana \* 1993, (Adjunct); MA, 1991, PhD, 1993, Stanford University; East European literature, film, former Yugoslavia, theory, American literature, comparative literature.

### Senior Lecturer

Dornbush, Jean M. \* 1980; PhD, 1976, Princeton University; medieval period, women and literature, writing in comparative literature.

### Lecturer

Popov, Nikolai B. \* 1985; PhD, 1994, University of Washington; modern Irish, Slavic, and German writers; literary theory and criticism; translation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**C LIT 400 Introduction to the Theory of Literature (5) VLPA** A selection of major theoretical statements in the history of literary theory, with emphasis on fundamental issues of lasting concern and with attention to some recent emphases.

**C LIT 410 Studies in Literary History (5, max. 15) VLPA** Introduction to a major figure or movement associated with the development of literary history. Through the study of one aspect of literary history students gain a thorough understanding of a particular point of view, while exploring the breadth of contemporary approaches to literature.

**C LIT 421 Studies in Connections: Literature and Other Disciplines (5, max. 15) VLPA** Examines the links between literature and other disciplines or art forms. Literature and history, literature and philosophy, literature and music, literature and the visual arts are all appropriate topics. Selection of focus depends on instructor.

**C LIT 422 Studies in Genre (5, max. 15) VLPA** Major genres of world literature: poetry, fiction, drama. Readings, in English from a wide selection of national literatures.

**C LIT 424 The Epic Tradition (5) VLPA** Ancient and medieval epic and heroic poetry of Europe in English: the Iliad, Odyssey, and Aeneid; the Roland or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments

and adaptations of the genre. Choice of reading material varies. Literary background recommended. Offered: jointly with CLAS 424.

**C LIT 430 Readings in Folklore (5) VLPA** Exploration of theoretical and methodological issues in folklore studies through independent reading of journal articles published during the last five years. Recommended: SCAND 230 or C LIT 230. Offered: jointly with SCAND 430.

**C LIT 431 The Northern European Ballad (5) VLPA** Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with SCAND 431.

**C LIT 460 Cinematic Production (5) VLPA** Examines fictional or documentary filmmaking/video production from concept, focus, treatment, research, data gathering, story development, scripting, narrating, performing and postproduction. Students will be exposed to a wide variety of filmmaking styles and will engage in a group creative project.

**C LIT 470 Senior Seminar in Folklore (5) VLPA** Investigates ethnic and several American folk traditions in the Pacific Northwest through extensive fieldwork. Recommended: SCAND 230 or C LIT 230. Offered: jointly with SCAND 470.

**C LIT 490 Directed Study or Research (1-5, max. 10)** Individual study of topics in comparative literature by arrangement with the instructor and the Comparative Literature office.

**C LIT 491 Internship (1-5, max. 5)** Supervised experience in local businesses and other agencies. Open to upper-division Comparative Literature and Cinema Studies majors. Recommended: 25 credits of C LIT courses.

**C LIT 493 Comparative Literature Honors Seminar (5, max. 15) VLPA** Special topics in comparative literature. Required of honors students in comparative literature.

**C LIT 495 Honors Thesis (5) VLPA** Preparation of an honors thesis under the direction and supervision of a faculty member.

**C LIT 496 Special Studies in Comparative Literature (3-5, max. 15) VLPA** Offered occasionally by visitors or resident faculty. Content varies.

**C LIT 497 Special Topics in Cinema Studies (3-5, max. 10) VLPA** Varying topics in Cinema Studies. Offered by resident or visiting faculty.

### Courses for Graduates Only

**C LIT 500 The Theory of Literature I: The Literary Text (5, max. 15)** An investigation into the nature of literature in contrast to other forms of writing and into essential features of literature such as genres, imagery, modes of communication, and structure.

**C LIT 501 The Theory of Literature II: History of Literature (5, max. 15)** An exploration of topics of literary history such as periods, traditions, the writing of literary history, and literary history in contrast to other histories.

**C LIT 502 The Theory of Literature III: Special Topics (5, max. 15)** Offerings vary to cover topics such as individual theorists, theoretical movements, or the intersection of literary theory with other disciplines or arts (psychoanalysis, structuralism, ethics, aesthetics).

**C LIT 507 History of Literary Criticism and Theory I (5, max. 15)** A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle,

Longinus, and the major medieval critics. Offered: jointly with ENGL 507.

**C LIT 508 History of Literary Criticism and Theory II (5, max. 15)** Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with ENGL 508.

**C LIT 509 History of Literary Criticism and Theory III (5, max. 15)** Literary Criticism and theory from Kant's Critique of Judgment to the mid-twentieth century and the work of Northrop Frey. Offered: jointly with ENGL 509.

**C LIT 510 History of Literary Criticism and Theory IV (5, max. 15)** A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with ENGL 510.

**C LIT 511 Literary Translation (5, max. 15)** Lectures on principles of translating literary works into readable English. Students present and comment on translations made by them and write seminar papers on problems of translation in theory and practice.

**C LIT 516 Colloquium in Criticism (5, max. 15)** Recent trends in literary criticism, taught by representatives from various literature departments, covering critical trends such as structuralism, poststructuralism, hermeneutics, reception theory, and sociological approaches to literature.

**C LIT 517 Colloquium in Folklore (5)** Recent trends in folklore studies, taught by representatives from various literature departments and disciplines in the social sciences.

**C LIT 518 Colloquium in Medieval Studies (5)** Salient literary aspects of the European Middle Ages, taught by representatives from various literature departments as well as from related disciplines, such as philosophy, art history, history, and comparative religion.

**C LIT 530 Cultural Criticism and Ideology Critique I (5, max. 15)** A study of the main attempts to come to an understanding of the humanities and the nature of historical interpretation in a cultural context.

**C LIT 535 Cultural Criticism and Ideology Critique II (5, max. 15)** Offerings vary to cover individual theorists and particular manifestations of cultural criticism and ideology critique.

**C LIT 545 Medieval Studies (3/5, max. 15)** Literature, intellectual history, and sociology of the Middle Ages, 500-1200. Topics may include "renaissance" of the twelfth century; the educational ideal; rise of universities; philosophical concepts.

**C LIT 546 Studies in Renaissance and Baroque (3-5, max. 10)** Aspects of Western European literature during the Renaissance and Baroque period. Course content varies.

**C LIT 547 Studies in Eighteenth-Century Literature (3-5, max. 10)** Examination of various trends in eighteenth-century literature including the Enlightenment, Rationalism, Pre-Romanticism, and Neo-Classicism. Course content varies with instructor.

**C LIT 548 Studies in Nineteenth-Century Literature (3-5, max. 10)** Examination of various trends in nineteenth century literature including Romanticism, Realism, Naturalism, and Symbolism.

**C LIT 549 Twentieth-Century Literature (3-5, max. 10)** Selected movements, schools, and trends of significance in twentieth-century literature of Europe and Americas. Symbolism, surrealism, dada, expressionism, neorealism, existentialism, nouveau roman, and absurd may be considered. Texts in English, French, and German figure most prominently, but Spanish, Italian, Russian, and other materials may be examined. Content and emphasis vary.

**C LIT 570 The Novel: Theory and Practice (3-5, max. 15)** Study of the novel as a genre, examining two or more novels of varying national literatures. Course content varies.

**C LIT 571 The Lyric: Theory and Practice (3-5, max. 15)** Examination of central questions in the study of the lyric genre as approached from an international point of view. Course content varies.

**C LIT 572 The Epic: Theory and Practice (3-5, max. 15)** Examination of epic literature as exemplified by selected works chosen from various cultures and periods (e.g., French and German medieval courtly epic, the epic in Renaissance and baroque Europe, traditions of the mock epic). Course content varies.

**C LIT 573 The Drama: Theory and Practice (3-5, max. 15)** Examination of various aspects of the drama as a major literary genre, as approached from international and multilingual points of view. Course content varies.

**C LIT 576 Seminar in East-West Literary Relations (3-5, max. 15)** Comparative investigation of literary topics requiring the study of both Eastern and Western documents. Explores parallels and contradictions between the two, in concepts, ideas, and specific topics. A comparative paper on a chosen topic with qualified conclusions is required. Emphasis varies. Prerequisite: at least one East Asian language.

**C LIT 596 Special Studies in Comparative Literature (3-5, max. 15)** Offered occasionally by visiting or resident faculty. Course content varies.

**C LIT 599 Special Seminar or Conference (1-9, max. 30)** Group seminars or individual conferences scheduled to meet special needs. Prerequisite: permission of graduate program adviser.

**C LIT 600 Independent Study or Research (\*)**

**C LIT 700 Master's Thesis (\*)**

**C LIT 800 Doctoral Dissertation (\*)**

## Comparative Religion

See International Studies.

## Dance

258 Meany



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/dance.html](http://www.washington.edu/students/genecat/academic/dance.html)



Department Web page:  
[depts.washington.edu/uwdance/](http://depts.washington.edu/uwdance/)

The dance program is designed as part of a liberal arts curriculum and provides students with a foundation for future advanced work in performance or movement-related work. It is recommended that majors supplement their dance studies with work that will provide a foundation for later specialization in dance ethnology, dance history and criticism, performance art, education, movement therapy, or movement science.

## Graduate Program

Graduate Program Coordinator  
259 Meany, Box 351150  
(206) 543-7536  
[uwdance@u.washington.edu](mailto:uwdance@u.washington.edu)

The dance program offers graduate study leading to a Master of Fine Arts degree. This program is designed specifically for professional dance performers who wish to prepare for a transition into college teaching careers. All graduate students will comprise the Chamber Dance Company and will hold teaching assistantships.

During the two-year program, a student must complete at least 72 credits, of which a minimum of 24 must be in an area of specialization (e.g., history, criticism, aesthetics, anatomy, ethnology).

### Admission Requirements

(1) A letter of application and résumé. (2) An undergraduate degree. (3) A minimum of eight years of professional performing experience. (4) The ability to demonstrate movement skills at a professional level in at least one idiom, and an in-person audition or performance video tape. (5) Three letters of reference verifying success and responsibility in the professional dance arena. Neither a foreign language nor the Graduate Record Examination is required. Application deadline is January 15.

### Financial Aid

All graduate students will receive tuition waivers and teaching assistant stipends.

## Faculty

### Acting Chair

Sarah N. Gates

### Professors

Boris, Ruthanna 1965, (Emeritus); DTR, 1946, American Dance Therapy Association; ballet technique and dance therapy.

Knapp, Joan S. \* 1981, (Emeritus); MA, 1964, University of Illinois; dance composition, improvisation, kinesesthetic training.

Wiley, Hannah \* 1984; MA, 1981, New York University; ballet, scientific aspects of dance, choreography, dance in higher education.

### Assistant Professors

Novak, Marsha 1990, (Affiliate); MS, 1982, University of Washington.

Parker, Rip \* 1989; MFA, 1992, University of Washington; artists and their work in relation to history, choreography.

Simpson, Maria Quinlan \* 1994; MFA, 1996, University of Washington; physical challenges of dance techniques, ballet, modern dance.

### Lecturer

Kitsos, Robert R. 1995; MFA, 1997, University of Washington; dance aesthetics, choreography, contemporary popular styles.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**DANCE 420 Dance Aesthetics (3) VLPA/I&S** Philosophical investigation of the expressive elements of dance. Reading and discussion of the concepts of beauty, style, and aesthetic theory.

**DANCE 490 Special Studies in Dance (1-3, max. 10) VLPA** Special studies designed to address contemporary and historical concerns in the field of dance.

**DANCE 493 Anatomy for Dance (3) VLPA/NW Simpson** Anatomy of the musculoskeletal system and its applications in dance movement. Offered: alternate years; W.

### Courses for Graduates Only

**DANCE 510 Chamber Dance Production (3, max. 9)** Dance production in the university environment. Publicity, programming, budgeting. Rehearsal, rehearsal direction, and performance of Chamber Dance Company repertoire. Credit/no credit only.

**DANCE 515 Dance Research Methods (3)** Seminar in problem identification and definition, theory development, research design, data analysis, and interpretation. Examples of various types of dance research.

**DANCE 520 Dance in Higher Education (3)** Readings, discussion, and observation of teaching methods. Students assist faculty in the instruction of lower-level classes. Selected anatomical, historical, and aesthetic concepts as they relate to dance pedagogy. Development of a personal teaching style appropriate for university-level dance courses.

**DANCE 521 Dance Administration (3)** Readings and discussion relating to dance administration in college and professional settings. Topics include: curricular development, academic advising, budgetary procedures, personnel issues, and problems related to dance as a performing art within the university structure.

**DANCE 530 Choreographer/Composer Collaboration (2) Rahn, Wiley** Collaboration between choreographers and composers: models and creative workshop projects, in preparation for a concert of collaborative work in DANCE 531. Offered: Sp.

**DANCE 531 Choreographer/Composer Collaborative Performance (3, max. 9) Kitsos, Rahn** Collaboration between choreographers and composers culminating in public performance. Offered: A.

**DANCE 544 Early Dance History (3)** Study of the evolution of dance from ritual to a theatre art form. Offered: alternate years.

**DANCE 545 Late Dance History (3)** Roots of contemporary dance as an art form and its relationship to developments in ballet since the turn of the century. Offered: alternate years.

**DANCE 590 Dance Teaching Methodologies (3) Wiley** Introduction to dance pedagogy with an emphasis on motor learning skills and biomechanics. Practical teaching experience. Offered: alternate years.

**DANCE 595 Master's Project (3)** Culminating project in area of interest developed in consultation with faculty advisor and supported by elective courses. Full faculty approval of proposed project by end of first year. Formal presentation, appropriate to project's content, presented to full faculty during second year. Projects may range from creative to scholarly.

**DANCE 600 Independent Study or Research (\* max. 10)**

## Drama

101 Hutchinson



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/drama.html](http://www.washington.edu/students/genocat/academic/drama.html)



Department Web page:  
[asc.arts.washington.edu/drama/](http://asc.arts.washington.edu/drama/)

At the graduate level the School of Drama provides advanced training which prepares theatre artists and scholars to make significant contributions in theatre performance, production, and scholarship.

The School uses four theatres including the Penthouse (the first theatre-in-the-round built in the United States), the thrust-stage Playhouse, the end-stage Studio Theatre, and the proscenium opera house in Meany Hall. Faculty- and student-directed plays drawn from the full range of world dramatic literature are produced throughout the year. The School also produces operas in association with the School of Music and utilizes two performance spaces in Hutchinson Hall for student work.

## Graduate Program

Graduate Program Coordinator  
101 Hutchinson, Box 353950  
(206) 543-5140  
[uwdrama@u.washington.edu](mailto:uwdrama@u.washington.edu)

The School of Drama offers programs of graduate study leading to the Master of Fine Arts and Doctor of Philosophy degrees. Areas of study for the M.F.A. degree are acting, stage direction, scene design, lighting design, and costume design. Most students should expect to spend three years to complete requirements for the M.F.A. degree.

The Ph.D. program provides students with training for scholarly research in theatre history, dramatic literature, theory, and criticism. Students are also encouraged to do interdisciplinary work with such allied programs as the Ph.D. program in critical theory.

## Admission Requirements

Students may enter only in autumn quarter. Since admission requirements vary for each of the graduate programs, applicants should contact the School for current application information and deadlines.

## Faculty

### Chair

Sarah N. Gates

### Professors

Clay, Jack D. \* 1986, (Emeritus); MA, 1956, Northwestern University; acting.

Comtois, Mary Elizabeth \* 1985, (Emeritus); PhD, 1970, University of Colorado (Boulder); playwrighting.

Crider, James R. \* 1952, (Emeritus); MA, 1950, University of Washington; costume design.

Dahlstrom, Robert A. \* 1971; MA, 1967, University of Illinois; scene design.

Gates, Sarah N. \* 1983; MA, 1974, University of California (Santa Barbara); MFA, 1983, Boston University; costume design.

Haaga, Agnes M. 1947, (Emeritus); MA, 1952, Northwestern University; child drama.

Hostetler, Paul S. \* 1974, (Emeritus); PhD, 1965, Louisiana State University; theatre history, directing.

Jones, Frank W. 1955, (Emeritus); PhD, 1941, University of Wisconsin; MA, 1955, Oxford University (UK); translation, twentieth-century theatre, poetry.

Jory, Jon 2000; directing, acting.

Loper, Robert B. \* 1967, (Emeritus); PhD, 1957, University of Birmingham (UK); acting, directing.

Pearson, Steven \* 1989; MFA, 1978, Carnegie Mellon University; professional actor training and modern Japanese theatrical techniques.

Siks, Geraldine B. 1949, (Emeritus); MA, 1940, Northwestern University; child drama.

Sydow, John D. 1970, (Emeritus); MFA, 1950, Yale University; directing.

Witham, Barry B. \* 1979; PhD, 1968, Ohio State University; modern theatre history.

### Associate Professors

Forrester, William D. \* 1972; MFA, 1969, Yale University; scene design.

Geiger, Mary L. \* 1993; MFA, 1985, Yale University; lighting design.

Hunt, Robyn \* 1988; MFA, 1978, University of California (San Diego); actor training, cross cultural performances, techniques, and script writing.

Jenkins, Mark F. \* 1989; the Stanislavsky approach to acting; acting, directing.

Valentinetti, Aurora 1943, (Emeritus); MA, 1949, University of Washington; puppetry.

### Assistant Professors

Curtis-Newton, Valerie \* 1993; MA, 1996, University of Washington; directing, acting, African-American theatre history.

Johnson, David Odai \* 1998; PhD, 1994, University of Texas (Austin); theatre history, especially English Restoration and 18th century.

Parker, Shanga Kyle Gerard \* 1994; MFA, 1991, University of California (San Diego); acting, directing, acting in verse.

Redd, Tina \* 1993; PhD, 1996, University of Washington; dramatic theory and criticism, emphasis on representations of race and gender.

Wolcott, John R. \* 1967, (Emeritus); PhD, 1967, Ohio State University; theatre history, computing in theatre research.

### Senior Lecturers

Harrison, Mark Jeffrey \* 1997; PhD, 1989, New York University; theatre and opera, directing.

Shahn, Judith \* 1990; BFA, 1977, Carnegie Mellon University; voice production for the theatre, dialects, Shakespeare and modern text.

### Lecturers

Burke, Thomas D. \* 1994; MFA, 1988, University of Washington; CAD, technical theatre.

Trout, Deborah L. \* 1994; MFA, 1994, Yale University; costume design.

### Artist in Residence

Madden, Catherine M. 1987; MA, 1977, Washington University; Alexander technique, acting.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### DRAMA 401- Drama Colloquium ([0-1]-, max. 4)

**VLPA** *Gates* A professional seminar featuring guest artists and career development specialists. Recommended for prospective Drama majors and required for admitted majors. Offered: AWSp.

### DRAMA 405 Computer Graphics Systems (3)

**VLPA** *Burke* Introduction to CAD applications in theatre design and technology. Focus on learning to use general purpose graphics software for CAD. Discussion of available hardware and software. Recommended: DRAMA 420. Offered: A.

### DRAMA 410 Advanced Theatre Technical Practices (2-4, max. 20) VLPA

Production-related apprenticeship, in the areas of scene construction, scene painting, costume, or lighting. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 418. Offered: AWSp.

### DRAMA 413 Advanced Scene Construction (3)

**VLPA** *Burke* Special problems in scene construction materials and rigging. Recommended: DRAMA 210; DRAMA 212; DRAMA 290; DRAMA 292; DRAMA 410; DRAMA 420.

### DRAMA 414 Scene Design (3, max. 6) VLPA

*Dahlstrom, Forrester* Theory, practice, and rendering of scene designs. Repeat of course involves intermediate designs and models. Recommended: ART H 203; DRAMA 210.

### DRAMA 415 Stage Costume Design (3, max. 6)

**VLPA** Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate designs. Recommended: ART H 203; DRAMA 211; DRAMA 416 if repeating.

### DRAMA 416 History of Western Dress (5) VLPA

*Gates* Survey history of Western dress. Emphasis on use of this information by theatrical costume designers. Includes development of costume for drama, ballet, and opera. Prerequisite: DRAMA 302.

### DRAMA 417 Stage Costume Patterning and Construction (3, max. 6) VLPA

Techniques of costume construction, including study of fabrics; emphasis on creating patterns by draping. Recommended: DRAMA 211; DRAMA 416.

### DRAMA 418 Scene Painting (3, max. 6) VLPA

*Forrester* Lecture-laboratory with focus on techniques and principles of scene painting. Uses of various media and types of equipment as applicable to varied scenic pieces. Recommended: DRAMA 210.

### DRAMA 419 Advanced Stage Lighting Design (3, max. 9) VLPA

*Geiger* Development of a working process consistent with current professional practice. Includes drafting, worksheets, study of color. Students read plays and develop analytical skills. Recommended: DRAMA 212.

**DRAMA 420 Design and Technical Drafting (2, max. 4) VLPA** Laboratory and project critique covering stage design graphics and technical drawing; specifically: designer's elevations, ground plans, sections, detail drawing, transposition of design drawing information to technical drawings. Recommended: DRAMA 210.

**DRAMA 421 Drawing and Rendering Techniques for the Theatre (2, max. 10) VLPA** *Forrester* Weekly figure-drawing laboratories with live model and weekly field trips for laboratories in drawing natural phenomena and architectural detail. Studies in historical drawing styles. Practice in use of several media and techniques of expression. Recommended: DRAMA 210; DRAMA 211.

**DRAMA 441 Beginning Playwriting (1-6, max. 12) VLPA** Writing exercises and drafts of a one-act play provide first experience in writing for performance. Readings of representative one-act plays introduce genres and writing styles. Recommended: DRAMA 253 or DRAMA 353; DRAMA 210; DRAMA 211; DRAMA 212.

**DRAMA 450 Rehearsal Laboratory (2, max. 6) VLPA** Acting in projects directed by graduate directing students. Recommended: DRAMA 253.

**DRAMA 454 Projects in Acting (3, max. 9) VLPA** Rehearsal and classroom performance of dramatic literature of various periods and styles.

**DRAMA 455 Alexander Technique (3) VLPA** *Madden Harrison* A practical and theoretical introduction to the Alexander Technique, a psychophysical re-education process developed by F. M. Alexander (1869-1955). Studio application of this work improves physical/vocal coordination, enhances creativity, and clarifies thinking.

**DRAMA 460 Introduction to Directing (3) VLPA** *Harrison* Student is introduced to the art of the stage director. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 253 or DRAMA 353; DRAMA 302. Offered: A.

**DRAMA 461 Elementary Directing (3) VLPA** *Harrison* Elementary study of the art of the stage director. Recommended: DRAMA 460.

**DRAMA 462 Elementary Directing (3) VLPA** *Harrison* Elementary study of the art of the stage director. Recommended: DRAMA 461.

**DRAMA 466 Stage Management (2-5, max. 15) VLPA** *Stewart* Study and practice of stage management. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 290; DRAMA 291; DRAMA 292.

**DRAMA 471 History of the English Restoration and 18th Century Theatre (5) VLPA** Examination of the relationship of the physical theatre and the productions that took place within that theatre. Particular emphasis on the text performed, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. Prerequisite: DRAMA 302.

**DRAMA 472 European and American Theatre, Revolution to Modernism (1780-1920) (5) VLPA** Survey of the drama, theatre, and theatre culture from the French Revolution into the beginnings of Modernism; social and political aspects of theatre, rise of Romanticism, melodrama, and variety entertainment through the 19th century to the artistic revolution that paved the way for modern theatre. Prerequisite: DRAMA 302.

**DRAMA 473 Modern European Theatre and Drama (5) VLPA** *Witham* Major movements and figures in contemporary European theatre from French absurdism to the present. Prerequisite: DRAMA 302.

**DRAMA 475 Modern English Theatre and Drama (5) VLPA** *Witham* Major trends in contemporary English theatre, post-World War II to the present. Performers, dramatists, and designers who shaped the course of the theatre following the "angry young rebellion" of the 1950s. Prerequisite: DRAMA 302.

**DRAMA 476 Modern American Theatre and Drama (5) VLPA** *Witham* Major forces shaping modern American theatre, Eugene O'Neill to the present. Leading dramatists, directors, and designers of the post-World War II era. Experiments such as the Federal Theatre Project, Group Theatre, and Living Theatre. Prerequisite: DRAMA 302.

**DRAMA 490 Special Studies in Acting-Directing (1-6, max. 12) VLPA**

**DRAMA 491 Special Studies in Design-Technical (1-6, max. 6) VLPA**

**DRAMA 494 Special Studies in Theatre and Drama (5, max. 20) VLPA** *Johnson, Redd, Witham* Topics in drama, history, and criticism. See Time Schedule for specific topic. Prerequisite: DRAMA 302.

**DRAMA 495 Practicum in Design and Technical Theatre (2-6, max. 15) VLPA** Emphasis on developing design and technology problem-solving skills through laboratory and project evaluation. Recommended: DRAMA 211, DRAMA 212, DRAMA 313.

**DRAMA 496 Stage Costume Problems (2, max. 8) VLPA** Specific research problems of stage costume design and execution: accessories, masks, wigs, fabric modification, millinery or construction analysis for specialized costumes. Topics vary. Recommended: DRAMA 211; DRAMA 416.

**DRAMA 498 Theatre Production (1-2, max. 9) VLPA** Laboratory course for students participating in School of Drama major productions. Credit/no credit only. Offered: AWSp.

**DRAMA 499 Undergraduate Research (1-5, max. 15)**

### Courses for Graduates Only

**DRAMA 502 Designer-Director Analysis (4)** *Dahlstrom, Harrison* Methods of examining plays to make the collaboration of director and designer productive. Attempts to create a structural whole from visual and verbal approaches to analysis. Prerequisite: graduate standing in drama.

**DRAMA 510 Design Studio (3, max. 18)** *Dahlstrom, Forrester, Gates, Geiger, Trout* Investigation of space, form, light, texture, and color in total theatre design, stressing mastery of the media, methods of presentation and execution, and intelligent and appropriate visual reaction to a dramatic text. Prerequisite: graduate standing in drama.

**DRAMA 512 Lighting Design Seminar (1/4, max. 18)** *Geiger* Forum for graduate lighting students to further explore the art of lighting design. Assignments include paper projects, School of Drama production, and field trips to local theatres. Prerequisite: graduate standing.

**DRAMA 514 Design and Technical Theatre Colloquium (2, max. 18)** Discussion of work in progress or completed in production, centering on the conceptual work of the designer/director on the production and the methods of execution in the shops and on stage. Offered: AWSp.

**DRAMA 518 Studies in Historic Design (3)** *Dahlstrom* Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods.

**DRAMA 519 Studies in Historic Design (3)** *Dahlstrom* Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods. Prerequisite: DRAMA 518, or permission of instructor.

**DRAMA 520 Advanced Theatre Practicum (1-5, max. 15)** Professional student internship with professional theatres: scenery, lighting, scene painting, costume, acting, directing, stage management, theatre management. Prerequisite: permission of instructor.

**DRAMA 551 Teaching of Acting (1-3, max. 3)** Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

**DRAMA 552 Teaching of Acting (1-3, max. 3)** Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

**DRAMA 553 Teaching of Acting (1-3, max. 3)** Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

**DRAMA 555 Studies in Acting (2-6, max. 18)** Individual or group work on special skills for the actor. Topics vary. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

**DRAMA 557 Studio I (12, max. 36)** *Hunt, Jenkins, Pearson, Shahn* Skill development in acting, voice, speech, and movement necessary for professional training in acting. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

**DRAMA 558 Studio II (12, max. 36)** *Hunt, Jenkins, Pearson, Shahn* Continuation of 557. Prerequisite: DRAMA 557 and completion of the first year of the Professional Actor Training program. Offered: AWSp.

**DRAMA 559 Studio III (6, max. 18)** *Hunt, Jenkins, Pearson, Shahn* Specialized and individualized work relating to the main curriculum of the third year of the Professional Actor Training Program. Prerequisite: DRAMA 558 and completion of the second year of the Professional Actor Training Program. Offered: AWSp.

**DRAMA 560 Managing the Rehearsal and Production Process (2)** Introduction to graduate-level directing. Play analysis, research, performance theory, and concept development as it relates to process-acting and rehearsal, design, staging techniques, and production management. Reading and writing assignments augmented by faculty and professional guests in performance, design, production, and dramaturgy.

**DRAMA 561 Directing Projects (2-3, max. 12)** *Harrison* Rehearsal techniques and staging skills in a variety of spatial configurations. One-act and full-length plays which follow a prescribed sequence. Prerequisite: graduate standing in the directing program.

**DRAMA 562 Performance Studio (1-3, max. 12)** Performance techniques in specialized areas of importance to the professional director, including stage combat, speech and dialect, mask, physical comedy, improvisation, and puppetry.

**DRAMA 563 Seminar in Directing (2, max. 18)** *Harrison* Seminar discussion of current productions; focused readings and discussion in specific areas of dramatic literature and problems related to stage direction. Prerequisite: graduate standing in drama and permission of instructor.

**DRAMA 564 Theatre Studies: History, Theory, Criticism (3, max. 15)** Special topics in history, theory, and criticism.

**DRAMA 565 Verse Workshop (4)** Techniques necessary to direct and perform plays of Shakespeare, Moliere, and other verse playwrights: scansion and imagery; period and style using verse text; crowd scenes, transformations of time and space, and other staging exercises; direction of scenes or acts from verse plays.

**DRAMA 566 Directing for the Camera (3)** Storyboarding, setting up camera shots, improvisation, and rehearsal techniques for directing actors on camera (both in studio and on location). Students direct one- and two-camera scenes; and write, direct, and edit a short screenplay.

**DRAMA 567 Acting Process (1-3, max. 12)** Development of acting skills necessary for the professional director. Emphasis on physical training, playing action, strong internal technique, imagination and clarity of expression.

**DRAMA 568 Writing for the Stage (3, max. 6)** Focus on adaptation for the stage of non-dramatic sources, such as literature, poetry, history, and contemporary events. Emphasis on structure, dialogue, dramatic action, rhythm, characterization. Writing exercises using fictive and non-fictive sources, biographical sources, and found objects.

**DRAMA 569 Directing/Teaching Apprenticeship (3)** Assisting faculty or professional guest director in production for the entire rehearsal period, or assisting faculty in performance training.

**DRAMA 571 Problems in Theatre History Research (5)** *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

**DRAMA 572 Problems in Theatre History Research (5)** *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

**DRAMA 573 Problems in Theatre History Research (5)** *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

**DRAMA 575 Seminar in Theatre History (5)** *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

**DRAMA 576 Seminar in Theatre History (5)** *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

**DRAMA 577 Seminar in Theatre History (5)** *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

**DRAMA 581 Analysis of Dramatic Texts (5)** *Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

**DRAMA 582 Analysis of Dramatic Texts (5)** *Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

**DRAMA 583 Analysis of Dramatic Texts (5)** *Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

**DRAMA 585 Seminar in Dramatic Theory (5)** *Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

**DRAMA 586 Seminar in Dramatic Theory (5)** *Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

**DRAMA 587 Seminar in Dramatic Theory (5)** *Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

**DRAMA 599 Advanced Studies in Theatre Arts (1-5, max. 10)** Independent projects or group study of specialized aspects of theatre arts. Prerequisite: permission of instructor.

**DRAMA 600 Independent Study or Research (\*)**

**DRAMA 700 Master's Thesis (\*)**

**DRAMA 800 Doctoral Dissertation (\*)**

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## Economics

302 Savery



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/economics.html](http://www.washington.edu/students/gencat/academic/economics.html)



Department Web page:  
[www.econ.washington.edu](http://www.econ.washington.edu)

The Department of Economics is concerned with the analysis of the ways in which societies organize the production of goods and services and the distribution of these among groups and individuals. Applied fields of study available to the student include money and banking, industrial organization, natural resource economics, labor economics, public finance, economic history, comparative systems and development, international trade, and econometrics.

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## Graduate Program

Graduate Program Coordinator  
304A Savery, Box 353330  
(206) 685-1384  
[econadv@u.washington.edu](mailto:econadv@u.washington.edu)

The department offers programs of study leading to the Master of Arts and the Doctor of Philosophy degrees. The academic programs in economics are designed to develop trained economists for careers in teaching, private industry, government, and international agencies. Frequent seminars led by U.S. and foreign visitors as well as by faculty and students are conducted as an integral element of the department's graduate program.

## Special Requirements

Applicants should have completed undergraduate training that includes courses in at least intermediate-level microeconomic and macroeconomic theory. In addition, applicants must have had at least one year of calculus, one term of linear algebra, and one term of statistics. A course in differential equations is strongly recommended. Additional work in calculus, matrix algebra, and probability and statistics is also strongly recommended. An undergraduate major in economics is not required for admission to the graduate program provided that the above prerequisites have been met. All applicants are required to take the General Test of the Graduate Record Examination (GRE) and are encouraged to take the Subject Test in Economics.

Graduate requirements for the M.A. degree include ECON 500, 501, 502, 503, 508, 580, 581, and 582. In addition to this core program, M.A. students must take at least seven elective courses in economics at the graduate level. At least three of these courses must be in applied areas, and at least two must be in the same area (the field of specialization). M.A. students also must complete 6 credits of a supervised internship. Well-prepared students should be able to complete the M.A. program in two years.

Graduate requirements for the Ph.D. degree include ECON 500, 501, 502, 503, 508, 509, 580, 581, and 582. Ph.D. students are required to pass core examinations in microeconomics and macroeconomics. In addition to this core program, Ph.D. students must take eight other elective field courses in economics at the graduate level. Each Ph.D. student must satisfy the requirements for two fields of specialization. The fields of specialization include advanced macroeconomic theory, advanced microeconomic theory, comparative systems and development, econometrics, finance, health economics, industrial organization, international economics, labor economics, natural resource economics, and public finance.

The doctoral dissertation is the final major requirement for the Ph.D. degree. Each Ph.D. student chooses a dissertation topic and a doctoral supervisory committee is appointed. After the dissertation topic has been developed, Ph.D. students take the General Examination, an oral defense of the dissertation proposal. When the dissertation is completed, Ph.D. students take the Final Examination, an oral defense of the completed dissertation. A foreign language is not required. The doctoral program is designed to be completed in four years, although most students take slightly longer.

## Financial Aid

The principal form of financial aid available to graduate students in economics is a teaching assistantship. A number of such assistantships are available to entering graduate students with promising academic records.

## Research and Computing Resources

The Institute for Economic Research houses a computer laboratory that provides hardware and software for economic modeling, economic estimation, word processing, and other faculty and graduate student research functions. Access is restricted to economics graduate students and faculty. In addition, the Center for Social Science Computation and Research (CSSCR) maintains an extensive library of computer software and data, and offers free consulting services to aid faculty and students with computing problems.

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## Faculty

### Chair

Richard Startz

### Professors

Barzel, Yoram \* 1961; MA, 1956, Hebrew University (Israel); PhD, 1961, University of Chicago; price theory, political economy, property rights.

Brown, Gardner \* 1965; PhD, 1964, University of California (Berkeley); resource and environmental economics.

Bruce, Neil \* 1990; PhD, 1975, University of Chicago; public finance (economics of the public sector), especially taxation.

Crutchfield, James A. \* 1960, (Emeritus); PhD, 1954, University of California (Berkeley); natural resources economics, policy and management, especially marine and environmental resources.

Deolalikar, Anil B. \* 1989; PhD, 1981, Stanford University; economic development, economics of human capital, economics of population, technology transfer.

Engel, Charles M. \* 1991; PhD, 1983, University of California (Berkeley); international monetary economics.

Halvorsen, Robert \* 1972; PhD, 1973, Harvard University; environmental and natural resource economics.

Hartman, Richard C. \* 1971; PhD, 1971, University of California (Berkeley); economic theory.

Lundberg, Shelly J. \* 1984; PhD, 1981, Northwestern University; labor economics.

Madden, Carolyn Watts \* 1984, (Adjunct); MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

Mah, Feng-Hwa \* 1961, (Emeritus); PhD, 1959, University of Michigan; Chinese economy and foreign trade.

McCaffree, Kenneth M. \* 1949, (Emeritus); PhD, 1950, University of Chicago; labor economics and the economics of medicine.

McGee, John S. \* 1966, (Emeritus); PhD, 1952, Vanderbilt University; industrial organization.

Morris, Morris D. 1949, (Emeritus); PhD, 1954, University of California (Berkeley); economic history and the economy of India.

Nelson, Charles R. \* 1975; PhD, 1969, University of Wisconsin; econometric analysis of time series data, financial markets, monetary economics.

North, Douglas C. 1950, (Emeritus); PhD, 1952, University of California (Berkeley); economic history.

Parks, Richard \* 1970; PhD, 1966, University of California (Berkeley); microeconomics, econometrics, finance.

Plotnick, Robert D. \* 1984, (Adjunct); MA, 1973, PhD, 1976, University of California (Berkeley); poverty, labor and social welfare policy, economic policy analysis.

Silberberg, Eugene \* 1967; PhD, 1964, Purdue University; microeconomics.

Startz, Richard \* 1984; PhD, 1978, Massachusetts Institute of Technology; macroeconomics, econometrics, economics of race, finance.

Thornton, Judith Ann \* 1961; PhD, 1960, Harvard University; transition economics, natural resources.

Turnovsky, Stephen J. \* 1987; PhD, 1968, Harvard University; macroeconomics and growth, international economics, theory of economic stabilization.

Wong, Kar-Yiu \* 1983; PhD, 1983, Columbia University; international trade and commercial policy.

### Associate Professors

Brock, Philip L. \* 1991; PhD, 1982, Stanford University; economic liberalization with emphasis on financial markets and capital accumulation.

Hadjimichalakis, Michael \* 1969; PhD, 1970, University of Rochester; monetary theory and policy, macroeconomics, growth, Federal Reserve.

Huppert, Daniel D. \* 1987, (Adjunct); PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Khalil, Fahad A. \* 1991; PhD, 1991, Virginia Polytechnic Institute and State University; industrial organization, theory of contracts.

Kochin, Levis A. \* 1972; PhD, 1975, University of Chicago; macroeconomics, industrial organization, financial economics.

Lawarree, Jacques P. \* 1990; PhD, 1990, University of California (Berkeley); industrial organization, contract theory, game theory.

Leffler, Keith B. \* 1978; PhD, 1977, University of California (Los Angeles); antitrust economics, industrial organization, contracts.

Thomas, Robert P. \* 1968; PhD, 1964, Northwestern University; economic history.

### Assistant Professors

Eicher, Theo S. \* 1994; MA, 1991, MPhil, 1993, PhD, 1994, Columbia University; international, development, and macroeconomics, with emphasis on economic growth.

Liu, Wen-Fang 1998; PhD, 1998, University of Chicago; macroeconomics theory.

Martin, Laurent 1998; PhD, 1999, University of Maryland; public economics, microeconomics.

Rose, Elaina 1993; PhD, 1993, University of Pennsylvania; labor, development, applied microeconomics.

Zivot, Eric W. \* 1993; PhD, 1992, Yale University; time series, econometrics, applied macroeconomics, empirical finance.

### Senior Lecturers

Heyne, Paul \* 1976; PhD, 1963, University of Chicago; evolution of economic theory and commercial society.

Salehi-Esfahani, Haideh 1990; PhD, 1985, University of Pennsylvania; international economics, economic development.

Turnovsky, Michelle H. L. 1987; MBA, 1965, Harvard University; PhD, 1978, Australian National University; international economics, economics of the European Union.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ECON 400 Advanced Topics in Microeconomics (5) NW** Application of calculus to microeconomics. Development of comparative statics used in production and consumption theory, including derivation of the Slutsky equation and duality results. Prerequisite: ECON 300; either MATH 124, MATH 127, MATH 134, or MATH 145; recommended: MATH 126.

**ECON 401 Advanced Topics in Macroeconomics (5) NW** Application of mathematics to macroeconomics. Possible topics include economic dynamics and growth, rational expectations, real business cycle models, and New Keynesian approach. Prerequisite: ECON 301; either MATH 126, MATH 129, or MATH 136.

**ECON 403 The Economics of Property Rights (5) I&S** Property rights as an economic concept. Delineation of rights as a subject of optimization. Formation of contracts to maximize the value of personal property. Formation of organizations to induce efficient use of resources and minimize losses to public domain. Prerequisite: ECON 300; recommended: two 400-level microeconomics classes.

**ECON 404 Industrial Organization and Price Analysis (5) I&S** Analysis of firm behavior in imperfectly competitive markets. Topics include monopoly, oligopoly, product differentiation, entry deterrence, and the role of asymmetric information. Game theoretic tools and empirical evidence used to analyze topics. Prerequisite: ECON 300.

**ECON 406 Undergraduate Seminar in Economics (5, max. 10) I&S** Provides undergraduate student an opportunity to apply the tools of economic analysis in a critical examination of theoretical and empirical work. A list of topics is available in the departmental office. Prerequisite: ECON 200.

**ECON 407 Development of Economic Thought (5) I&S** From the early modern period to the present. The main subjects treated are Adam Smith and the classical school, Karl Marx, the neoclassical reformulation and its critics, the impact of J. M. Keynes, and the evolution of economics in the twentieth century. Prerequisite: ECON 300.

**ECON 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S** Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with POL S 409.

**ECON 421 Money, Credit, and the Economy (5) I&S** Role of money and the banking system in the United States economy. Relation of money to inflation, interest rates, and business fluctuations. Monetary policy and Federal Reserve System. Prerequisite: ECON 301.

**ECON 422 Investment, Capital, and Finance (5) I&S** Intertemporal optimization: consumption and portfolio allocation decisions of households, investment and financing decisions of firms. Introduction to financial decisions under uncertainty. Portfolio theory, asset pricing, options, and futures. Financial market institutions and efficiency. Prerequisite: ECON 300; either ECON 311 or STAT 311.

**ECON 431 Government and Business (5) I&S** Economic effects of various governmental regulatory agencies and policies. Antitrust legislation as a means of promoting desired market performance. Observed economic effects of policies intended to regulate business practices, control prices, conserve resources, or promote competition. Prerequisite: ECON 300.

**ECON 435 Natural Resource Economics (5) I&S** Survey of the economics of renewable and nonrenewable resources including fisheries, forest, minerals, and fuels. Optimal trade-offs between benefits and costs of resource use, including trade-offs between current and future use. Effects of property rights on resource use. Prerequisite: ECON 300.

**ECON 436 Economics of the Environment (5) I&S** Microeconomic analysis of environmental regulation. The problem of social cost, policy instrument choice, enforcement of regulations, methods for damage assessment, and estimating benefits of environmental improvement. Prerequisite: ECON 300.

**ECON 437 Economics of Biological Resources (5) I&S** Application of economic concepts to biology and biological concepts to economics. Examination of theory of species maximization, parallels in behavior between humans and other biota, animal choices among alternative food sources, games animals play, evidence of risk aversion in animals. Prerequisite: ECON 300.

**ECON 443 Labor Market Analysis (5) I&S** Determinants of employment and incomes in the United States: analysis of individual and firm decisions and of equilibrium in the labor market. Topics include decisions to work and retire, education and occupation choices, compensation, discrimination, poverty, unemployment and unions. Examination of policy issues affecting the labor market. Prerequisite: ECON 300.

**ECON 444 Topics in Labor Market Analysis (5) I&S**

In-depth analysis of special topics in the operation of labor markets and public policies affecting incomes and employment. Course content varies by instructor. Prerequisite: ECON 300.

**ECON 447 Economics of Gender (5) I&S**

Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: ECON 300. Offered: jointly with WOMEN 447.

**ECON 448 Population and Development (5) I&S**

Survey of topics in population economics, including history of thought, demographic experience of currently developing countries, household production models, fertility demand, quantity-quality models of fertility, mortality, health and nutrition, migration, macroeconomic-demographic linkages. Prerequisite: ECON 300.

**ECON 450 Public Finance: Expenditure Policy (5) I&S**

Application of normative microeconomic theory to analysis of government expenditures. Rationale for government economic activity, collective choice, public goods, and externalities, income redistribution, public sector pricing, and specific expenditure programs. Prerequisite: ECON 300.

**ECON 451 Public Finance: Tax Policy (5) I&S**

Microeconomics of taxation: efficiency, incidence, effect on distribution of income, personal and corporate income taxes, sales and consumption taxes, taxation of property and estates. Prerequisite: ECON 300.

**ECON 454 Cost-Benefit Analysis (5) I&S**

Theory and practice of cost-benefit analysis of public sector projects and policies. Welfare criteria, investment criteria, shadow prices, social discount rate, marginal-willingness-to-pay for non-market goods, social risk, and special topics. Prerequisite: ECON 300.

**ECON 460 Economic History of Europe (5) I&S**

Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with HIST 481.

**ECON 462 Economic History of the United States to the Civil War (5) I&S**

Systematic study of the changing pre-Civil War economic conditions and the consequences of these changes for the American society. Prerequisite: ECON 201.

**ECON 463 Economic History of the United States From the Civil War to the Present (5) I&S**

Systematic study of the changing economic conditions since the Civil War and the consequences of these changes for the American society. Prerequisite: ECON 201.

**ECON 466 Economic History of China: 1840-1949 (5) I&S**

Study of the post-1840 Chinese economy, with a brief introduction to the socioeconomic background of the earlier period. Explanations of China's long economic stagnation, and analyses of the impact of external factors and the role of the government in China's economic development before 1949. Recommended: ECON 201.

**ECON 468 China's Economic Reforms-Integration Into World Economy (5) I&S**

Systematic survey of China's economic reforms since 1978, including China's increasing integration into the world economy. Prerequisite: ECON 201. Offered: jointly with SISEA 468.

**ECON 471 International Trade (5) I&S**

Theory of comparative advantage and different models of international trade. Trade and welfare. Factor mobility and trade flows. Economic integration. Theory and practice of commercial policy. Prerequisite: ECON 301.

**ECON 472 International Macroeconomics (5) I&S**

International monetary theory and open economy macroeconomics. Balance of payments and foreign exchange markets. Different exchange rate arrangements and their adjustment mechanisms. Money and international capital movements. Policy issues. The international monetary system. Prerequisite: ECON 301.

**ECON 473 Topics in International Trade (5) I&S**

Advanced theory of trade and analysis of government trade policies. International trade and factor mobility. Theory of commercial policy. Prerequisite: ECON 301; ECON 471.

**ECON 475 Economics of the European Union (5) I&S**

Analysis of economic issues relating to the European union. Explores the institutional aspects, the attempt to coordinate social and economic policies-welfare, employment, commercial, fiscal, and monetary-and the economic linkages between the European Union and the rest of the world. Prerequisite: ECON 301.

**ECON 481 Introduction to Mathematical Statistics (5) NW**

Probability, generating functions; the  $t$ -method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and 580.) Prerequisite: STAT/ECON 311; either MATH 129, MATH 136, or MATH 126 with either MATH 308 or MATH 309. Offered: jointly with STAT 481; A.

**ECON 482 Econometric Methods (5) NW**

Application of statistical modeling to empirical work in economics. A mixture of theory and applied computer work. Primary focus is regression analysis. Prerequisite: ECON 300; ECON/STAT 311.

**ECON 483 Applied Econometric Modeling (5) NW**

Provides undergraduates the opportunity to learn econometric model building for a particular problem while applying the theory learned in various courses to specific economic cases. Students estimate, test, and forecast economic models. Extensive use of the computer and econometric programs. Prerequisite: ECON 301; ECON/STAT 311.

**ECON 485 Game Theory with Applications to Economics (5) NW**

Introduction to the main concepts of game theory: strategy, solution concepts for games, strategic behavior, commitment, cooperation, and incentives. Application to economics oligopoly theory, bargaining theory, and contract theory. Prerequisite: either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145; recommended: ECON 300; ECON 404.

**ECON 490 Comparative Economic Systems (5) I&S**

Study of resource allocation, growth, and income distribution in capitalist, market socialist, and centrally planned economies. Prerequisite: ECON 301.

**ECON 491 Issues in Economic Development (5) I&S**

Examines factors contributing to the economic problems of developing countries and possible solutions. Theory and applications in economic development and international trade. Prerequisite: ECON 301.

**ECON 494 Economy of Japan (5) I&S**

Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with SISEA 494.

**ECON 495 Economic Transformation of Russia and Eastern Europe (5) I&S**

Analytical survey of the economic institutions and economic structures of the transforming socialist economies. Socialist resource allocation. Market institutions. Structural change and the sequencing of economic reform. Primary focus on Russia and Eastern Europe. Prerequisite: ECON 301.

**ECON 496 Honors Seminar (5) I&S**

Honors and other students in high standing have the opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply tools of economic analysis to selected topics in economic theory and current issues of national and international economic policy. For seniors only.

**ECON 497 Honors Directed Study (5)**

Students write their honors thesis on the topic chosen in the Honors Seminar working under the previously arranged supervision of an economics faculty adviser. Prerequisite: ECON 496

**ECON 499 Undergraduate Research (1-5, max. 10)**

May not be applied toward an advanced degree.

**Courses for Graduates Only****ECON 500 Microeconomic Analysis I (4)**

Duality and comparative statics analysis. Consumer and firm behavior. Uncertainty. Prerequisite: ECON 300.

**ECON 501 Microeconomic Analysis II (4)**

General equilibrium and welfare economics. Introduction to game theory. Prerequisite: ECON 500.

**ECON 502 Macroeconomic Analysis I (4)**

An introduction to advanced macroeconomics. Theories of income, employment, inflation, and growth. Prerequisite: ECON 300 and ECON 301.

**ECON 503 Macroeconomic Analysis II (4)**

Rational expectations in macroeconomic models. Dynamic optimizing models under uncertainty. Empirical examination of consumption, asset-pricing, and real business cycles.

**ECON 505 Microeconomic Theory: Problems and Applications (3)**

Seminar for graduate students who have completed the basic core sequence in price theory. Designed to extend the student's analytic and problem-solving abilities by working systematically through a programmed set of readings and problems. The material includes both formal analytical techniques and applications of economic theory. Prerequisite: ECON 501.

**ECON 507 History of Economic Thought (3)**

Classical and neoclassical economics with emphasis on alternative conceptions of the nature and significance of economic science.

**ECON 508 Microeconomic Analysis III (4)**

Information economics. Prerequisite: ECON 500, ECON 501.

**ECON 509 Macroeconomic Analysis III (4)**

Modern macroeconomic dynamics, presenting a range of approaches based on intertemporal optimization. Representative agent models with special emphasis on the analysis of government policy. More advanced discussion of economic growth. Prerequisite: ECON 502, ECON 503 or equivalent.

**ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12)**

Seminar in advanced microtheory. Selected topics of special interest and significance. Prerequisite: ECON 500, ECON 501.

**ECON 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12)**

Seminar in advanced macrotheory. Selected topics of special interest and significance.

**ECON 513 Mathematical Economics: Linear Analysis (3)** Theory and application of linear algebra and linear economic models. Prerequisite: ECON 300 and MATH 126 or equivalent.

**ECON 515 Special Topics in Mathematical Economics (3, max. 12)**

**ECON 516 Introduction to Noncooperative Game Theory (3)** Study of both pure game theory and its applications to such problems as oligopoly pricing, non-cooperative bargaining, entry deterrence, reputation phenomena. Focus on game theory as a modeling tool as opposed to a body of known results. Prerequisite: ECON 508.

**ECON 518 Contract Theory (3)** Basic contract theory models, including hidden action and hidden information models. Current developments in contract theory. Prerequisite: ECON 508 and ECON 516 or permission of instructor.

**ECON 520 The Economics of Property Rights (3)** Application of standard economic theory to analyze various forms of property rights as constraints on competition; the costs associated with delineation and enforcement of rights; the costs of negotiating and enforcing contracts for right transfers; resource allocation and income distribution implied by different property right and transaction cost constraints. Prerequisite: ECON 500 and ECON 501, or permission of instructor.

**ECON 523 Emergence of the State (3)** Using tools of property rights, industrial organization, and game theory, explores the emergence of the state. Specifies conditions conducive to constitutional rule. Analyzes circumstances amenable to state-promoted exchange as opposed to self-enforced agreements. Prerequisite: ECON 500 and ECON 501 or permission of instructor.

**ECON 530 Government Regulation of Business (3)** Public policy in the United States with respect to industrial organization and business conduct. Economic issues in antitrust policy emphasized. Prerequisite: ECON 500, ECON 501.

**ECON 531 Theory of Industrial Organization I (3)** Analysis of the monopolist's problem in different choice variables. Topics include the theory of the firm; pricing; choice of quality and advertising; price discrimination; and vertical control. Prerequisite: ECON 500, ECON 501.

**ECON 532 Theory of Industrial Organization II (3)** The application of game theory to problems of strategic behavior that arise in the study of imperfectly competitive markets. Topics include vertical integration, short- and long-run price competition, folk theorems, empirical tests of oligopoly pricing models, entry deterrence, research and development, and product differentiation. Prerequisite: ECON 500, ECON 501.

**ECON 535 Economics of Natural Resources I (3)** First half of integrated two-course sequence. Non-renewable resource extraction and exploration, including effects of market structure, uncertainty, and taxation. Externality theory and pollution-control policies. Prerequisite: ECON 500, ECON 501, or permission of instructor.

**ECON 536 Economics of Natural Resources II (3)** Second half of integrated two-course sequence. Renewable resources, including fisheries and forests. Valuation of environmental amenities. Prerequisite: ECON 535.

**ECON 537 Economic Aspects of Marine Policy I (3)** Development of pertinent economic concepts and their application to selected topics in marine policy decision making. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 537.

**ECON 538 Economic Aspects of Marine Policy II (3)** Development of pertinent economic concepts and their application to selected topics in marine policy. Prerequisite: ECON 537 or permission of instructor. Offered: jointly with SMA 538.

**ECON 539 Economics of Natural Resources Seminar III (3)** Selected advanced topics in the economics of natural resources and environmental regulation. Topics may include environmental regulation as a problem in optimal mechanism design, enforcement of regulations, regulatory regimes for common property resources, and the measurement of market power in nonrenewable resource industries. Prerequisite: ECON 536.

**ECON 541 Labor Economics (3)** Theoretical and empirical analysis of the labor market. The determinants of labor supply and demand, human capital investment, the pattern of compensation, employment contracts and incentives, unemployment and labor market dynamics.

**ECON 542 Labor Economics (3)** Theoretical and empirical analysis of the labor market. The determinants of labor supply and demand, human capital investment, the pattern of compensation, employment contracts and incentives, unemployment and labor market dynamics.

**ECON 543 Population Economics (3)** Economic determinants and consequences of population growth; emphasis on formal theoretical models and on empirical analysis. Introduction to: formal demography; welfare economics of population change, including analyses of population effects on consumption, savings, investment, and technical change; and determinants of mortality, fertility, and migration. Prerequisite: ECON 500, ECON 501, or permission of instructor.

**ECON 546 Health Economics (3)** Theoretical and empirical models of the demand for health and health care; supply of health care from physicians and hospitals; government programs that subsidize health care; occupational health; cost-benefit analyses of preventive health care and new medical technologies. Prerequisite: graduate-level microeconomics, HSERV 585, or permission of instructor.

**ECON 547 Health Policy Economics (3)** Selected topics in health economics, including risk and insurance, medical malpractice, the market for physician services, and industry regulation. Prerequisite: a course in intermediate microeconomics or permission of instructor. Offered: jointly with HSERV 587.

**ECON 550 Public Finance: Expenditure Policy (3)** Theory of public finance with emphasis on public expenditures. Social welfare maximization, public goods and externalities, decreasing cost industries, theory of collective choice, second-best analysis. Prerequisite: ECON 500, ECON 501, or permission of instructor.

**ECON 551 Public Finance: Tax Policy (3)** Theory of public finance with emphasis on taxation. Second-best analysis, optimal taxation, general equilibrium incidence analysis, issues in personal income taxation and corporate income taxation. Prerequisite: ECON 500, ECON 501, or permission of instructor.

**ECON 554 Cost-Benefit Analysis (3)** Covers the theoretical foundations of cost-benefit analysis using graduate microeconomics. Stresses both the conceptual and practical problems encountered in the subject. Emphasis on problem solving and term project. Prerequisite: ECON 500 and ECON 501.

**ECON 571 International Trade Theory (3)** Comparative advantage, resource allocation, income distribution, and foreign trade. Different theories of trade, with or without perfect competition and constant returns. International factor mobility. Prerequisite: ECON 500, ECON 501.

**ECON 572 International Financial and Monetary Economics (3)** Analysis of open economy macro models with emphasis on exchange rates and balance of payments determination. Prerequisite: ECON 502, ECON 503.

**ECON 573 International Commercial Policy (3)** Analysis of welfare aspects of international trade and factor mobility. Costs and benefits of protection; implications of different government policies. Import competition and response. Prerequisite: ECON 571 or permission of instructor.

**ECON 574 International Macroeconomics (3)** Surveys recent developments in international macroeconomics, placing particular emphasis on the dynamic aspects. One sector, multisector, and two-country international models discussed. Fiscal issues treated in depth. Stochastic aspects introduced and related to the literature on international real business cycles. Prerequisite: ECON 509 or equivalent.

**ECON 580 Econometrics I (4)** Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Students may receive credit for only one of MATH/STAT 390, ECON/STAT 481, and ECON 580.

**ECON 581 Econometrics II (4)** Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 580.

**ECON 582 Econometrics III (4)** Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 581.

**ECON 583 Econometric Theory I (3)** Estimation and testing in linear and nonlinear regression models. Asymptotic theory, bootstrapping. Theoretical developments are reinforced with a variety of empirical examples and applications. Prerequisite: ECON 580, ECON 581, ECON 582 or equivalent.

**ECON 584 Econometric Theory II (3)** Continuation of 583. Analysis of stationary and nonstationary, univariate, and multivariate time series models. Emphasis on empirical applications. Prerequisite: ECON 583.

**ECON 585 Applied Microeconomics (3)** Economic issues that arise in applied microeconomic research. Topics include the use of panel data and models with limited and qualitative dependent variables. Prerequisite: ECON 582 or equivalent.

**ECON 591 Theoretical Issues in Economic Development (3)** Analysis of issues in economic development with application to the less-developed countries of the world today. Prerequisite: ECON 500, ECON 501, or permission of instructor.

**ECON 592 Development Policy (3)** Theoretical and empirical analysis of macroeconomic policies pursued by developing countries. Topics include the determination of exchange rates and relative prices in small economies; the examination of government spending, taxation, banking, trade, and labor market policies; and the evaluation of market-oriented economic reform programs. Prerequisite: ECON 503; recommended: ECON 591.

**ECON 595 Analysis of the Transforming Socialist Economies (3)** Applications of economic analysis to the economic problems of transforming socialist economies. Economic institutions. The role of the state. Privatization and the behavior of decentralized organizations. Integration into the world market. Prerequisite: micro- and macroeconomic theory and permission of instructor.

**ECON 596 Research Practicum in Microeconomics (1, max. 6)** Provides opportunity to practice research and presentation skills in applied and theoretical microeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

**ECON 597 Research Practicum in Macroeconomics (1, max. 6)** Provides opportunity to practice research and presentation skills in applied and theoretical macroeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

**ECON 598 Research Practicum in Labor and Development (1, max. 6)** Provides opportunity to practice research and presentation skills in economics of labor and development. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

**ECON 599 Research Issues in Demography and Population Studies (1-2, max. 7)** Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Offered: AWP.

**ECON 600 Independent Study or Research (\*)** Credit/no credit only.

**ECON 601 Internship (3-9, max. 9)** Credit/no credit only.

**ECON 602 Teaching Introductory Economics (1)** Examines problems encountered in preparing and presenting courses in introductory economics. Credit/no credit only.

**ECON 800 Doctoral Dissertation (\*)** Credit/no credit only.

## English

A101 Padelford



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/english.html](http://www.washington.edu/students/genecat/academic/english.html)



Department Web page:  
[depts.washington.edu/engl/](http://depts.washington.edu/engl/)

## Graduate Program

Graduate Program Coordinator  
A105 Padelford, Box 354330  
(206) 543-6077  
[englgrad@u.washington.edu](mailto:englgrad@u.washington.edu)

The Department of English offers a complete program of graduate courses and seminars designed to provide aspirants for the Master of Arts and Doctor of Philosophy degrees with a knowledge of English literature and language and the necessary scholarship for training in literary criticism and theory, literary history, and English-language study, including rhetoric and composition. It is possible to pursue a literature- or language-study emphasis. The Master of Fine Arts program in creative writing emphasizes projects in imaginative writing in fiction and poetry, supported by courses in criticism and literary periods and types. A special degree program, the Master of Arts for Teach-

ers, is offered for English teachers in secondary schools and community colleges and a Master of Arts for Teachers (English as a Second Language) for those interested in teaching English to speakers of other languages. The graduate program permits completion of master's degree requirements in four to six quarters and doctoral degree requirements in five years (including the master's degree). In a typical five-year program, a student is encouraged to complete course requirements (75 credits) during the first three years, the General Examination for the doctorate in the fourth year, and the dissertation in the fifth year. Those admitted with a master's degree from another university can complete the doctorate in four years: two years of course work, exam year, and dissertation year.

### Financial Aid

The department annually awards 20 or more new teaching assistantships. To be considered for the following autumn, applicants must submit an assistantship application and supporting materials for admission to the graduate program by January 15. A statement of purpose, three recommendations, the GRE general test, the GRE subject test (literature in English) [except M.F.A., M.A.T. (E.S.L.)], and a critical-writing sample are required [except M.A.T. (E.S.L.)]. Teaching assistantship applicants who are not native speakers of English must submit as part of their application a score of 290 or better on the Test of Spoken English (TSE) or UW-administered SPEAK test.

### Master of Arts

**Admission Requirements:** Bachelor of Arts degree: Major in English equivalent to that awarded by the UW preferred. Graduate Record Examination general test and subject test (literature in English). Three letters of recommendation, statement of purpose, and a critical writing sample.

**Graduation Requirements:** Intermediate-level proficiency in a language other than English. 40 credits, including 30 credits in graduate English seminars. For students continuing to the doctoral program, a 10-credit master's essay. For a terminal master's degree, students may substitute 10 additional credits in graduate English seminars for the master's essay. A maximum of 5 credits may be transferred from an accredited graduate program elsewhere.

### Master of Fine Arts

**Admission Requirements:** Bachelor of Arts degree, Graduate Record Examination general test, three letters of recommendation, statement of purpose, a critical-writing sample, and a creative-writing sample.

**Graduation Requirements:** 55 credits, including 20 credits in creative writing, 15 credits in graduate English seminars (5 credits must be from an approved course in criticism), 5 elective credits, 15 thesis credits (including a creative thesis, an MFA essay, and a final oral examination); demonstration of proficiency in a language other than English.

### Master of Arts for Teachers

**Admission Requirements:** Same as for the Master of Arts degree, but usually including prior teaching experience.

**Graduation Requirements:** 45 credits, of which 25 must be in courses numbered 500 or above; including at least one course each in English language or linguistics, rhetoric and/or composition, literary criticism or critical theory, and literature; three courses must have a stated orientation on teaching English; and 5 credits of M.A.T. essay. In addition to the 45 credits, a student with no regular or formal teaching experience is required to complete at least 6 credits of ENGL 601 (Internship). 15 of these may be taken outside the department in courses related to the teaching of English, subject to approval.

### Master of Arts for Teachers (English As A Second Language)

**Admission Requirements:** Bachelor of Arts degree, Graduate Record Examination general test, statement of purpose, three letters of recommendation. Students without training in linguistic method and theory must take LING 400 as a prerequisite for 400-level linguistics courses.

**Graduation Requirements:** 45-54 credits, including ENGL 571, 572, 574, 576; LING 446 or 450, ENGL 575 or LING 461; three courses from ENGL 471, 478, 479, 560, 561, 562, 563, 564, 567, 569, 575, LING 433/ ANTH 464, LING 457/PSYCH 457, LING 451, 462; one elective course; 3-6 credits of ENGL 570. Intermediate-level proficiency in a language other than English.

### Doctor of Philosophy

**Admission Requirements:** By petition to the Graduate Studies Committee upon completion of the M.A. degree option in literature. Students with recent master's degrees from other institutions are admitted at the post-master's level following the guidelines for admission to the M.A. option and must complete two quarters before petitioning the Graduate Studies Committee for admission to the doctoral program. Students transferring with a master's degree from other institutions may be required to submit an equivalent to the master's essay. Students with M.F.A., M.A.T., or M.A.T. (E.S.L.) degrees from this University must complete coursework and language requirements for the M.A. degree option and submit an equivalent to the master's essay.

**Graduation Requirements:** 75 graded credits of electives in graduate English seminars as advised by the student's Supervisory Committee. Students with a recent master's degree from another university may count up to 30 credits from the master's program, upon approval of the Director of Graduate Studies. Students with a master's degree from the UW may count up to 40 credits in courses taken before admission to the doctoral program. Fluency in at least one language other than English, plus whatever additional language study the supervisory committee advises. Written examinations for literature emphasis: (1) historical period, (2) specialized field of study, (3) second period or genre; written examinations for language emphasis: (1) major approach to English-language study, (2) second approach to language study, (3) textual focus (can be literary period); an oral General Examination on an individualized topic; 27 credits of ENGL 800 (Dissertation) and a Final Examination based on the dissertation.

## Faculty

### Chair

Shawn H. Wong

### Professors

Alexander, Edward \* 1962; MA, 1959, PhD, 1963, University of Minnesota; romantic and Victorian literature.

Allen, Carolyn \* 1972; MA, 1966, Claremont Graduate School; PhD, 1972, University of Minnesota; twentieth-century literature, women writers, contemporary critical theory.

Bierds, Linda L. \* 1981; MA, 1971, University of Washington; poetry writing; contemporary American poetry.

Blake, Kathleen \* 1971; PhD, 1971, University of California (San Diego); Victorian literature, children's literature, women's studies.

Brown, Marshall J. \* 1988; PhD, 1972, Yale University; eighteenth- and nineteenth-century literature, literary theory, music and literature.

- Burns, Wayne 1948, (Emeritus); MA, 1940, Harvard University; PhD, 1946, Cornell University; Victorian literature.
- Butler, Johnella E. \* 1987, (Adjunct); EdD, 1979, University of Massachusetts; Afro-American and multicultural studies, comparative American ethnic literature, African diaspora.
- Coldewey, John C. \* 1972; PhD, 1972, University of Colorado (Boulder); Renaissance literature, medieval drama.
- Dillon, George L. \* 1986; PhD, 1969, University of California (Berkeley); rhetoric, composition.
- Dunn, Richard J. \* 1967; PhD, 1964, Case Western Reserve University; Victorian literature, English novel.
- Fowler, David C. \* 1952, (Emeritus); PhD, 1949, University of Chicago; medieval literature, comparative religion.
- Frey, Charles Hubbard \* 1970; PhD, 1971, Yale University; Renaissance literature, Shakespeare.
- Gerstenberger, Donna \* 1960, (Emeritus); PhD, 1958, University of Oklahoma; twentieth-century literature, Anglo-Irish literature, feminist criticism.
- Handwerk, Gary J. \* 1984; PhD, 1984, Brown University; literary theory, English and Irish nineteenth- and twentieth-century narrative.
- Harris, Markham 1946, (Emeritus); MA, 1931, Williams College; fiction writing.
- Heilman, Robert B. 1948, (Emeritus); MA, 1930, Ohio State University; MA, 1931, PhD, 1935, Harvard University; drama.
- Irrmscher, William F. \* 1960, (Emeritus); PhD, 1950, Indiana University; rhetoric and theory of composition.
- Jeffords, Susan E. \* 1985; MA, 1977, PhD, 1981, University of Pennsylvania; feminist theory, American popular culture, and the representation of Vietnam.
- Johnson, Charles R. \* 1983; MA, 1973, Southern Illinois University; PhD, 1988, State University of New York (Stony Brook); fiction writing.
- Jones, Frank W. 1955, (Emeritus); PhD, 1941, University of Wisconsin; MA, 1955, Oxford University (UK); translation, twentieth-century theatre, poetry.
- Kaplan, Sydney J. \* 1971; PhD, 1971, University of California (Los Angeles); twentieth-century literature, women writers, feminist criticism.
- Kenney, Richard L. \* 1987; BA, 1970, Dartmouth College; poetry writing.
- Korg, Jacob \* 1955, (Emeritus); PhD, 1952, Columbia University; Victorian, twentieth-century literature.
- Lockwood, Thomas \* 1967; PhD, 1967, Rice University; Restoration and eighteenth-century literature.
- Matchett, William H. \* 1954, (Emeritus); PhD, 1957, Harvard University; Renaissance literature, Shakespeare.
- McCracken, J. David \* 1966; PhD, 1966, University of Chicago; eighteenth-century, Romantic, and biblical literature.
- McElroy, Colleen J. \* 1972; PhD, 1973, University of Washington; Black literature, women writers, poetry writing.
- McHugh, Heather \* 1982; MA, 1973, University of Denver; writing and close reading of poetry, form in nature and art.
- Modiano, Raimonda \* 1978; PhD, 1973, University of California (San Diego); romanticism.
- Posnock, Ross \* 1983; PhD, 1980, Johns Hopkins University; American literature.
- Reinert, Otto \* 1956, (Emeritus); PhD, 1952, Yale University; comparative literature, eighteenth-century literature.
- Russ, Joanna \* 1977, (Emeritus); MFA, 1960, Yale University; fiction writing.
- Sale, Roger H. \* 1962, (Emeritus); PhD, 1957, Cornell University; Renaissance literature.
- Shapiro, Steven \* 1984; PhD, 1981, Yale University; literary theory, romantic poetry, post-modernism.
- Shields, David \* 1988; MFA, 1980, University of Iowa; fiction writing, screen writing, twentieth-century literature, autobiography, mass media, film.
- Shulman, Robert \* 1961; PhD, 1959, Ohio State University; American literature.
- Silberstein, Sandra V. \* 1982; PhD, 1982, University of Michigan; TESL, critical theory, discourse analysis, sociolinguistics, language and culture.
- Simonson, Harold P. \* 1967, (Emeritus); PhD, 1958, Northwestern University; American literature.
- Staten, Henry J. \* 1998; PhD, 1978, University of Texas (Austin); 19th- and 20th-century British literature, history of criticism.
- Stevick, Robert D. \* 1962, (Emeritus); PhD, 1956, University of Wisconsin; medieval language and literature.
- Streitberger, William R. \* 1973; PhD, 1973, University of Illinois; Renaissance literature, textual criticism, paleography.
- Tollefson, James W. \* 1984; PhD, 1980, Stanford University; English as a second language, language planning.
- Wagoner, David R. \* 1957; MA, 1949, Indiana University; twentieth-century literature, fiction and poetry writing.
- Wong, Shawn H. \* 1984; MA, 1974, San Francisco State; creative writing, Chinese-American area studies.

### Associate Professors

- Abrams, Robert \* 1979; PhD, 1973, Indiana University; American literature.
- Altieri, Joanne S. \* 1977, (Emeritus); PhD, 1969, University of North Carolina; Shakespeare studies, including early seventeenth-century theatre more generally.
- Aravamudan, Srinivas \* 1996; MA, 1986, Purdue University; PhD, 1991, MA, 1991, Cornell University; eighteenth-century literature, contemporary postcolonial literature.
- Bosworth, David L. \* 1984; BA, 1969, Brown University; fiction writing, modern fiction and poetry, American Puritans.
- Brenner, Gerald J. \* 1966; PhD, 1969, University of New Mexico; American literature, fiction writing.
- Butwin, Joseph M. \* 1978; PhD, 1971, Harvard University; Victorian literature.
- Cummings, Katherine \* 1985; PhD, 1985, University of Wisconsin; feminist, psychoanalytical, and literary theory, modern and contemporary literature.
- Dunlop, William M. \* 1962; MA, 1965, Cambridge University (UK); Shakespeare, nineteenth-century literature, poetry writing.
- Fisher, Alan S. \* 1968; PhD, 1969, University of California (Berkeley); Renaissance, seventeenth- and eighteenth-century literature, history of literary criticism.
- Griffith, John W. \* 1968; PhD, 1969, University of Oregon; American literature.
- Guerra, Juan C. \* 1990; MA, 1983, PhD, 1992, University of Illinois (Chicago); rhetoric, composition, literacy, ethnography.
- Hudson, Lois Phillips \* 1969, (Emeritus); LittD, 1965, North Dakota State University; fiction writing.
- Laguardia, Eric \* 1961; PhD, 1961, University of Iowa; Renaissance literature.

- Longyear, Christopher R. \* 1972, (Emeritus); PhD, 1961, University of Michigan; linguistics.
- Moody, Joycelyn K. \* 1991; MA, 1980, University of Wisconsin; PhD, 1993, University of Kansas; nineteenth-century American, African-American, and women's literature, autobiography.
- Mussetter, Sally Ann \* 1978; PhD, 1975, Cornell University; medieval language and literature.
- Palomo, Dolores J. \* 1971, (Emeritus); PhD, 1972, State University of New York (Buffalo); Renaissance literature, women writers.
- Patterson, Mark R. \* 1981; PhD, 1981, Princeton University; American literature.
- Remley, Paul G. \* 1988; PhD, 1990, Columbia University; Old and Middle English, medieval languages and literatures, critical theory.
- Riggenbach, Heidi R. \* 1989; PhD, 1989, University of California (Los Angeles); teaching English as a second language, discourse analysis, sociolinguistics.
- Searle, Leroy F. \* 1977; MA, 1968, PhD, 1970, University of Iowa; twentieth-century literature, critical theory, American studies.
- Simpson, Caroline Chung \* 1994; MA, 1989, University of Houston; PhD, 1994, University of Texas (Austin); Asian American literature and culture, postwar fiction and film.
- Smith, Eugene H. \* 1958, (Emeritus); PhD, 1963, University of Washington; rhetoric and theory of composition.
- Sonenberg, Maya \* 1993; MA, 1984, Brown University; fiction writing, twentieth-century fiction, postmodern fiction, women writers.
- Stanton, Robert B. \* 1956, (Emeritus); PhD, 1953, Indiana University; American literature.
- Stygall, Gail \* 1990; PhD, 1989, Indiana University; rhetoric and composition, English language linguistics, law and literature.
- van den Berg, Sara J. \* 1980; PhD, 1969, Yale University; early modern and seventeenth-century literature, psychoanalytic theory, medicine and literature.
- Vaughan, Miceal F. \* 1973; PhD, 1973, MA, 1973, Cornell University; medieval language and literature.
- Webster, John M. \* 1972; PhD, 1974, University of California (Berkeley); Renaissance literature.

### Assistant Professors

- Bawarshi, Anis 1999; PhD, 1999, University of Kansas; rhetoric and composition.
- Burstein, Jessica L. \* 1998; PhD, 1998, University of Chicago; modernism.
- Crane, Gregg David \* 1995; MA, 1981, University of California (Los Angeles); JD, 1986, University of California (San Francisco); PhD, 1995, University of California (Berkeley); American literature.
- Curzan, Anne L. \* 1998; PhD, 1998, University of Michigan; Old English languages.
- Eversley, Shelly J. \* 1997; PhD, 1997, Johns Hopkins University; twentieth-century American, African American literature and culture.
- Fuchs, Barbara \* 1997; PhD, 1997, Stanford University; early modern English and Spanish literature, literature and imperialism.
- Goldberg, Brian B. \* 1999; PhD, 1995, Indiana University; romanticism.
- Goodlad, Lauren M. E. \* 1994; MA, 1986, New York University; MPhil, 1989, PhD, 1994, Columbia University; Victorian literature and culture, contemporary culture, cross-disciplinary literary/cultural theory.
- Griffith, Malcolm A. \* 1966; PhD, 1966, Ohio State University; twentieth-century literature, modern criticism, American literature.

Khanna, Ranjana \* 1996; PhD, 1993, York University (Canada); postcolonial theory, transnational feminism, twentieth-century writing.

Sanok, Catherine 1999, (Acting); PhD, 1999, University of California (Los Angeles); medieval literature.

Weinbaum, Alys E. \* 1998; PhD, 1998, Columbia University; 19th and 20th century American and European literature.

### Senior Lecturers

George, E. Laurie \* 1991; PhD, 1984, University of Oregon; expository/computer-aided writing, American literature, feminist linguistics, pedagogy.

Graham, Joan Adelle 1974; MA, 1972, University of Washington; expository and interdisciplinary writing.

McNamara, Robert J. 1985; PhD, 1985, University of Washington; expository and interdisciplinary writing.

Simmons-O'Neill, Elizabeth 1985; PhD, 1988, University of Washington; expository and interdisciplinary writing, service learning, education and tutoring.

### Lecturers

Gillis-Bridges, Kimberlee 1989; PhD, 1999, Claremont Graduate School; interdisciplinary writing.

O'Neill, John 1985; MA, 1986, University of Washington; interdisciplinary writing.

Popov, Nikolai B. \* 1985; PhD, 1994, University of Washington; modern Irish, Slavic, and German writers; literary theory and criticism; translation.

Wacker, Norman J. 1989; MA, 1976, PhD, 1986, University of Washington; expository and interdisciplinary writing.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ENGL 407 Special Topics in Cultural Studies (5) VLPA** Advanced work in Cultural Studies.

**ENGL 422 Arthurian Legends (5) VLPA** Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance.

**ENGL 430 British Writers: Studies in Major Authors (5, max. 15) VLPA** Concentration on one writer or a special group of British writers.

**ENGL 431 Topics in British Literature (5, max. 15) VLPA** Themes and topics of special meaning to British literature.

**ENGL 440 Special Studies in Literature (3/5, max. 10) VLPA** Themes and topics offering special approaches to literature.

**ENGL 442 The Novel: Special Studies (5, max. 10) VLPA** Readings may be English or American and drawn from different periods, or they may concentrate on different types—gothic, experimental, novel of consciousness, realistic novel. Special attention to the novel as a distinct literary form. Specific topic varies from quarter to quarter.

**ENGL 443 Poetry: Special Studies (5, max. 10) VLPA** A poetic tradition or group of poems connected by subject matter or poetic technique. Specific topics vary, but might include poetry as a geography of mind, the development of the love lyric, the comic poem.

**ENGL 451 American Writers: Studies in Major Authors (5, max. 15) VLPA** Concentration on one writer or a special group of American writers.

**ENGL 452 Topics in American Literature (5, max. 15) VLPA** Exploration of a theme or special topic in American literary expression.

**ENGL 453 Introduction to American Folklore (5) VLPA** Study of different kinds of folklore inherited from America's past and to be found in America today.

**ENGL 466 Gay and Lesbian Studies (5) VLPA/I&S** Examination of ways gays and lesbians are represented in literature, film, performance, and popular culture and how these representations are interpreted in mainstream, gay/lesbian, and academic writing.

**ENGL 471 The Composition Process (5) VLPA** Consideration of psychological and formal elements basic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation.

**ENGL 473 Current Developments in English Studies: Conference (5) VLPA**

**ENGL 474 Special Topics in English for Teachers (1-10, max. 10) VLPA**

**ENGL 475 Colloquium in English for Teachers (1-5, max. 10) VLPA**

**ENGL 476 Puget Sound Writing Program Institute (1-9, max. 9) VLPA** Focus on the writing process and the teaching of writing, accomplished through research, writing, reflection, and demonstration of writing instruction. Affiliated with the National Writing Project.

**ENGL 477 Children's Literature (5) VLPA** An examination of books that form a part of the imaginative experience of children, as well as a part of a larger literary heritage, viewed in the light of their social, psychological, political, and moral implications.

**ENGL 478 Language and Social Policy (5) VLPA/I&S** Examines the relationship between language policy and social organization; the impact of language policy on immigration, education, and access to resources and political institutions; language policy and revolutionary change; language rights.

**ENGL 479 Language Variation and Language Policy in North America (5) VLPA/I&S** Surveys basic issues of language variation: phonological, syntactic, semantic, and narrative/discourse differences among speech communities of North American English; examines how language policy can affect access to education, the labor force, and political institutions.

**ENGL 481 Special Studies in Expository Writing (5) VLPA** Individual projects in various types of nonfictional prose, such as biographical sketches, informational reports, literary reviews, and essays.

**ENGL 483 Advanced Verse Writing (5, max. 15) VLPA** Intensive study of ways and means of making a poem. Prerequisite: ENGL 383.

**ENGL 484 Advanced Short Story Writing (5, max. 10) VLPA** Experience with the theory and practice of writing the short story. Prerequisite: ENGL 384.

**ENGL 485 Novel Writing (5, max. 15) VLPA** Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite: ENGL 384.

**ENGL 490 Study Abroad Program (5, max. 15) VLPA** This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of their settings.

**ENGL 491 Internship (1-6, max. 12)** Supervised experience in local businesses and other agencies. Open only to upper-division English majors. Credit/no credit only.

**ENGL 492 Advanced Expository Writing Conference (1-5, max. 10)** Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

**ENGL 493 Advanced Creative Writing Conference (1-5, max. 10)** Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

**ENGL 494 Honors Seminar (5) VLPA** Survey of current issues confronting literary critics today. Readings begin with work in the New Criticism that followed World War II and move forward to consider issues such as changing student population and role of the critic, revisions of the past, emergent technologies, and rise of interdisciplinary teaching and research.

**ENGL 495 Major Conference for Honors in Creative Writing (5)** Special projects available to honors students in creative writing. Required of, and limited to, honors students in creative writing.

**ENGL 496 Major Conference for Honors (5)** Individual study (reading, papers) by arrangement with the instructor. Required of, and limited to, honors seniors in English.

**ENGL 497 Honors Senior Seminar (5) VLPA** Seminar study of special topics in language and literary study. Limited to honors students majoring in English.

**ENGL 498 Senior Seminar (5) VLPA** Seminar study of special topics in language and literary study. Limited to seniors majoring in English.

**ENGL 499 Independent Study (1-5, max. 10)** Individual study by arrangement with instructor.

### Courses for Graduates Only

**ENGL 500 Reading Medieval Literature (5)** Special problems involved in the study and interpretation of medieval texts, selected examples drawn from the beginnings of English literature to 1500.

**ENGL 501 The Renaissance and Literary Tradition (5)** Examination of selected texts from 1500 to 1660, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the Renaissance.

**ENGL 502 English Literary Culture: 1660-1800 (5)** Examination of selected texts of the Restoration and eighteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

**ENGL 503 English Literary Culture: 1800-1900 (5)** Examination of selected texts from the nineteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

**ENGL 504 Backgrounds of Modern Literature (5)** Examination of selected texts from the twentieth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

**ENGL 505 Theories of American Literature (5)** Examination of selected texts in American Literature, concentrating on the specific problems of interpretation and scholarship characteristic of the study of works in this field.

**ENGL 506 Critical Approaches to Literary Texts (5)**

Examination of a range of critical theories and practices appropriate to the study of literature.

**ENGL 507 History of Literary Criticism and Theory I (5, max. 15)**

A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle, Longinus, and the major medieval critics. Offered: jointly with C LIT 507.

**ENGL 508 History of Literary Criticism and Theory II (5, max. 15)**

Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with C LIT 508.

**ENGL 509 History of Literary Criticism and Theory III (5, max. 15)**

Literary criticism and theory from Kant's *Critique of Judgment* to the mid-twentieth century and the work of Northrop Frye. Offered: jointly with C LIT 509.

**ENGL 510 History of Literary Criticism and Theory IV (5, max. 15)**

A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with C LIT 510.

**ENGL 512 Introductory Reading in Old English (5)****ENGL 513 Old English Language and Literature (5, max. 15)****ENGL 514 Middle English (5, max. 15)****ENGL 515 Chaucer (5, max. 15)****ENGL 516 Topics in Medieval English Literature (5, max. 15)****ENGL 517 Sixteenth-Century Literature (5, max. 15)****ENGL 518 Shakespeare (5, max. 15)****ENGL 520 Seventeenth-Century Literature (5, max. 15)****ENGL 521 Milton (5, max. 15)****ENGL 522 Topics in the English Renaissance, 1485-1660 (5, max. 15)****ENGL 524 Restoration and Eighteenth-Century Literature (5, max. 15)****ENGL 525 Topics in Restoration and Eighteenth-Century Studies (5, max. 15)****ENGL 527 Romanticism (5, max. 15)****ENGL 528 Victorian Literature (5, max. 15)****ENGL 529 Topics in Nineteenth-Century Studies (5, max. 15)****ENGL 531 Early American Literature (5, max. 15)****ENGL 532 Nineteenth-Century American Literature (5, max. 15)****ENGL 533 Modern American Literature (5, max. 15)****ENGL 535 American Culture and Criticism (5, max. 15)****ENGL 537 Topics in American Studies (5, max. 15)****ENGL 540 Modern Literature (5, max. 15)****ENGL 541 Contemporary Literature (5, max. 15)****ENGL 543 Anglo-Irish Literature (5, max. 15)****ENGL 544 World Literature in English (5, max. 15)****ENGL 546 Topics in Twentieth-Century Literature (5, max. 15)****ENGL 550 Studies in Narrative (5, max. 15)****ENGL 551 Studies in Poetry (5, max. 15)****ENGL 554 Theories of Structure, Genre, Form, and Function (5, max. 15)****ENGL 555 Feminist Theories (5, max. 15)****ENGL 556 Cultural Studies (5, max. 15)****ENGL 559 Literature and Other Disciplines (5, max. 15)****ENGL 560 The Nature of Language: History and Theory (5)****ENGL 561 Stylistics (5)****ENGL 562 Discourse Analysis (5)****ENGL 563 Comparative Grammars (5)****ENGL 564 Current Rhetorical Theory (5)** Prerequisite: teaching experience.**ENGL 567 Approaches to Teaching Composition (1-5, max. 10)** Readings in composition theory and discussion of practical classroom applications. Prerequisite: previous experience or concurrent assignment in teaching writing.**ENGL 569 Topics in Language and Rhetoric (5, max. 15)****ENGL 570 Practicum in Teaching English as a Second Language (3, max. 6)** Discussion and practice of second-language teaching techniques. Three hours per week teaching required in addition to regular class meetings. Credit/no credit only. Prerequisite: ENGL 571 or permission of instructor.**ENGL 571 Theory and Practice on Teaching English to Speakers of Other Languages (5)** Topics include second language reading, aural/oral skills, critical pedagogy, program administration, and language policy.**ENGL 572 Methods and Materials for Teaching English as a Second Language (5)** Prerequisite: LING 445 or permission of instructor.**ENGL 574 Research Methods in Second-Language Acquisition (5)** Prerequisite: ENGL 572, LING 449, or permission of instructor.**ENGL 575 Pedagogy and Grammar in Teaching English as a Second Language (5)****ENGL 576 Testing and Evaluation in English as a Second Language (5)** Evaluation and testing of English language proficiency, including testing theory, types of tests, and teacher-prepared classroom tests. Prerequisite: ENGL 571 and ENGL 572 or permission of instructor.**ENGL 578 Colloquium in Teaching English to Speakers of Other Languages (5, max. 10)** Overview of major issues in second-language acquisition, teaching methodology, and classroom practice with special emphasis on links between theories of language learning and practical aspects of teaching English to speakers of other languages.**ENGL 581 The Creative Writer as Critical Reader (5)****ENGL 584 Advanced Fiction Workshop (5, max. 15)** Prerequisite: graduate standing.**ENGL 585 Advanced Poetry Workshop (5, max. 15)** Prerequisite: graduate standing.**ENGL 586 Graduate Writing Conference (5)****ENGL 590 Master of Arts Essay (5/10, max. 10)**

Research and writing project under the close supervision of a faculty member expert and with the consultation of a second faculty reader. The field of study is chosen by the student. Work is independent and varies. The model is an article in a scholarly journal. Prerequisite: graduate standing in English.

**ENGL 591 Master of Arts for Teachers Essay (5)**

Research and writing project under the close supervision of a faculty member expert in the field of study chosen by the student within the MAT degree orientation towards the teaching of English, and with the consultation of a second faculty reader. The model is an article in a scholarly journal.

**ENGL 592 Graduate English Studies (1-5, max. 10)****ENGL 593 Textual Criticism (5)** Introduction to paleography, codicology, analytical and descriptive bibliography; examination of the major contributions to textual theory in the nineteenth and twentieth centuries; practice in applying textual theory in editing literary works.**ENGL 595 Topics in Teaching Literature (5, max. 15)****ENGL 597 Directed Readings (\* max. 18)** Intensive reading in literature or criticism, directed by members of doctoral supervisory committee. Credit/no credit only.**ENGL 598 Colloquium in English (1-5, max. 10)**

Lectures and seminars presented by visiting scholars or a range of local scholars relevant to English graduate studies.

**ENGL 599 Special Studies in English (5, max. 15)****ENGL 600 Independent Study or Research (\*)****ENGL 601 Internship (3-10, max. 10)** Credit/no credit only.**ENGL 700 Master's Thesis (\*)****ENGL 800 Doctoral Dissertation (\*)**

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## European Studies

See International Studies.

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## Genetics

J205 Health Sciences

General Catalog Web page:  
[www.washington.edu/students/genecat/academic/genetics.html](http://www.washington.edu/students/genecat/academic/genetics.html)

Department Web page:  
[depts.washington.edu/genetics/](http://depts.washington.edu/genetics/)

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## Graduate Program

Graduate Program Coordinator  
J205 Health Sciences, Box 357360  
(206) 543-1657

The Department of Genetics offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy. Students are admitted only to the doctoral program and may be granted the Master of Science only in lieu of or in conjunction with the Ph.D. A student may choose among a wide variety of research areas, while at the same time receiving broad training in genetics. New graduate students join a research project in one of the faculty laboratories during each of the first three quarters in residence. New students

thereby become acquainted with several different experimental approaches in genetics research, and the projects help them choose an adviser for their thesis work at the end of the first year. In addition to graduate courses offered by the Department of Genetics, students can choose among a large number of courses in related departments to broaden their perspective. Graduate students also participate in undergraduate teaching after gaining expertise in pertinent areas. A General Examination is taken during the second year to gain formal admittance to candidacy for the Ph.D. degree.

Applications for graduate work are invited from students who have emphasized biology, the physical sciences, or mathematics in their undergraduate careers. Applicants are asked to submit Graduate Record Examination scores and three letters of recommendation.

### Financial Aid

The Department of Genetics offers financial support to promising students who wish to work toward the doctoral degree.

### Research Facilities

The department is housed in a modern, well-equipped building shared with the Department of Biochemistry and the Howard Hughes Medical Institute. Students benefit from interdisciplinary research and teaching programs in collaboration with departments having related interests.

## Faculty

### Chair

Breck E. Byers

### Professors

Bendich, Arnold J. \* 1970, (Adjunct); PhD, 1969, University of Washington; chromosome structure in mitochondria, chloroplasts, and bacteria.

Brewer, Bonita J. \* 1982; PhD, 1979, University of Washington; replication of chromosomes, plasmids, and mitochondrial DNA in yeast.

Byers, Breck E. \* 1970; PhD, 1967, Harvard University; cell biology; mitosis and meiosis, mechanisms of nuclear division and crossing-over in yeast.

Deeb, Samir S. \* 1983, (Adjunct Research); PhD, 1964, University of Illinois; genetic factors predisposing to hyperlipidemia and coronary artery disease.

Eisen, Harvey \* 1986, (Affiliate); PhD, 1967, University of Toronto (Canada); host-parasite interactions, generation of genetic diversity.

Fangman, Walton L. \* 1967; PhD, 1965, Purdue University; molecular genetics: control of replication of yeast chromosomes, plasmid and mitochondrial DNA.

Felsenstein, Joseph \* 1968; PhD, 1968, University of Chicago; evolution and population genetics.

Fields, Stanley \* 1995; MA, 1978, PhD, 1981, Cambridge University (UK); molecular genetics.

Furlong, Clement E. \* 1977, (Research); PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.

Gallant, Jonathan A. \* 1961; PhD, 1961, Johns Hopkins University; molecular genetics, control mechanisms in bacteria, accuracy of translation.

Gartler, Stanley M. \* 1957, (Emeritus); PhD, 1952, University of California (Berkeley); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation.

Gottschling, Daniel E. 1996, (Affiliate); PhD, 1984, University of Colorado; chromosome biology.

Hall, Benjamin D. \* 1963; MA, 1956, PhD, 1959, Harvard University; yeast molecular genetics and molecular evolution of gene expression in eukaryotes.

Hartwell, Leland H. \* 1968; PhD, 1964, Massachusetts Institute of Technology; genetic analysis of chromosome transmission and of the control of division by hormones in yeast.

Hawthorne, Donald C. \* 1980, (Emeritus); PhD, 1955, University of Washington; yeast genetics, chromosome mapping, supersuppressors.

King, Mary-Claire \* 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

Laird, Charles D. \* 1971, (Adjunct); PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Manoil, Colin C. \* 1986; PhD, 1979, Stanford University; molecular genetics, protein localization in bacteria.

Martin, George \* 1957, (Adjunct); MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, Alzheimer's disease, Werner's syndrome.

Motulsky, Arno G. \* 1953, (Emeritus); MD, 1947, University of Illinois; medical genetics.

Olson, Maynard V. 1992; PhD, 1970, Stanford University; large-scale genome mapping and sequencing.

Reid, Brian J. \* 1983, (Adjunct); PhD, 1975, MD, 1980, University of Washington; genetic and cell-cycle abnormalities in neoplastic progression in Barrett's esophagus.

Schubiger, Gerold A. \* 1972, (Adjunct); PhD, 1968, University of Zurich (Switzerland); developmental genetic control of *Drosophila* embryos, pattern formation in imaginal disks.

Sibley, Carol Hopkins \* 1976; PhD, 1974, University of California (San Francisco); mammalian cell genetics and molecular parasitology.

Smith, Gerald R. \* 1983, (Affiliate); PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.

Stadler, David R. \* 1956, (Emeritus); PhD, 1952, Princeton University; mutation and genetic repair in *Neurospora*.

Stamatoyannopoulos, George 1964; MD, 1958, DMedSc, 1960, University of Athens (Greece); medical genetics.

Trask, Barbara J. \* 1992, (Adjunct); PhD, 1985, University of Leiden (Netherlands); molecular cytogenetics, large-scale genome organization and polymorphism, genomics of olfaction.

Wakimoto, Barbara T. \* 1984, (Adjunct); PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.

Young, Elton \* 1969, (Adjunct); PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.

### Associate Professors

Berg, Celeste A. \* 1990; PhD, 1986, Yale University; *Drosophila* developmental genetics: cell communication and cell migration during oogenesis.

Braun, Robert Elmer \* 1986; PhD, 1985, Tufts University; mouse molecular genetics and male germ cell development.

Breedon, Linda 1994, (Affiliate); PhD, 1981, University of Colorado (Boulder); cell cycle regulation in budding yeast.

Henikoff, Steven 1982, (Affiliate); PhD, 1977, Harvard University; chromosome organization, epigenetic effects, analysis of protein sequence information.

Kruglyak, Leonid \* 1998, (Affiliate); PhD, 1990, University of California (Berkeley); genetic linkage analysis, population genetics, analysis of gene expression arrays.

Monnat, Raymond J. Jr. \* 1982, (Adjunct); MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.

Soriano, Philippe 1994, (Affiliate); PhD, 1978, University of Paris (France); vertebrate developmental genetics.

Thomas, James H. \* 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.

Wright, Robin L. \* 1990, (Adjunct); PhD, 1985, Carnegie Mellon University; biogenesis of membranes, yeast cell biology.

### Assistant Professors

Edgar, Bruce A. 1994, (Affiliate); PhD, 1987, University of Washington; cell cycle control in *Drosophila*.

Pallanck, Leo J. \* 1997; PhD, 1992, Albert Einstein College of Medicine; neurogenetics.

Ruohola-Baker, Hannele \* 1993, (Adjunct); PhD, 1989, Helsinki University (Finland); signaling, pattern formation, establishment of polarity in development.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**GENET 411 Gene Action (5) NW** Molecular genetics: description of fundamental genetics processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focus is on prokaryotic organisms. Prerequisite: BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with MICROM 411; W.

**GENET 453 Genetics of the Evolutionary Process (3) NW** *Felsenstein* Contributions of genetics to the understanding of evolution. Processes of mutation, selection, and random genetic events as they affect the genetic architecture of natural populations and the process of speciation. Emphasis on experimental data and observation, rather than mathematical theory. Prerequisite: either GENET 371 or GENET 372.

**GENET 454 The Origins of Genetics (4) NW** Discovery and eventual triumph of Mendelism in the early twentieth century. Concepts of heredity from ancient times to the nineteenth century. Mendel's work and its rediscovery. Evidence contributing to cornerstone of classical genetics—the chromosome theory of heredity. Prerequisite: either GENET 351, GENET 371, or GENET 372. Offered: A.

**GENET 465 Advanced Human Genetics (4) NW** *King, Olson* Explores genetic analysis of naturally occurring variation in humans; origins and consequences of mutation, as mediated by selection, migration, population structure and drift; approaches to finding human disease genes and characterizing them at the molecular level; relevance of to other species to analysis of human genes. Offered: W.

**GENET 466 Cancer Genetics (3) NW** Focuses on three types of cancer-related genetics. DNA repair, mitotic recombination, chromosome loss and imbalance, and other aspects of genomic instability. Metastatic cancer as an example of natural selection and evolution. Yeast and nematodes as models for the study of cancer genetics. Prerequisite: either GENET 371 or GENET 372. Offered: Sp.

**GENET 490 Undergraduate Seminar (2, max. 6) NW** Seminar for advanced undergraduate students engaged in individual research projects or those who wish to gain an understanding of genetic research by analysis of the primary literature. Assignments emphasize the rationale for research projects and the presentation and interpretation of research findings. Offered: AWSpS.

**GENET 499 Undergraduate Research (\* max. 30)** Credit/no credit only. Offered: AWSpS.

### Courses for Graduates Only

**GENET 501 Introduction to Research Materials (3, max. 9)** The student undertakes a research project in one of the research groups within the department for a quarter at a time. Credit/no credit only. Prerequisite: graduate standing in the Department of Genetics or permission of graduate program coordinator. Offered: AWSpS.

**GENET 520 Seminar (1, max. 15)** Credit/no credit only. Prerequisite: graduate standing in the Department of Genetics or permission of graduate program coordinator. Offered: AWSp.

**GENET 525 Current Literature in Human Genetics (1)** Topics from current literature in human genetics. Students and faculty each present one topic per quarter. Credit/no credit only. Prerequisite: graduate or postdoctoral status. Offered: AWSp.

**GENET 531 Human Genetics (3)** Modern approaches to the identification of human disease genes permitted by their isolation. Functional conservation of proteins throughout eukaryotic evolution as an approach to their function in model systems such as somatic cell culture, transgenic mice, nematodes, *Drosophila*, and yeast. Prerequisite: second-year graduate student. Offered: alternate years.

**GENET 550 Methods and Logic in Genetics (3)** Critical reading and detailed discussion of genetics-related scientific research papers. Material emphasizes methodological and logical themes of importance in modern genetics, for example: origin of mutants, genetic epistasis, pulse labeling, and *in vivo* gene function. Prerequisite: first year genetics graduate students only. Offered: A.

**GENET 551 Basics of Genetic Analysis (3)** First course in a three-quarter sequence in formal, molecular, and microbial genetics. Offered: A.

**GENET 552 Nature and Consequences of Mutation (3)** Origin of mutations and their analysis in human and other genomes. Prerequisite: GENET 551 or permission of instructor. Offered: W.

**GENET 553 Chromosome Structure and Mechanics (3)** Chromosome structure and DNA replication; molecular basis of recombination and transposition. Prerequisite: GENET 552 or permission of instructor. Offered: Sp.

**GENET 554 Topics in Genetics (2, max. 6)** Current problems and research methods. Credit/no credit only. Prerequisite: permission of instructor.

**GENET 562 Population Genetics (4)** *Felsenstein* Mathematical and experimental approaches to the genetics of natural populations, especially as they relate to evolution. Emphasis on theoretical population genetics. Prerequisite: permission of instructor. Offered: Sp.

**GENET 565 Advanced Human Genetics (4)** *King, Olson* Explores genetic analysis of naturally occurring variation in humans; origins and consequences of mutation, as mediated by selection, migration, population structure, and drift; approaches to finding human disease genes and characterizing them at the molecular level; relevance of other species to analysis of human genes. Offered: W.

**GENET 570 Phylogenetic Inference (3)** *Felsenstein* Methods for inferring phylogenies (evolutionary trees)—biological assumptions, statistical foundations, and computational methods. A comprehensive introduction for graduate students in the biological sciences to phylogenetic methods using data from molecular sequences, continuous and discrete characters, and gene frequencies. Prerequisite: introductory courses in evolution and in statistics. Offered: alternate years; Sp.

**GENET 575 Developmental Genetics (3)** Genetic control of early development in a range of organisms, emphasizing systems in which cellular, genetic, and molecular approaches have combined to make significant contributions to understanding. Prerequisite: permission of instructor. Offered: W.

**GENET 581 Seminar in *Drosophila* Genetics (1)** *Berg* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of *Drosophila* development. Credit/no credit only. Offered: AWSp.

**GENET 582 Seminar in Mouse Genetics (1)** *Braun* Discussion of contemporary research in and novel methods for genetic, cell biological, and molecular analysis of mammalian development, with utilization of transgenic techniques. Credit/no credit only. Offered: AWSp.

**GENET 583 Seminar in Molecular Cytology (1)** *Byers* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of spindle behavior in the mitotic cell cycle of budding yeast. Credit/no credit. Offered: AWSp.

**GENET 584 Seminar in DNA Replication (1)** *Brewer, Fangman* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of budding yeast, with emphasis on the mechanisms and control of DNA replication. Credit/no credit only. Offered: AWSp.

**GENET 585 Seminar in Bacterial Genetics (1)** *Manoil* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of bacterial assembly mechanisms, with emphasis on the topogenesis of membrane proteins. Credit/no credit only. Offered: AWSp.

**GENET 586 Seminar in Mammalian Genetics (1)** *Sibley* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of mammalian genetics, with emphasis on lymphoblast development. Credit/no credit only. Offered: AWSp.

**GENET 587 Seminar in Nematode Genetics (1)** *Thomas* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of nematode development, with emphasis on neurogenesis and other developmental processes. Credit/no credit only. Offered: AWSp.

**GENET 590 Population Genetics Seminar (1)** *Felsenstein* Weekly presentation by participants of current literature and ongoing research in evolution, molecular evolution, evolutionary genetics of natural populations, human population genetics, and quantitative genetics applied to animal and plant breeding. Credit/no credit only. Prerequisite: GENET 562 or permission of instructor.

**GENET 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**GENET 700 Master's Thesis (\*)** Offered: AWSpS.

**GENET 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Geography

408A Smith

 *General Catalog Web page:*  
[www.washington.edu/students/genecat/academic/geography.html](http://www.washington.edu/students/genecat/academic/geography.html)

 *Department Web page:*  
[depts.washington.edu/geog/](http://depts.washington.edu/geog/)

Geography is a far-reaching discipline providing a distinctive spatial approach to many of today's societal problems and issues: regional inequality; growth of service activities; residential and educational segregation; health-care delivery, urban growth management; transportation efficiency; environmental and pollution problems; economic impacts of major investments or technological changes; spatial efficiency of industrial production; spatial inequality in the distribution of goods, services, and resources; and the activities of international corporations and political states. Geography is the study of how individuals, groups, and societies interact with their environments. The discipline offers sufficient skills training to enable both graduates and undergraduates to be competitive in many job markets.

The study of geography emphasizes both technical and critical thinking skills. Geographers' skill sets include the ability to use Geographic Information Systems (GIS) software to produce maps; advanced technical skills in statistical analysis; the ability to use census and other demographic data; sophistication in locating data and interpreting it to help make an argument; sophistication in visual techniques for displaying data, including maps, charts, and graphs; advanced use of such software as spreadsheets, relational data bases, and Web page design; and the ability to present multiple models of land-use patterns for analysis in environmental and economic decision making. Graduates have pursued careers as urban planners, environmental planners and land-use analysts, GIS analysts, economic analysts (marketing, location analysis, geodemographics), public health researchers, NGO specialists in developing nations, airline route analysts, import-export/international-trade specialists, real estate valuation specialists, economic development specialists, social studies teachers, and college professors.

Geography seeks to understand the complex processes that result in observed patterns of settlement, location of economic activities, patterns of development, political organization, and the linkages and direction of trade and communication. Geographers also construct analytical tools, models of information representation, and graphic portrayals (notably maps) to aid the cognitive process of understanding. Individual undergraduate and graduate programs are built around five program options. Students are encouraged to develop a specific, individualized focus of study within their chosen option.

1. *Urban, Social, and Political Processes and Patterns.* Human population distribution, migration, settlement systems, and organization. Geographic facets of ethnicity, race, sexuality, and gender; wealth and poverty; and health and disease. Cultural landscapes; politics, nationalism, and identity formation; geopolitics. Location of urban services, including health-care systems, urban transportation, land use and housing, and neighborhoods. Urban spatial policies. Courses include: GEOG 230, 277, 280, 308, 330, 342, 350, 371, 375, 380, 401, 430, 431, 432, 440, 442, 443, 445, 461, 478.
2. *Economic Geography.* Key questions in this concentration include the following: Why do some cities and regions grow while others decline? What local characteristics attract businesses and employment? What determines the flows of goods, services, ideas, people, and capital that bind together the world economy and the regions within it? How are all these relationships being affected by, and in turn influencing, technological change? What can governments and non-governmental organizations do to affect these characteristics and flows? What personal, organizational, and institutional attributes tend to influence spatial behaviors? What are the relevant economic analysis tools to apply to questions of environmental regulation and land use? What effects do global corporations have on the economies of regions and nation-states? To what extent is international development driven by questions of political economy. Courses include: GEOG 207, 230, 302, 330, 336, 349, 350, 366, 367, 370, 430, 433, 435, 440, 443, 447, 448, 449, 450, 478, and 498.
3. *Regional Geography and International Development Studies.* Continental and global patterns of international relations and development. Political economy of development; development theory and practice; globalization. Analysis of geographic concepts in the regional context, especially on such topics as population growth and migration; development history, theory, and practice; hunger, resources, and poverty; and interconnections in the global economy. Special emphasis on East Asia, Russia and the former Soviet republics, Africa, Latin America, Canada, and the United States. Courses include: GEOG 230, 302, 304, 308, 313, 330, 333, 335, 336, 349, 371, 375, 404, 430, 431, 432, 433, 434, 435, 437, 466.
4. *Geographic Information Systems (GIS).* Role, design, and use of geographic information systems for research, planning, management, and decision making. Use of computers in the collection, manipulation, analysis, and presentation of geographical data. Courses include: GEOG 360, 370, 443, 458, 460, 461, 463, 465, 471.
5. *Society and Environment.* Examines the key debates on the causes and outcomes of environmental change and degradation and the paths to sustainable development; the use of data in the formulation of human-environment interaction models; perceptions of nature; nature-culture relationships; and historical and contemporary societal responses to environmental degradation, health problems, and resource consumption. Courses include: GEOG 270, 360, 370, 371, 372, 432, 460, 461, 463, 471, 472, 480, 490.

## Special Research and Teaching Facilities

A map center in Suzzallo Library houses atlases, sheet maps, and aerial photographs. Departmental facilities include the Edward L. Ullman Geography Collaboratory and the John C. Sherman Laboratory, which houses a variety of computer workstations connected to the campus computer network. The Ullman Collaboratory in 415 Smith provides a unique collaborative classroom with networked computer work stations. The Geography Commons Computer Room also provides computer work stations for students. The Department of Geography is a member of the Center for Social Science Computation and Research, which maintains an extensive data archive and offers many statistical and software consulting services.

## Graduate Program

Graduate Program Coordinator  
415B Smith, Box 353550  
(206) 543-3246  
geogd@u.washington.edu

The Department of Geography has flexible programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The aspirant to the master's degree is expected to complete all work for the degree in four to six quarters. The aspirant to the doctoral degree is expected to undertake two years of post-master's study and must take a departmental diagnostic examination upon entry, pass the General Examination, attain an appropriate level of competence in a foreign language or cognate field, and successfully complete a dissertation. Normally, doctoral program students complete all degree requirements in three to four years.

## Admission Requirements

Admission to the graduate program normally requires a minimum GPA of 3.00 (on a 4.00 scale), or "B." Students holding a master's degree must meet this minimum scholastic requirement, but also should have achieved a GPA higher than 3.00 for graduate studies completed. All applicants must take the Graduate Record Examination. Specific information regarding application procedures may be obtained by writing to the graduate program adviser.

## Financial Aid

The department usually awards approximately 15 to 20 teaching assistantships for the academic year. Most of the assistantships are for teaching quiz sections for a larger lecture class. A few of the more advanced doctoral candidates may teach a class. Normally, several research assistantships are also available. In recent years, approximately 85 percent of the department's graduate students have been funded by internal or external sources.

## Faculty

### Chair

Victoria A. Lawson

### Professors

Beyers, William B. \* 1962; PhD, 1967, University of Washington; economic geography, regional analysis, regional development.

Chrisman, Nicholas R. \* 1987; PhD, 1982, University of Bristol (UK); geographic information systems, spatial error analysis, science and technology studies.

Fleming, Douglas K. \* 1963, (Emeritus); PhD, 1965, University of Washington; transportation geography (especially ocean and air), regional organization of western Europe.

Guest, Avery \* 1972, (Adjunct); MS, 1964, Columbia University; MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Harrington, James W. \* 1997; PhD, 1983, University of Washington; economic change and labor processes in sub-national, regional economic development.

Hart, Lawrence G. 1982, (Adjunct); PhD, 1985, University of Washington; rural health policy, medical geography.

Hayuth, Yehuda 1990, (Affiliate); PhD, 1978, University of Washington.

Hodge, David C. \* 1975; MS, 1973, PhD, 1975, Pennsylvania State University; urban geography, urban transportation geography, equity, gender.

Jackson, W. A. Douglas \* 1955, (Emeritus); PhD, 1953, University of Maryland; Canada, political systems, nature and culture.

Krumme, Gunter \* 1970; PhD, 1966, University of Washington; economic, organizational and marketing geography, location theory, regional development.

Lawson, Victoria A. \* 1986; PhD, 1986, Ohio State University; Latin America, critical development studies, feminist geography.

Mayer, Jonathan D. \* 1977; PhD, 1977, University of Michigan; medical geography, clinical applications, philosophy, human-environment relations.

Morrill, Richard L. \* 1955, (Emeritus); PhD, 1959, University of Washington; spatial organization, migration, population, diffusion, regional planning/development, inequality.

Nyerges, Timothy L. \* 1985; PhD, 1980, Ohio State University; GIS, collaborative decision support, growth management, transportation, environment, land use.

Thomas, Morgan D. \* 1959, (Emeritus); PhD, 1954, Queen's University (UK); regional economics, regional planning and development, technical innovation.

Velikonja, Joseph \* 1964, (Emeritus); PhD, 1948, State University (Italy); social and political geography, international migration, immigrants in America, eastern Europe.

Zumbrunnen, Craig \* 1977; PhD, 1973, University of California (Berkeley); resource analysis, Russia and NIS, quantitative methods, physical geography, urban ecology.

## Associate Professors

Braden, Kathleen 1989, (Affiliate); PhD, 1981, University of Washington

Chan, Kam Wing \* 1991; PhD, 1988, University of Toronto (Canada); economic development, urbanization, migration, China, Hong Kong.

Chang, Kuei-Sheng \* 1966, (Emeritus); PhD, 1955, University of Michigan; economic geography of China, historical geography of exploration, Third World development.

Ellis, John Mark 1999; PhD, 1988, Indiana University; labor markets, immigration, "race," ethnicity.

England, Kim V. L. 1999; MA, 1984, PhD, 1988, Ohio State University; feminist geographies, labor markets, service-sector employment, families, child care.

Jaros, Lucy A. \* 1990; PhD, 1990, University of California (Berkeley); critical development studies; food and agriculture, feminist geography, political ecology.

Kakiuchi, George H. \* 1957, (Emeritus); PhD, 1957, University of Michigan; Japan, agriculture, internal migration, regional geography.

Mitchell, Katharyne 1993; PhD, 1993, University of California (Berkeley); urban, cultural and economic geography, Pacific Rim, migration, transnational studies.

Waddell, Paul A. \* 1997, (Adjunct); PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

**Assistant Professors**

Brown, Michael P. \* 1997; PhD, 1994, University of British Columbia (Canada); local, political, cultural, health geography; gender and sexuality; history of geographic thought.

Chang, Stephanie E. \* 1997, (Research); PhD, 1994, Cornell University; natural hazards, economic geography, transportation and urban infrastructure, Japan.

Hayes, Michael V. 1990, (Affiliate); PhD, 1989, McMaster University (Canada)

Jhaveri, Nayna J. 1997, (Acting); MSc, 1984, PhD, 1999, University of Edinburgh (UK); political and cultural ecology, consumption and environment, common property systems, Asia.

Sparke, Matthew \* 1995; MA, 1991, PhD, 1996, University of British Columbia (Canada); geopolitics, Cascadia, borderlands studies, globalization.

Withers, Suzanne D. \* 1997; PhD, 1992, University of California (Los Angeles); population, spatial demography, urban housing, quantitative and longitudinal methods, poverty.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**GEOG 401 Culture, Capital, and the City (5) I&S**

*Brown* Examines current themes in social theory as they apply to the urban landscape. Includes the interconnections of cultural and economic processes and the spatial patternings of race, class, and gender in the modern urban context. Offered: A.

**GEOG 425 Qualitative Methodology in Geography (5) I&S**

*Jaroszk* Historical and philosophical overview of qualitative methodology in design of geography research strategies. Techniques of interviewing, participant observation, and archival research. Forms of analyses such as textual interpretation, discourse analysis and computer-aided analyses of interview transcripts and ethnography. Questions of ethics, field notes and write-up. Offered: W.

**GEOG 426 Quantitative Methods in Geography (5) I&S**

*Withers* Quantitative methods for empirical research in geography. Emphasis on statistical analysis; use of geographic data bases like the United States Census; understanding special issues and problems associated with geographically ordered data; verbal and graphic presentation in a computer environment. Recommended: GEOG 326. Offered: Sp.

**GEOG 430 Contemporary Development Issues in Latin America (5) I&S**

*Lawson* Contemporary development issues in Latin America, seen from a spatial perspective. Concept of development; competing theories as related to various Latin American states. Economic structural transformation, migration, urbanization, regional inequality, and related policies. Offered: A.

**GEOG 431 Geography and Gender (5) I&S**

*Jaroszk* Examines theories and case studies across international, national, and regional scales in order to illustrate the impacts of social and economic processes upon the construction of gender in particular places. Offered: Sp.

**GEOG 432 Population and Urbanization Problems of Russia and the Newly Independent States (5) I&S**

*ZumBrunnen* Historical background and evolution of Soviet/Russian population and urbanization processes and problems. Distinguishing demographic characteristics and recent trends in the growth and migration of rural and urban populations. Analysis of problems associated with ethnicity and nationality, regional-temporal labor demand and supply issues, and spatial-temporal well-being. Offered: odd years; Sp.

**GEOG 433 Resource Use and Management in Russia and the Newly Independent States (5) I&S**

*ZumBrunnen* Geographic and historical background of the natural resource base of Russia and the Newly Independent States. Geographic and historical perspectives on Soviet natural resource use and management in theory and practice. Implications of the breakup of the USSR for natural resource use and management. Offered: odd years; W.

**GEOG 434 Southeast Asia: Conflict and Development (5) I&S**

*Mitchell* Study of complexity of ethnic, cultural, and socioeconomic background in relation to division and rivalry in past; conflict and development in contemporary southeast Asia.

**GEOG 435 Industrialization and Urbanization in China (5) I&S**

*Chan* Examines the impacts of industrialization strategies adopted by the Peoples Republic of China on urbanization and rural-urban relations. Topics include: economic development strategies, industrial geography, rural industrialization, urban development patterns, migration, and urbanization policies. Recommended: GEOG 336. Offered: Sp.

**GEOG 440 Regional Analysis (5) I&S**

*Beyers* Regional industrial structures and economic change. Application of shift-share, cohort, multiplier, input/output, and programming models to the analysis and projection of regional population and employment patterns, regional growth differentials, and regional impact analysis. Recommended: GEOG 207. Offered: Sp.

**GEOG 442 Social Geography (5) I&S**

Review of concepts and methods of postwar social geography; historical roots and present orientations. Study of social spatial systems, their structures and functioning.

**GEOG 443 Location and Movement Models (5) I&S**

*Morrill* Application of models of optimum location and allocation; assignment, transportation, and spatial equilibrium; spatial interaction; geographic simulation; and spatial diffusion.

**GEOG 445 Population Distribution and Migration (5) I&S**

*Withers* Relation of population distribution to environment, economic development, and culture. Frontier and rural settlement, urbanization, and suburbanization. Regional variation in age, ethnicity, fertility, and mortality. Causes and effects of migration from the world to the local scale. Offered: A.

**GEOG 447 The Geography of Air Transportation (5) I&S**

Geographic analysis of world air routes, passenger and cargo flows, and airport activities; consideration of physical, economic, political, and institutional determinants of routes and flows.

**GEOG 448 Geography of Transportation (5) I&S**

Circulation geography, principles of spatial interaction emphasizing commodity flow, the nature and distribution of rail and water transport, the role of transport in area development.

**GEOG 449 Geography of Ocean Transportation (5) I&S**

Geographic analysis of ocean trade routes, cargo and passenger flows, and port activities. Evaluation of the role of the transportation carrier in international trade.

**GEOG 450 Theories of Location (5) I&S**

*Krummel* Derives basic micro-economic, decision-theoretical, managerial, and organizational-theoretical principles underlying consumer, commercial, industrial, and government behavior in physical, economic, transportation, and communication (including cyber-) space. Recommended: GEOG 207. Offered: A.

**GEOG 451 Cultural Geography of Latin America (5) I&S**

Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with SISLA 451.

**GEOG 458 Map Sources and Errors (5) I&S**

*Chrisman* Analysis and appraisal of source materials for maps, production constraints of mapping agencies, coverage and quality. Focus on errors inherent in maps and geographic information; metadata resources; judgment of fitness for specific applications. Prerequisite: 2.0 in GEOG 360.

**GEOG 460 Geographic Information Systems Analysis (5) I&S**

*Chrisman* Methods of Analysis provided by geographic information systems (GIS). Operations on map information including map overlay, aggregation/disaggregation, and other spatial and attribute procedures. Exposure to raster and vector software. Review of capabilities of current available GIS software. Prerequisite: 2.0 in GEOG 360. Offered: A.

**GEOG 461 Urban Geographic Information Systems (5) I&S**

*Nyerges* Use of geographic information systems to investigate urban/regional issues; focus on transportation, land-use and environmental issues; all urban change problems considered. GIS data processing strategies. Problem definition for GIS processing. Data collection, geocoding issues. Data structuring strategies. Prerequisite: 2.0 in GEOG 360; recommended: GEOG 277. Offered: W.

**GEOG 463 Geographic Information Systems Workshop (5) I&S**

*Chrisman, Nyerges* Practical experience applying geographic information system (GIS) tools to analyze spatial data. Workshop format requires student-motivated projects; diverse backgrounds encouraged. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: Sp.

**GEOG 465 Analytical Cartography (5) I&S**

*Chrisman* Algorithms and data structures for selected topics in computer-assisted cartography. Emphasis on point, line, area, and surface data representation, map design, generalization, and data transformations. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: odd years; W.

**GEOG 466 Regional Economic Development (5) I&S**

*Harrington* Provides a theoretical overview of sub-national, regional economic growth and structural change, including the roles of interregional interaction and international trade, technological change, social, and legal institutions. Emphasizes inter-regional disparities in the context of relatively wealthy countries. Explores the constraints and effectiveness of government (and other organizations') policy. Offered: W.

**GEOG 471 Methods of Resource Analysis (5) I&S**

*ZumBrunnen* Economic and noneconomic criteria for resource analysis. Theory and methods of linear models of natural resource analysis. Includes materials-balance modeling, residuals management, constrained system optimization approaches to water quality analysis, land-use patterns and interregional energy use, and multiple objective planning techniques applied to natural resource problems. Recommended: GEOG 370.

**GEOG 472 Ecoscapes: Nature, Culture, and Place (5) I&S** *Jhaveri* Relationship between nature, culture, and place as the heart of geographic inquiry. Examines how perceptions of nature are influenced by changing political-economic, cultural, and scientific practices. Uses cultural studies of ecological science as a primary method of analysis. Offered: Sp.

**GEOG 478 Intraurban Spatial Patterns (5) I&S** *Brown* Geographic patterns and processes within metropolitan areas. Economic land-use patterns (commercial and industrial location), social land-use patterns (segregation, housing, and neighborhood change), urban political geography, analysis of urban infrastructure, and assessment of contemporary and future trends in urban development. Recommended: GEOG 277. Offered: A.

**GEOG 480 Environmental Geography, Climate, and Health (5) I&S** *Mayer* Demonstrates and investigates how human-environment relations are expressed in the context of health and disease. Local and global examples emphasize the ways medical geography is situated at the intersection of the social, physical, and biological sciences. Examines interactions between individual health, public health, and social, biological, and physical phenomena. Offered: W.

**GEOG 490 Field Research: The Seattle Region (6) I&S** *Morrill* Field methods for contemporary urban research. Survey designs used in the analysis of transportation, land use, location of employment, shopping and housing, political fragmentation, and environmental degradation. Field report required, based on field work in the Seattle region.

**GEOG 492 Library Research in Geography (3) I&S** Introduction to library research methods in geography. Review and assessment of geographical bibliographies and abstract services for monographs, periodicals, gazetteers, dictionaries, encyclopedias, government publications, and statistical sources. Credit/no credit only.

**GEOG 494 Senior Essay (3) I&S** Supervised individual research and writing of major paper during senior year. Offered: AWSp.

**GEOG 495 Special Topics (\* max. 15) I&S** Topics vary and are announced in the preceding quarter. Offered: AWSpS.

**GEOG 496 Internship in Geography (3/5, max. 12)** Internship in the public or private sector, supervised by a faculty member. Credit/no credit only. Offered: AWSpS.

**GEOG 497 Tutorial in Geography (1-3, max. 6) I&S** *ZumBrunner* Intensive directed study and tutoring. Literature reviews, formulations of project outlines and research designs, orientation in contemporary geographic thought and trends. Directed writing. Required for honors students. Offered: AWSp.

**GEOG 498 Undergraduate Seminar in Economic Geography and Regional Science (3) I&S** *Krumme* Selected advanced topics and current problems in economic geography. Emphasis on formulating research questions, developing an appropriate research process, selecting methods, searching for resources, writing up and documenting research results, and using the Internet for research purposes. Offered: A.

**GEOG 499 Special Studies (\* max. 15)** Supervised reading programs, undergraduate and graduate library and field research; special projects for undergraduate honors students. Offered: AWSpS.

## Courses for Graduates Only

**GEOG 502 Professional Writing in Geography (\* max. 6)**

**GEOG 505 Research Seminar: China (5, max. 10)** *Chan* Offered: A.

**GEOG 507 Research Seminar: Canadian Problems (3, max. 6)** Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with SISCA 507.

**GEOG 512 History of Geographic Thought (5)** Historical development of modern geography. Emphasis on various philosophical and methodological debates in geography and the contexts from which they emerged. Investigates geography's foundational concepts and institutions; how they have responded to—and influenced—the world around them. Offered: A.

**GEOG 513 Research Grant Workshop (5, max. 10)** Writing research proposals. Participants learn to identify and approach sponsors; practice the peer-review process; develop a competitive research proposal. Prerequisite: GEOG 512 or GEOG 515 or equivalent; training and experience with quantitative, qualitative, or cartographic analysis; an already-formulated research project.

**GEOG 515 Evidence and Explanation in Geography (5)** *Sparke* Introduces the main strands of philosophical debate shaping the discipline of human geography, including description, prediction, explanation, abstraction, structuration, representation, and institutionalization. Focuses on ways "theories" from outside the discipline have shaped the questions and concerns of geographers, and the ways geography reworks such theories. Offered: Sp.

**GEOG 520 Research Seminar: Geographic Information Representation (5)** *Nyerges* Current issues in geographic information representation for geographic information systems (GIS). Includes representation for visualization, databases, and analyses. Prerequisite: one course in GIS.

**GEOG 531 Latin American Development Seminar (5, max. 10)** *Lawson* Evolution of development theory in Latin America from a spatial perspective. Theories and development issues, using case studies from Latin America. How geographers have conceptualized development problems and solutions. Prerequisite: GEOG 430. Offered: W.

**GEOG 532 Rural Development Seminar (5, max. 10)** *Jarosz* Contemporary issues in international development theory related to regional and agrarian change, with emphasis on Africa. Offered: Sp.

**GEOG 533 Research Seminar: Russia and the Newly Independent States (5, max. 10)** *ZumBrunner*

**GEOG 540 Research Seminar: Industrial Geography (5, max. 10)** *Beyers* Offered: W.

**GEOG 542 Research Seminar: Social and Population Geography (5, max. 10)** *Morrill* Offered: W.

**GEOG 553 Advanced Topics in Cultural Geography (5, max. 10)** *Mitchell* Focuses on important contemporary topics in cultural geography. Examines current theoretical debates in anthropology, sociology, geography, feminist criticism, and cultural studies as they relate to the landscape. Include critical questions surrounding issues of representation and ethnography. Designed to help student prepare for advanced fieldwork. Offered: Sp.

**GEOG 560 Geographic Information and Analysis (3, max. 6)** *Chrisman* Current research topics in geographic information systems. Particular emphasis on analytical methods, and their use in practical circumstances. Prerequisite: graduate status in GIS or related field. Offered: W.

**GEOG 563 Algorithms and Data Structures for Geographic Information Systems (5)** *Chrisman* Anatomy of a software package for geographic information processing. Emphasis on analysis of algorithmic complexity and software design techniques. Presents dynamic data structures, persistence of temporal data, and data flow algorithms. Prerequisite: GEOG 460, GEOG 465, and CSE 326 or CSE 373.

**GEOG 567 Research Seminar: Geography and Economic Development (5, max. 10)** *Harrington* Explores ways in which economic and social changes affect the well-being and development of subnational, regional economies. Explanatory roles of such factors as labor and labor institutions, governments, technical change, corporations, capital markets, information costs, and international trade in the process of global restructuring. Specific focus changes annually.

**GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6)** *ZumBrunner*

**GEOG 571 Research Seminar: Critical and Normative Ecologies (5)** *Jhaveri* Engages in an ecocritique of mainstream managerial environmentalisms by unearthing their ideological bases, and delves into the ethical underpinnings of ecological resistance struggles or green utopias such as ecofeminist, deep and social ecology, and environmental justice movements. Offered: A.

**GEOG 575 Advanced Political Geography (5)** *Sparke* Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with SIS 575.

**GEOG 577 Research Seminar: Internal Spatial Structure of Cities (4, max. 8)** *Hodge* Offered: A.

**GEOG 580 Medical Geography (3)** *Mayer* Geography of disease, consideration in health systems planning. Analysis of distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services; distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research; health-related issues. Offered: jointly with HSERV 586; W.

**GEOG 581 Seminar in Medical Geography (3)** *Mayer* Research and methodologies in medical geography; critical analysis of readings in medical geography; interrelations of medical geography with (1) other geographical specialties, (2) other health sciences. Prerequisite: GEOG 580. Offered: odd years; W.

**GEOG 597 Tutorial for Graduate Students (2)** Introduces beginning geography students to the main research agendas of the faculty; identifies the range of current discourse communities formed by current faculty and graduate students; establishes a process of mentoring and long-term planning for each new graduate student. Credit/no credit only. Offered: A.

**GEOG 598 Geography Colloquium (1, max. 3)**  
Participation in, and critique of, student thesis and dissertation research, faculty research, and visitor contributions. Offered: AWP.

**GEOG 599 Effective Teaching of Geography (1)**  
Designed for the ongoing development of effective teaching and professional skills. Topics/activities include micro-teaching, communications and presentation skills; course organization, time management, personal and small group dynamics; design of geography curricula using simulations and computer-assisted instruction in the classroom, and fostering of creative thinking. Credit/no credit only. Offered: A.

**GEOG 600 Independent Study or Research (\*)**  
Offered: AWP.

**GEOG 700 Master's Thesis (\*)** Offered: AWP.

**GEOG 800 Doctoral Dissertation (\*)** Offered: AWP.

## Geological Sciences

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General Catalog Web page:  
[www.washington.edu/students/genecat/academic/geo\\_sci.html](http://www.washington.edu/students/genecat/academic/geo_sci.html)



Department Web page:  
[www.geology.washington.edu](http://www.geology.washington.edu)

The geological sciences include the collection and interpretation of field and laboratory data as well as the application of principles of physics, chemistry, biology, and mathematics to the study of the earth, its environment, its origin, and the processes by which it has been transformed through time.

The department is well equipped with modern analytical, computational, and experimental facilities and has sizable research/teaching collections of rocks, minerals, and fossils.

## Graduate Program

Graduate Program Coordinator  
63 Johnson, Box 351310  
(206) 543-5405

The Department of Geological Sciences offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy. The department emphasizes a rigorous quantitative approach to significant problems in the geological sciences. Study in virtually all branches of geology is possible; any emphasis on field, laboratory, or theoretical work is largely dictated by the nature of the research problem selected.

While in the graduate program, students develop into productive scholars. Nearly all Geological Sciences doctoral graduates go on to teaching and research careers in academia, government organizations, or industry research laboratories.

## Research Facilities

Analytical, experimental, and computational research facilities include a wet chemistry laboratory, a Finnigan SOLA ICP-MS for elemental and isotopic analyses of rocks and fluids, a JEOL 733 Superprobe with EDS/WDS for mineral analysis, a thermal-ionization mass spectrometer and clean laboratory for separation of radiogenic and trace elements (Rb/Sr, Sm/Nd, U/Pb), two fully automated single-crystal x-ray diffractometers for crystal-structure studies at high temperature, a computer laboratory, a remote-sensing laboratory with an image-processing system with LANDSAT tape li-

brary and spectral reflectance equipment, and high temperature controlled atmosphere furnaces. Additional facilities are provided by the Burke Memorial Washington State Museum which houses paleontological laboratories and extensive reference collections of invertebrate, vertebrate, and plant fossils, and minerals, and the Quaternary Research Center (scanning and transmission electron microscopes, radiocarbon and stable-isotope research laboratories, palynology, snow and ice research, and a periglacial laboratory).

## Master of Science

*Graduation Requirements: With Thesis*—36 credits, of which 18 must be in courses at the 400 level or above and up to 9 may be for thesis (GEOL 700). Final examination consists of oral presentation and defense of thesis. *Without Thesis*—45 credits, of which 18 must be in courses at the 400 level or above, which includes a 5-credit research paper (GEOL 600). Final examination is oral and is administered by the supervisory committee. All students entering the M.S. program must present approved field courses or other approved field experience.

## Doctor of Philosophy

*Graduation Requirements:* Credits variable; one-half total program, including dissertation, must be in courses at the 500 level or above; a minimum of 27 credits for thesis (GEOL 800); at least 18 credits completed with numerical grade in courses at the 400 and 500 levels. Completion of two years of graduate study, passage of the Ph.D. entrance requirement which includes the defense of a proposal, General Examination, and admission to candidacy; completion of acceptable dissertation and passage of Final Examination.

## Financial Aid

The department awards annually a number of teaching assistantships, endowed fellowships and scholarships, and research assistantships. Industry-sponsored grants are also available. Qualified students are strongly encouraged to apply for National Science Foundation and other fellowships available through national and private agencies.

## Faculty

### Acting Chair

Darrel S. Cowan

### Professors

Adams, John B. \* 1975, (Emeritus); MS, 1958, PhD, 1961, University of Washington; planetology, remote sensing.

Atwater, Brian F. \* 1986, (Affiliate); MS, 1974, Stanford University; PhD, 1980, University of Delaware; paleoseismology, neotectonics, regional geology, seismic hazards.

Bostrom, Robert C. \* 1964, (Emeritus); MA, 1952, PhD, 1961, Oxford University (UK); geotectonics, geophysics.

Brown, J. Michael \* 1984, (Adjunct); PhD, 1980, University of Minnesota; experimental and theoretical mineral physics at high pressure and temperature.

Cowan, Darrel S. \* 1974; PhD, 1972, Stanford University; structural geology and regional tectonics.

Creager, Joe S. \* 1958, (Emeritus); PhD, 1958, Texas A&M University; geological oceanography, sedimentology.

Crosson, Robert S. \* 1966, (Adjunct); PhD, 1966, Stanford University; seismology, structure and tectonics, earthquake hazards.

Delaney, John R. \* 1977, (Adjunct); PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.

Dunne, Thomas \* 1973, (Affiliate); PhD, 1969, Johns Hopkins University; geomorphology and hydrology.

Evans, Bernard W. \* 1969; PhD, 1959, Oxford University (UK); petrology and mineralogy.

Ghiorso, Mark S. \* 1980; MA, 1978, PhD, 1980, University of California (Berkeley); geochemistry.

Ghose, Subrata \* 1972; PhD, 1959, University of Chicago; mineralogy.

Gillespie, Alan R. \* 1985; PhD, 1982, California Institute of Technology; landscape evolution, paleoclimate, geochronology, and applications of remote sensing.

Hallet, Bernard \* 1980; PhD, 1975, University of California (Los Angeles); glaciology, permafrost studies, geomorphology.

Johnson, Harlan Paul \* 1976, (Adjunct); PhD, 1972, University of Washington; paleomagnetism and marine geophysics.

Leopold, Estella B. \* 1976, (Adjunct); PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environment.

Mallory, V. Standish \* 1952, (Emeritus); PhD, 1952, University of California (Berkeley); biostratigraphy, micro-paleontology, paleoecology.

McCallum, Ian S. \* 1970; PhD, 1968, University of Chicago; petrology.

Merrill, Ronald T. \* 1967; PhD, 1967, University of California (Berkeley); geomagnetism, geophysics of solids, rock magnetism.

Nelson, Bruce K. \* 1986; PhD, 1985, University of California (Los Angeles); isotopic and geochemical investigations.

Newhall, Christopher \* 1994, (Affiliate); PhD, 1980, Dartmouth College; volcanology.

Nittroer, Charles \* 1998; PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.

Porter, Stephen C. \* 1962; PhD, 1962, Yale University; Quaternary geology and geomorphology.

Raymond, Charles F. \* 1969, (Adjunct); PhD, 1969, California Institute of Technology; glaciology, glacier and ice sheet dynamics.

Rensberger, John M. \* 1966; PhD, 1967, University of California (Berkeley); Cenozoic mammalian evolution, taxonomy, and biostratigraphy.

Sack, Richard O. \* 1993, (Affiliate); PhD, 1979, Harvard University; petrology, thermochemistry of rock-forming minerals.

Stuiver, Minze \* 1969, (Emeritus); PhD, 1958, University of Groningen (Netherlands); geochronology, isotope geology.

Swanson, Donald A. \* 1992, (Affiliate); PhD, 1964, Johns Hopkins University; volcanology.

Tsukada, Matsuo \* 1969, (Adjunct); PhD, 1961, Osaka City University (Japan); interpretation of Quaternary events from palynological and kindred data.

Ward, Peter D. \* 1984; PhD, 1976, McMaster University (Canada); invertebrate paleontology, paleobiology.

Washburn, A. Lincoln 1974, (Emeritus); PhD, 1942, Yale University; geomorphology, periglacial processes and environments.

**Associate Professors**

Anderson, Patricia M. \* 1982, (Research); MA, 1976, PhD, 1982, Brown University; paleoecology, paleoclimatology, Quaternary studies, biogeography, North American archaeology.

Bergantz, George W. \* 1988; PhD, 1988, Johns Hopkins University; physical petrology, heat and mass transfer, geophysics.

Booth, Derek B. \* 1980, (Adjunct Research); PhD, 1984, University of Washington; geomorphology, environmental geology.

Bourgeois, Joanne \* 1980; PhD, 1980, University of Wisconsin; sedimentology, sedimentary geology.

Cheney, Eric S. \* 1964; PhD, 1964, Yale University; economic geology, sequence stratigraphy.

Irving, Anthony J. \* 1979, (Affiliate); PhD, 1972, Australian National University; igneous petrology and geochemistry.

Iverson, Richard M. \* 1990, (Affiliate); PhD, 1984, Stanford University; landslides, debris flows, granular materials, geomechanics, hydrology, geomorphology.

Montgomery, David R. \* 1991; PhD, 1991, University of California (Berkeley); earth surface processes, especially those occurring in mountain drainage basins.

Stewart, Richard J. \* 1969; PhD, 1970, Stanford University; sedimentary petrology, diagenesis of sediment.

Vance, Joseph A. \* 1957, (Emeritus); PhD, 1957, University of Washington; igneous and metamorphic petrology, general geology.

**Assistant Professors**

Cladouhos, Trenton T. 1995, (Affiliate); PhD, 1993, Cornell University; structural geology, hydrogeology of fractured rocks.

Kress, Victor C. 1990, (Research); PhD, 1990, University of California (Berkeley); igneous petrology, volcanology, experimental petrology.

Nesbitt, Elizabeth A. \* 1993, (Affiliate); PhD, 1982, University of California (Berkeley); paleontology, K-12 education.

Sletten, Ronald S. 1983, (Research); MS, 1987, PhD, 1995, University of Washington; aquatic geochemistry, polar soils.

Stone, John O. H. \* 1998; PhD, 1986, Cambridge University (UK); Quaternary dating and geomorphical studies with cosmic-ray-produced isotopes.

Weeks, Robin J. 1992, (Research); PhD, 1988, University of California (Santa Barbara); remote sensing and global/regional change.

Willett, Sean D. \* 1998; PhD, 1988, University of Utah; numerical modeling of lithospheric processes.

**Senior Lecturer**

Chernicoff, Stanley E. 1981; PhD, 1980, University of Minnesota; geomorphology.

**Lecturer**

Swanson, Terry W. 1988; MA, 1989, University of California (Davis); PhD, 1994, University of Washington; cosmogenic isotopes, Quaternary studies.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**GEOL 401 Field Geology (12) NW** Six weeks of geologic mapping in a variety of rock types in the western United States. Enhances students' knowledge of geologic phenomena and processes. Development of skills in mapping, field interpretation, and report writing. Students responsible for own living expenses while in the field. Prerequisite: GEOL 203; two courses selected from GEOL 391, GEOL 392, and GEOL 393. Offered: S.

**GEOL 402 International Field Geology (12) NW** Supervised geological field work in classic, instructive international sites. Venue varies from year to year. Work may include geologic mapping, construction of cross sections, measurement and analysis of stratigraphic sections, field excursion, and supervised individual research projects. Prerequisite: GEOL 401. Offered: S.

**GEOL 403 Principles of Paleobiology (4) NW Ward** Fossil record and methods of analysis. Biologic systems in geologic time, including preservation, variation, population structure, adaptation, functional morphology, biostratigraphy, paleoecology, evolution, and biogeography.

**GEOL 405 Global Geophysics and Plate Tectonics (5) NW Willett** Introduction to geophysical features of the earth including gravity, magnetic, and temperature fields. Use of geophysical methods including seismology, heat flow, and paleomagnetism to study geophysical and geological processes in the context of plate tectonic theory. Prerequisite: PHYS 121. Offered: A.

**GEOL 408 Regional Geology of the Pacific Northwest (5) NW Cheney** Explores the geological diversity of the Pacific Northwest temporally (Archean to Pleistocene), tectonically (craton, terranes, and cover sequences), and lithologically (ophiolites to coal). Three weekend field trips required. Offered: A.

**GEOL 409 Great Geological Issues (3) NW Bourgeois** History and development of geological and paleontological theories and controversies; philosophy and methodology that have driven scientific inquiry in the earth sciences. Recommended: HIST 311; HIST 312. Offered: alternate years.

**GEOL 410 Introduction to Geological Remote Sensing (4) NW Gillespie** Principles of image interpretation for geologists. Study of land forms, structure, lithology, surface processes using aircraft and satellite data. Use of digital multispectral images and radar images for geological mapping. Offered: A.

**GEOL 411 Geomorphology (5) NW** Introduction to landforms and surficial deposits. Emphasis on landscape-forming processes. Intended for students who wish to take additional courses in geomorphology. Prerequisite: PHYS 121; PHYS 131. Offered: A.

**GEOL 412 Fluvial Geomorphology (5) NW Montgomery** Hydraulic and morphological characteristics of streams and valley floors. Landscape evolution by stream erosion and deposition. Field exercises emphasize quantitative analysis of fluvial processes, channel forms, acquisition of various skills, such as mapping, topographic surveying, report writing. Prerequisite: either GEOL 392 or GEOL 411.

**GEOL 413 Hillslope Geomorphology (5) NW Montgomery** Theoretical, laboratory, and field study of hillslope evolution by mass wasting and water erosion. Prerequisite: either GEOL 392 or GEOL 411. Offered: alternate years; W.

**GEOL 414 Intermediate Spectral Remote Sensing (4) NW Gillespie, Weeks** Explores spectral image processing with ENVI software, used in individualized projects involving satellite or aircraft images. Emphasis on integration of remote sensing and field measurement using process models and Geographic Information Systems (GIS). Recommended: introductory courses in physics, chemistry, calculus, geology, and field geology. Prerequisite: GEOL 410. Offered: W.

**GEOL 415 Principles of Glaciology (3) NW Hallet, Porter, Raymond, Waddington, Warren** Snow deposition and metamorphism, avalanches, heat and mass balance at snow and ice surfaces, glacier flow, ice sheets, sea ice, permafrost, methods of paleoclimate reconstruction, Ice Age theories. Offered: jointly with GPHYS 415; A.

**GEOL 416 Glacial Geology (3) NW Porter** Interpretation of glacial environments and history through study of sediments and landforms; stratigraphic approaches, chronology, reconstructions, applications. Recommended: GEOL 415.

**GEOL 417 Environmental Change in the Glacial Ages (3) NW Porter** Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with QUAT 417.

**GEOL 418 Alpine and Polar Landscape (3) NW Hallet** Processes responsible for landforms and deposits in alpine and polar regions. Focuses on the underlying processes many of which are ice related. Includes discussions of linkages between glacial erosion and tectonics in active high mountain ranges, and between permafrost/glaciers and global climate. Prerequisite: GEOL 201.

**GEOL 419 Landscape Evolution (5) NW Hallet** Advanced examination of landscape evolution. Emphasis on interactions among tectonics, climate, and hillslope, fluvial, and glacial processes. Intended for seniors and graduate students in geomorphology and related disciplines. Prerequisite: either GEOL 412, GEOL 413, or GEOL 418. Offered: alternate years; W.

**GEOL 420 Mineralogy (5) NW Ghose** Symmetry of crystals and crystal structures. Rules of crystal chemistry. Microscopic, diffraction, and spectroscopic techniques of mineral characterization. Transformation processes in minerals: order-disorder, phase transition, and exsolution. Crystal chemistry and phase relations. Reactions on mineral surfaces. Physical properties, deformation, and creep. Prerequisite: CHEM 142; PHYS 123; GEOL 202; GEOL 391. Offered: W.

**GEOL 423 Optical Mineralogy (2) NW Evans** Petrographic microscopy and recognition of common minerals in thin section. Prerequisite: GEOL 202. Offered: A.

**GEOL 424 Petrology of Igneous Rocks (5) NW McCallum** Systematic study of the major families of volcanic and plutonic igneous rocks with emphasis on tectonic setting, phase relations, geochemistry, and models of their origin and evolution throughout geologic time. Laboratory emphasizes thin-section study of rocks using transmitted and reflected light. Prerequisite: GEOL 391; GEOL 423. Offered: W.

**GEOL 425 Petrography and Petrology of Metamorphic Rocks (5) NW** *Evans* Mineralogy, textures, and origins of metamorphic rocks; metamorphic facies and metamorphic phase equilibria; controls of metamorphism. Prerequisite: GEOL 391; GEOL 423. Offered: Sp.

**GEOL 426 Petrology and Petrography of Sedimentary Rocks (5) NW** *Stewart* Mineralogy, textures, and origin of sedimentary rocks, using petrographic microscope. Prerequisite: GEOL 391.

**GEOL 430 Invertebrate Paleontology (5) NW** *Ward* Important larger invertebrate groups; morphology, classification, stratigraphic distribution, evolution, paleoecology.

**GEOL 435 Seismic Exploration (5) NW** *Brown* Introduction to theory and practice of seismic exploration. Application of refraction and reflection techniques to problems in engineering geology and mineral exploration. Constraints in the interpretation of subsurface structure. Prerequisite: GEOL 392; either MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with GPHYS 435.

**GEOL 437 Fossil Vertebrates (5) NW** *Rensberger* Highlights in evolutionary history of the fossil vertebrates, from early Paleozoic fishes through late Cenozoic mammals. Morphology, adaptations, relationships of the major groups. Bone structures and systematic relationships. Field trip. Prerequisite: either GEOL 100 or BIOL 101.

**GEOL 438 Fossil Mammals (5) NW** *Rensberger* Evolutionary relationships of fossil mammals, from mammal-like reptiles of late Paleozoic to diverse Cenozoic groups. Morphology, adaptations, extinctions, evolutionary patterns. Structures and relationships of most major groups. Field trip. Prerequisite: either GEOL 100, BIOL 101, or GEOL 437.

**GEOL 440 Structure and Tectonics (5) NW** *Cowan* Geometry, kinematics, and tectonic setting of major types of structures, including those in contractional fold-and-thrust belts; extended crust; strike-slip-dominated regimes; and shear zones. Laboratory exercises develop basic tools of structural geology. Prerequisite: GEOL 203; GEOL 392. Offered: Sp.

**GEOL 452 Principles of Sediment Transport by Turbulent Flow (3) NW** Theoretical and experimental techniques used in studying erosion, transportation, and deposition of sediment. Initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediments, and applications of sediment transport theory to problems of geological interest. Prerequisite: GEOL 455. Offered: jointly with OCEAN 452.

**GEOL 455 Geodynamics (4) NW** Principles of continuum mechanics, their application to flow of water, mud, magma; deformation of soil, rock, ice. Emphasis on sound physical understanding of these principles and use of elementary mathematics in their application to earth sciences problems. Prerequisite: GEOL 392; either MATH 126, MATH 129, or MATH 136; PHYS 121.

**GEOL 461 Stratigraphy (4) NW** *Bourgeois* Systematic study of stratified rocks and space-time implications. Principles of stratigraphy, including biostratigraphy, magnetostratigraphy, seismic stratigraphy, subsurface analysis. Basin analysis, evolution of sedimentary basins and continental margins. Prerequisite: GEOL 203. Offered: A.

**GEOL 462 Depositional Environments (4) NW** *Bourgeois* Principles of sedimentary facies analysis, including survey of modern processes that produce sedimentary sequences. Recognition of various depositional environments represented in the geologic record, including terrestrial, marine terrigenous, and carbonate environments. Two field trips required. Prerequisite: GEOL 203. Offered: Sp.

**GEOL 474 Introduction to X-Ray Crystallography (3) NW** *Ghose* Point groups and space groups. Reciprocal lattice. Theory of x-ray diffraction from single crystals. Powder diffraction; identification of unknowns and determination of precise cell dimensions. Single crystal camera (precession and Weissenberg) techniques; determination of cell dimensions and space groups; study of exsolution and phase transformation in rock-forming silicates. Structure factor formula and the use of three-dimensional Fourier and Patterson series in the determination of crystal structures. Prerequisite: GEOL 391; PHYS 123.

**GEOL 476 Isotope Geology (3) NW** The geochemistry of stable isotopes. Topics covered include the chemical properties of isotopes, a survey of isotopic variations in nature, application of isotopes as natural tracers in surficial processes, and the use of isotopic proxy indicators for interpreting paleoclimate. Prerequisite: GEOL 391.

**GEOL 477 Isotope and Trace Element Geology: Lithosphere (3) NW** *Nelson* Radiogenic isotopes and trace element as petrogenetic indicators; evolution of earth's major geochemical reservoirs; application to problems in igneous, metamorphic, sedimentary petrology; stable isotope geothermometry; nucleosynthesis, origin, and chronology of solar system formation; U-Th disequilibrium series. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; GEOL 391.

**GEOL 478 Age Determinations in the Earth Sciences and Archaeology (3) NW** *Stone* Principles and methods of age dating with a strong focus on radiocarbon dating. Other techniques include dendrochronology, amino acid, potassium argon, uranium series, and thermoluminescence dating. History of past climatic change and cultural-global change applications.

**GEOL 480 Volcanic Processes (3) NW** *Bergantz, Nelson, Newhall* Pre-eruption, eruption, and post-eruption processes. Examines triggers of magma ascent, controls on volatile build-up and loss, magma fragmentation, magma-groundwater interaction, eruption column dynamics, gravity-controlled eruptive phenomena, syn- and post-eruption lahars and other re-working of deposits. Prerequisite: GEOL 391 or GEOL 392. Offered: Sp.

**GEOL 485 Geology of Ore Deposits (5) NW** *Cheney* The geologic principles, environmental aspects, and exploration strategies of selected types of metallic and nonmetallic ore deposits and coal. Prerequisite: GEOL 391.

**GEOL 488 Economic Field Geology (5) NW** *Cheney* Identification of hydrothermally altered rocks, oxidation, and supergene enrichment; principles of exploration, geochemistry and remote sensing. Four-to-eight-day field trip to mining districts for field inspection of ore deposits. Two weekends (three days each) mapping mineral deposits. Prerequisite: GEOL 485. Offered: Sp.

**GEOL 490 Special Topics (2-10, max. 20) NW**

### Courses for Graduates Only

**GEOL 509 Great Geological Issues (3)** *Bourgeois* History and development of geological and paleontological theories and controversies; philosophy and methodology that have driven scientific inquiry in the earth sciences. Requires a term paper analyzing primary material. Prerequisite: GEOL 409 and graduate standing in earth sciences, or in history of science, or permission of instructor.

**GEOL 511 Seminar in Geomorphology and Hydrology (\* max. 3)** Credit/no credit only. Prerequisite: graduate status and permission of instructor.

**GEOL 520 Advanced Mineralogy (3)** *Ghose* Crystal symmetry; point groups, space groups. Mathematical description of crystal structures; group theory, irreducible representations; tensor description of physical properties: stress, strain, piezoelectricity, elasticity; structural and magnetic phase transitions, Landau theory, deformation and creep crystals; elasto-viscous properties of earth's mantle, crystal chemistry, solid state reactions. Offered: jointly with MSE 518.

**GEOL 524 Petrogenesis of Igneous Rocks (3)** *McCallum* Origin of one or more of the major groups of igneous rocks. Selected petrogenetic problems in light of tectonic setting, petrography, geochemistry, and experimental studies. Prerequisite: GEOL 424 or equivalent. Offered: alternate years.

**GEOL 525 Theoretical Metamorphic Petrology (4)** *Evans* Theoretical treatment of metamorphic mineral assemblages and metamorphic processes. Prerequisite: GEOL 425, CHEM 456, or equivalent.

**GEOL 526 Advanced Igneous Petrology (4)** *Cry-*stal-liquid-vapor equilibria in magmatic systems. Physical properties of silicate melts. Geothermometry and geobarometry in igneous rocks. Models of fractionation, assimilation, and magma mixing. Trace elements, radiogenic isotopes, and stable isotopes as tracers in magmatic processes. Nucleation, crystal growth, and diffusion in melts. Prerequisite: GEOL 391, GEOL 424. Offered: alternate years.

**GEOL 527 Phase Equilibria in Magmatic Systems (4)** *McCallum* Phase equilibria in simple and multicomponent systems appropriate to the crystallization of igneous rocks. Effect of volatiles and variable oxidation states on phase equilibria. Application to the petrogenesis of common igneous rocks. Prerequisite: GEOL 391 and GEOL 424. Offered: alternate years.

**GEOL 533 Seminar in Vertebrate Paleontology (3, max. 9)** *Rensberger* Advanced topics in vertebrate evolution, morphology, classification, function, ecology, and stratigraphy. Subject to be chosen by class at beginning of quarter. Prerequisite: advanced standing in paleontology, vertebrate zoology, or biocultural anthropology.

**GEOL 548 Tectonic Evolution of Western North America (4)** *Cowan* Survey of each of the major Mesozoic and Cenozoic tectonic provinces in western North America, emphasizing structural styles, tectonic framework, and plate-tectonic setting. Provinces include: Laramide, Rocky Mountain thrust belt, Basin and Range, Cordilleran core complexes, San Andreas, Sierran-Klamath, Franciscan-Great Valley, Vancouver Island-San Juan Islands-North Cascades. Prerequisite: GEOL 440.

**GEOL 550 Theoretical Structural Geology (4)** Analysis of finite deformation; elastic, plastic, and viscous behavior; dislocations and crystal deformation; deformation mechanisms and flow laws for rocks; formation of folds, boudinage, and mullions; tensile fracture and the growth of joints, dikes, and veins; mechanics of faulting; large-scale crystal deformation. Credit/no credit only.

**GEOL 556 Planetary Surfaces (3)** Comparison of surface processes and conditions on Mercury, Venus, Earth, moon, Mars, asteroids, and satellites of the great planets. Emphasis on understanding how and why planetary surfaces differ from one another and on the implied course of solar-system evolution. Analysis of data from Earth-based telescopes and from manned and unmanned space missions. Offered: jointly with ASTR 556/GPHYS 556; alternate years.

**GEOL 557 Origin of the Solar System (3)** Nebular and nonnebular theories of the origin of the solar system; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; examination of the physical and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ASTR 557/GPHYS 557.

**GEOL 560 Mechanics of Erosion and Sediment Transport (3)** Physics of transportation of sediment by turbulent flows. Use of theoretical fluid mechanics to formulate and solve problems of bed-load and suspended-load transport. Prerequisite: GEOL 455 or MATH 329, and GEOL 452.

**GEOL 564 Sedimentology of Carbonate Rocks (2-4, max. 4)** *Bourgeois* Petrographic and environmental interpretation of carbonate sediments and rocks. Hand-specimen and thin-section studies, with references to modern and ancient carbonate environments. Offered: alternate years.

**GEOL 565 Interpretation of Sedimentary Structures (2-4, max. 4)** *Bourgeois* Physical and environmental analysis of sedimentary structures, including biogenic sedimentary structures. Clastic sediments and rocks. Field trips required.

**GEOL 571 Transport Theory and Applications in Geology (3)** *Bergantz* Introduction to the quantitative treatment of transport phenomena with applications to igneous processes and metamorphism, magma and mantle convection, flow and reaction in regional and contact metamorphism. Emphasis on the governing equations of heat transfer, fluid and porous media flow, rheology, and analytical, numerical, and scaling solutions. Prerequisite: AMATH 402.

**GEOL 572 Solution Geochemistry (4)** *Ghiorso* Solution chemistry and thermodynamics as applied to solid and liquid silicates and aqueous fluids. Modeling configurational entropies in solids, activity coefficients and complexes in aqueous solution, and modeling chemical mass transfer in geologic systems. Prerequisite: GEOL 391 or equivalent.

**GEOL 573 Electron Beam Microanalysis (4)** *Kuehner* Materials analysis using electron beams, including electron-target interactions, wave and energy dispersive x-ray analysis, scanning electron microscopy, and applications of these and related techniques to geological problems. Credit/no credit only.

**GEOL 574 Advanced X-Ray Crystallography (4)** *Ghose* Theory of x-ray diffraction; determination of crystal structures with special emphasis on minerals and inorganic compounds, through the application of three-dimensional Patterson function, Fourier series, and direct methods; structure refinement; determination of cation distribution, exsolution, and antiphase domain structure through x-ray diffraction. Prerequisite: GEOL 474 or permission of instructor.

**GEOL 575 Physics and Chemistry of the Earth's Interior (3)** *Brown, Creager, Irving, Merrill* Emphasizes current issues in global tectonics and mantle dynamics. Examples include global seismic tomography and its bearing on geodynamics, the fate of subducted lithosphere and geochemical constraints on mantle convection. Prerequisite: permission of instructor. Offered: jointly with GPHYS 575.

**GEOL 579 Magma Physics (3)** *Bergantz* The quantitative treatment of magmatic processes: thermo-mechanical state of the lithosphere, solidification, convection, conjugate heat transfer, crystal settling, magma mixing, diapirism and melt extraction, hydrothermal convection. Emphasis on continental lithosphere. Prerequisite: GEOL 571, AMATH 403.

**GEOL 582 Seminar in Sedimentology (2-4)** *Bourgeois* Selected problems of current interest; extended field trips to classic sedimentologic localities.

**GEOL 586 Economic Geology of Sedimentary Rocks (5)** *Cheney* Description and origin of metallic and nonmetallic ore deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite: GEOL 485 or equivalent or permission of instructor. Offered: alternate years.

**GEOL 587 Economic Geology of Igneous and Metamorphic Rocks (5)** *Cheney* Description and origin of metallic and nonmetallic ore deposits formed in igneous and metamorphic rocks or by igneous and metamorphic processes. Prerequisite: GEOL 485 or equivalent or permission of instructor. Offered: alternate years.

**GEOL 590 Special Topics (2-10, max. 20)**

**GEOL 600 Independent Study or Research (\*)** Credit/no credit only.

**GEOL 700 Master's Thesis (\*)**

**GEOL 800 Doctoral Dissertation (\*)**

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## Geophysics

202 Atmospheric Sciences Building



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/geophysics.html](http://www.washington.edu/students/gencat/academic/geophysics.html)



Department Web page:  
[www.geophys.washington.edu](http://www.geophys.washington.edu)

Geophysics is the study of the earth's constitution and behavior from its core to the near-space environment. Because solid, liquid, and gaseous elements of our dynamic planet interact in complex ways, geophysics is an interdisciplinary science that draws on fundamentals of mathematics, physics, and chemistry which are applied to the earth systems.

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## Graduate Program

Graduate Program Coordinator  
218 Atmospheric Sciences-Geophysics, Box 351650  
(206) 685-8992  
grad@geophys.washington.edu

The Geophysics program offers graduate study leading to the Master of Science and Doctor of Philosophy degrees. These degrees cover a broad range of topics in which the analytic techniques of physics and mathematics are brought to bear on problems of the earth and its environment. Major areas of interest are the internal and surface structures of planets, dynamic processes within the earth, oceans, atmosphere, and space environments, along with the associated environmental applications of these processes, and the interactions of the earth, ice, ocean, atmosphere, and near-space regions in the climate system.

The required curriculum is flexible to permit pursuit of the wide variety of scientific disciplines that may be necessary for approaching a specific geophysical problem. However, a core curriculum of basic physics and mathematics, and a sequence of courses dealing with some of the important problems encountered in space, the atmosphere, the oceans, and the solid earth are required. Additional specialized course work is necessary before a student embarks on a thesis project identified by the student and a faculty committee.

## Special Requirements

Qualification for the Ph.D. program is a process that considers course and research performance together with the result of an oral exam that is based on a research proposition and is normally given to students at the beginning of their second year. Students who do not qualify for the Ph.D. program by means of this process may be reconsidered following completion of an M.S. program.

## Financial Aid

Most financial aid is provided through graduate research assistantships that enable students to work with individual faculty members on research projects. However, two teaching assistantships also are awarded each year.

## Research Facilities

Research facilities include field equipment for electromagnetic induction studies; a high-pressure/temperature laboratory, including a laser-induced phonon spectrometer and diamond anvil cells for studying such rock and mineral properties as compression, sound velocities, and thermal conductivity; a permanent, statewide seismic network; a portable telemetered seismic network for studying volcanoes and active faults in western North America; geodetic-quality global-positioning-system receivers; a cold laboratory for studying problems in snow-cover geophysics, glaciology, and sea-ice research; a geophysical-fluids laboratory; a space-physics laboratory for preparing balloon, rocket, and satellite experiments; and a laboratory for the development of high-resolution optical instrumentation.

Computer facilities include a local area network linking a high-speed, large-storage server with various laboratory workstations and peripheral devices. This local net is connected to a campuswide fiber-optic ring that provides access to other campus computers and national networks.

Many of the geophysics faculty members also have laboratories or access to laboratories in other departments, thus making possible a wide diversity of research opportunities. This is particularly valuable in such fields as aeronomy, tropospheric aerosols, mineral physics, and geophysical fluid mechanics. The primary center for global digital seismic data, the IRIS Data Management System, is hosted by the Geophysics department.

In addition to laboratory work, field programs are carried out at a number of remote sites, particularly in the Washington Cascades and Olympics, Tibet, South America, and Antarctica. In marine geophysics, joint geophysics/oceanography projects provide opportunities for studying the earth's structure and tectonic processes on the sea floor. Facilities for reflection profiling and long-range seismic refraction are also available.

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## Faculty

### Chair

J. Michael Brown

### Professors

Baker, Marcia \* 1980; MS, 1960, Stanford University; PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Bergantz, George W. \* 1988, (Adjunct); PhD, 1988, Johns Hopkins University; physical petrology, heat and mass transfer, geophysics.

Booker, John R. \* 1971; PhD, 1968, University of California (San Diego); geomagnetic induction, magnetotellurics, inverse theory, geophysical fluid dynamics.

Brown, J. Michael \* 1984; PhD, 1980, University of Minnesota; experimental and theoretical mineral physics at high pressure and temperature.

Businger, Joost A. \* 1958, (Emeritus); PhD, 1954, University of Utrecht (Netherlands); boundary layer meteorology, air-sea interaction, atmospheric turbulence.

Charlson, Robert J. \* 1962, (Emeritus); MS, 1959, Stanford University; PhD, 1964, University of Washington; atmospheric chemistry, aerosol physics, aerosol/cloud/climate interaction and instrumentation.

Clark, Kenneth C. \* 1948, (Emeritus); PhD, 1947, Harvard University; optical spectroscopy, upper atmosphere.

Creager, Kenneth C. \* 1986; PhD, 1984, University of California (San Diego); global seismology and geophysical inverse theory.

Criminale, William O. \* 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, mathematical physics, nonlinear mechanics, stability theory.

Crosson, Robert S. \* 1966; PhD, 1966, Stanford University; seismology, structure and tectonics, earthquake hazards.

Ghose, Subrata \* 1972, (Adjunct); PhD, 1959, University of Chicago; mineralogy.

Hernandez, Gonzalo \* 1988, (Research); PhD, 1962, University of Rochester; optical interference phenomena, with application to remote sensing of atmospheres.

Holzworth, Robert \* 1982; PhD, 1977, University of California (Berkeley); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms.

LaChapelle, Edward R. \* 1955, (Emeritus); ScD, 1967, University of Puget Sound; snow-ice physics.

Leovy, Conway B. \* 1967, (Emeritus); PhD, 1964, Massachusetts Institute of Technology; climatic role of clouds, planetary atmospheres and astrobiology, upper-atmosphere circulation.

Lewis, Brian T. R. \* 1970; PhD, 1970, University of Wisconsin; marine geophysics, marine seismology, gravity, magnetics, and computer modeling of those processes.

Malone, Stephen \* 1972, (Research); PhD, 1972, University of Nevada; volcano seismology, general seismic network operations.

Maykut, Gary \* 1969, (Research); PhD, 1969, University of Washington; polar air-sea-ice interaction, radiative transfer in ice and snow.

Merrill, Ronald T. \* 1967; PhD, 1967, University of California (Berkeley); geomagnetism, geophysics of solids, rock magnetism.

Parks, George K. \* 1971; PhD, 1966, University of California (Berkeley); particles and waves in auroral, magnetospheric, and interplanetary space plasma phenomena.

Raymond, Charles F. \* 1969; PhD, 1969, California Institute of Technology; glaciology, glacier and ice sheet dynamics.

Smith, Stewart W. \* 1970, (Emeritus); PhD, 1961, California Institute of Technology; seismology, earthquake risk, seismotectonics.

Untersteiner, Norbert \* 1957, (Emeritus); PhD, 1950, University of Innsbruck (Austria); air-sea-ice interaction, polar climatology, sea ice physics.

Waddington, Edwin D. \* 1984; PhD, 1981, University of British Columbia (Canada); glacier and ice sheet modeling, interpretation of ice sheet stratigraphy.

Warren, Stephen G. \* 1981; MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow, and sea ice, Antarctic climate.

Whipple, Elden C. 1995, (Affiliate); PhD, 1965, George Washington University; magnetospheric physics, spacecraft-plasma interactions, kinetic theory of plasmas.

### Associate Professors

Conway, Howard B. \* 1987, (Research); PhD, 1986, University of Canterbury (New Zealand); glaciology with emphasis on physical process in snow and ice.

McCarthy, Michael P. \* 1978, (Research); PhD, 1988, University of Washington; plasma physics in space, especially processes that accelerate or heat charged particles.

Mercer, James A. \* 1968, (Research); PhD, 1983, University of Washington; ocean weather and climate change, acoustic tomography, seismoacoustics.

Odom, Robert I. Jr. \* 1990, (Research); PhD, 1980, University of Washington; ocean acoustics, theoretical seismology, wave propagation and scattering.

Qamar, Anthony \* 1983, (Research); PhD, 1971, University of California (Berkeley); earthquakes associated with volcanoes and glaciers, earth-structure and earthquake hazards.

Sahr, John D. \* 1991, (Adjunct); PhD, 1990, Cornell University; radar remote sensing, ionospheric physics; signal processing; wireless communications.

Unsworth, Martyn J. \* 1993, (Research); PhD, 1991, Cambridge University (UK); geomagnetic induction, magnetotellurics, electromagnetic geophysics.

Wilcock, William S. D. \* 1993, (Adjunct); PhD, 1992, Massachusetts Institute of Technology; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics.

Winglee, Robert M. \* 1991; PhD, 1984, University of Sydney (Australia); energetic phenomena in sun/earth plasmas, excitation of waves, high energy particle acceleration.

### Assistant Professors

DeCosmo, Janice M. 1984, (Affiliate); PhD, 1991, University of Washington; atmosphere-ocean interaction, boundary layer processes, science education, educational technology.

Swanson, Brian \* 1982, (Research); PhD, 1992, University of Washington; atmospheric geophysics, condensed-matter physics, physics of ice.

Willett, Sean D. \* 1998, (Adjunct); PhD, 1988, University of Utah; numerical modeling of lithospheric processes.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsccat/](http://www.washington.edu/students/crsccat/).

**GPHYS 401 Geophysical Continuum Mechanics (3) NW** Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: A.

**GPHYS 402 Seismology (3) NW** Introduction to theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibrations, ray theory. Structure of the Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Prerequisite: GPHYS 401; recommended: concurrent registration in GPHYS 432. Offered: W.

**GPHYS 403 Geophysics: The Earth (3) NW** The earth and its interior; gravity, magnetism, heat flow, seismology. Earth's outer structure, studied through the unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Prerequisite: GPHYS 402; PHYS 322. Offered: Sp.

**GPHYS 404 Geophysics: Fluids (3) NW** Introduction to geophysical fluid dynamics. An overview of fluids in geophysics with emphasis on the oceans. A nonrigorous development of the equations of motion with examples drawn from oceanography and solid earth geophysics. Prerequisite: either MATH 136 or both MATH 307 and MATH 308; PHYS 322. Offered: A.

**GPHYS 405 Space and Plasmas (3) NW** Survey of various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Prerequisite: PHYS 321. Offered: W.

**GPHYS 406 Geophysics: The Atmosphere (3) NW** Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Prerequisite: GPHYS 404. Offered: Sp.

**GPHYS 415 Principles of Glaciology (3) NW** *Hallet, Raymond, Waddington, Warren* Snow deposition and metamorphism, avalanches, heat and mass balance at snow and ice surfaces, glacier flow and erosion, ice sheets, sea ice, frozen ground, methods of paleoclimate reconstruction, Ice Age theories. Offered: jointly with GEOL 415; A.

**GPHYS 425 NASA Science and Engineering Research Seminar (1, max. 4) NW** *DeCosmo* Review of current space science-related research. Emphasis varies, but topics may include planetary geology, astronomy, global change, aeronautical engineering, and remote sensing. Credit/no credit only. Offered: Sp.

**GPHYS 431 Seismology and Earthquake Engineering (3) NW** Overview of earthquake processes and details of the characteristics of destructive ground motion; effects of such motion on engineering structures; current practice in estimating earthquake hazards for important structures such as nuclear power plants. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: jointly with CEE 431.

**GPHYS 432 Applied Seismology (2) NW** *Qamar* Interpretation methods in seismology. Seismogram interpretation, including body and surface waves. Seismic instrumentation. Earthquake location, magnitude, and fault-plane solutions. Seismic reflection and refraction methods. Measurement and interpretation of strong ground motion near the epicenter of large earthquakes. Recommended: concurrent registration in GPHYS 402. Offered: W.

**GPHYS 435 Seismic Exploration (5) NW** *Brown* Introduction to theory and practice of seismic exploration. Application of refraction and reflection techniques to problems in engineering geology and mineral exploration. Constraints in the interpretation of subsurface structure. Prerequisite: GEOL 392; either MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with GEOL 435; Sp.

**GPHY 458 Volcanic Processes (3) NW** *Bergantz, Nelson, Newhall, Qamar* Pre-eruption, eruption, and post-eruption processes. Examines triggers of magma ascent, controls on volatile build-up and loss, magma fragmentation, magma-groundwater interaction, eruption column dynamics, gravity-controlled eruptive phenomena, syn- and post eruption lahars and other re-working of deposits. Prerequisite: GEOL 391 or GEOL 392. Offered: Sp.

**GPHY 460 Water in the Environment (3) NW** *Baker, Raymond, Waddington, Warren* Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136 and PHYS 123; PHYS 133. Offered: jointly with ATM S 460 and PHYS 460. Offered: A.

**GPHY 480 Special Topics in Geophysics (2-6, max. 12) NW** Intensive treatment of a selected geophysical topic presented through faculty lectures, guest lectures, and student reports. For students in geophysics and related fields. Subject varies from year to year. Offered: A/WSp.

### Courses for Graduates Only

**GPHY 501 Geophysical Continuum Mechanics (3)** Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Includes advanced, research-oriented problems. Prerequisite: MATH 307 and MATH 308 or equivalent. Offered: A.

**GPHY 502 Seismology (3)** Theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibrations, ray theory. Structure of Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Advanced, research-oriented problems. Prerequisite: GPHY 501; recommended: concurrent registration in GPHY 432. Offered: W.

**GPHY 503 Geophysics: The Earth (3)** Study of gravity, magnetism, heat flow, seismology. Earth's outer structure studied through unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Includes advanced, research-oriented problems. Prerequisite: GPHY 502 and PHYS 322. Offered: Sp.

**GPHY 504 Geophysics: Fluids (3)** Geophysical fluid dynamics. Fluids in geophysics with emphasis on the oceans. Development of the equations of motion with examples drawn from oceanography and solid earth geophysics. Includes advanced, research-oriented problems. Prerequisite: PHYS 322, MATH 307 and MATH 308 or equivalent. Offered: A.

**GPHY 505 Geophysics: Space (3)** Various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Includes advanced, research-oriented problems. Prerequisite: PHYS 321 or equivalent. Offered: W.

**GPHY 506 Geophysics: The Atmosphere (3)** Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Includes advanced, research-oriented problems. Prerequisite: GPHY 504. Offered: Sp.

**GPHY 510 Physics of Ice (3)** *Raymond* Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Prerequisite: permission of instructor. Offered: jointly with ATM S 510; alternate years.

**GPHY 511 Formation of Snow and Ice Masses (3)** *Warren* Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with ATM S 511; alternate years.

**GPHY 512 Dynamics of Snow and Ice Masses (3)** *Raymond* Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with ATM S 512; odd years.

**GPHY 513 Structural Glaciology (3)** *Raymond* Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with ATM S 513; even years.

**GPHY 514 Ice and Climate Modeling (3)** *Warren* Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with ATM S 514; alternate years.

**GPHY 518 Introduction to Geophysical Research (1-2, max. 4)** Introduces research of faculty and advanced graduate students to first-year graduate students and provides experience for the formulation, oral presentation, and defense of research proposals and results. Offered: A/WSp.

**GPHY 519 Geophysical Research Methods (2, max. 12)** Current research methodology and results based on recent literature and on faculty and student research. Designed to develop student perspective on observational and theoretical methods and on relation of specific research to broader developments in geophysics and interdisciplinary aspects of geophysics through faculty-guided presentations and discussion by students. Offered: A/WSp.

**GPHY 520 Seminar (1, max. 15)** Review of current literature in geophysics and graduate student research with faculty participation. Credit/no credit only. Offered: A/WSp.

**GPHY 522 Atmospheric Electrical Dynamics (3)** *Holzworth* Global and local dynamic electric field models, including upper atmospheric and tropospheric sources as modified by propagation delays, orographic features, and transient phenomena. Radiation and plasma waves along with microphysics of corona discharge and charge separation mechanisms. Prerequisite: GPHY 405 and GPHY 406, or permission of instructor. Offered: A.

**GPHY 523 Introduction to Solar-Terrestrial Physics (3)** *Holzworth* Introduces the student to several areas of space physics, the physical principles that apply therein, and the methods by which significant observations are made. Covers electromagnetic and plasma processes from the center of the sun to the surface of the earth. Prerequisite: PHYS 321, PHYS 322, PHYS 323 or permission of instructor. Offered: Sp.

**GPHY 532 Atmospheric Radiation: Shortwave (3)** *Warren* Principles of radiative transfer in planetary atmospheres with emphasis on single and multiple scattering of visible and infrared radiation. Applications to atmospheric and surface energy balance and remote sensing. Prerequisite: PHYS 323 or permission of instructor. Offered: jointly with ATM S 532; alternate years.

**GPHY 533 Atmospheric Radiation: Longwave (3)** *Leovy, Warren* Principles of radiative energy exchange in planetary atmospheres with emphasis on emission and absorption of infrared and microwave radiation. Applications to atmospheric and surface energy balance and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with ATM S 533.

**GPHY 534 Remote Sensing of the Atmosphere and Climate System (3)** *Leovy, Warren* Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications for research. Prerequisite: GPHY 532 and GPHY 533. Offered: jointly with ATM S 534.

**GPHY 535 Cloud Microphysics and Dynamics (3)** *Baker, Houze* Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with ATM S 535; W.

**GPHY 537 Space and Laboratory Plasma Physics (3)** *Holzworth, Parks, Winglee* Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: GPHY 405 or equivalent or permission of instructor. Offered: jointly with A A 556; Sp.

**GPHY 538 Advanced Space Plasma Physics (3)** *Holzworth, Parks, Winglee* Formation by the interaction of solar wind with geomagnetic field. Trapped particles. Electromagnetic waves in anisotropic plasma. Dynamic disturbances and plasma instabilities. Prerequisite: GPHY 405 or permission of instructor. Offered: A.

**GPHY 539 Kinetic Theory and Simulation of Space Plasmas (3)** *Winglee* Wave-particle interactions in space plasmas. Generation of different wave modes, electrostatic and electromagnetic, Langmuir waves to Alfvén waves. Beam, Weibel, and masers instabilities, heavy ion interactions. Particle simulations, electrostatic and electromagnetic, for non-linear wave evolution and particle heating. Offered: even years; W.

**GPHY 540 Observational Seismology (1, max. 18)** *Creager, Crosson, Malone, Qamar* Quarterly research themes introduce students to a variety of digital and analog seismograms and techniques for their interpretation. Students present results of short investigations in an informal seminar setting. Credit/no credit only. Prerequisite: GPHY 402 or GPHY 502 or permission of instructor. Offered: A/WSp.

**GPHY 541 Theoretical Seismology I (3)** *Creager, Crosson* Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: GPHY 402 or GPHY 502 or permission of instructor. Offered: even years; Sp.

**GPHY 542 Theoretical Seismology II (3)** *Creager, Crosson* Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: GPHY 541. Offered: even years; A.

**GPHYS 543 Low-Frequency Seismology (3)**

*Creager* Represent seismic displacement field, including surface and body waves, as superposition of normal modes. Rigorous development of equations of motion, their solution, energy integrals, Rayleigh's Principle, perturbation theory, attenuation, and excitation formulae. Moment-tensor representation of seismic sources. Prerequisite: GPHYS 402 or GPHYS 502 or permission of instructor. Offered: odd years; Sp.

**GPHYS 545 Physics of the Oceanic Lithosphere I (3)**

Physical processes responsible for the formation and evolution of the oceanic lithosphere. Thermodynamic mechanisms of mantle creep; fluid dynamics of mantle flow, decompressional melting, formation of oceanic crust, and cooling of the oceanic lithosphere. Prerequisite: GPHYS 501 and GPHYS 504 or permission of instructor. Offered: jointly with OCEAN 545.

**GPHYS 546 Physics of the Oceanic Lithosphere II (3)**

Physical processes responsible for the formation and evolution of the oceanic lithosphere. Rheology, fault mechanics, plate flexure, marine gravity, the relationship between gravity and topography, magnetic properties of ocean crust, and character of marine magnetic anomalies. Prerequisite: GPHYS 545 or permission of instructor. Offered: jointly with OCEAN 546.

**GPHYS 551 Marine Seismology (3)**

Practical application of seismic techniques to the study of the ocean basins. Analysis of refraction data, multichannel reflection profiling, surface wave studies, and earthquake analysis. Prerequisite: GPHYS 502 or permission of instructor. Offered: jointly with OCEAN 551.

**GPHYS 555 Planetary Atmospheres (3)**

*Leovy* Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all planetary atmospheres; roles of radiation, chemistry, and dynamic processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar-system objects in the context of comparative planetology. Offered: jointly with ASTR 555/ATM S 555; alternate years.

**GPHYS 556 Planetary Surfaces (3)**

Comparison of surface processes and conditions on Mercury, Venus, Earth, moon, Mars, asteroids, and satellites of the great planets. Emphasis on understanding how and why planetary surfaces differ from one another and the implied course of solar-system evolution. Analysis of data from earth-based telescopes and manned and unmanned space missions. Offered: jointly with ASTR 556/GEOL 556; odd years; Sp.

**GPHYS 557 Origin of the Solar System (3)**

*Brownlee* Nebular and nonnebular theories of solar system origin; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; the physical and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ASTR 557/GEOL 557; W.

**GPHYS 561 Computational Methods and Modeling in Geophysics I (3)**

*Winglee* Solution of complex dispersion equations including multiple root finding. Data analysis, fitting, smoothing, fast integration. Ray tracing and particle tracking in 2-D and 3-D. Computer simulation of fluid interactions, unmagnetized and magnetized, compressible and incompressible, and flow around objects. Offered: odd years, W.

**GPHYS 562 Computational Methods and Modeling in Geophysics II (3)**

*Winglee* Solution of complex dispersion equations including multiple root finding. Data analysis, fitting, smoothing, fast integration. Ray tracing and particle tracking in 2-D and 3-D. Computer simulation of fluid interactions, unmagnetized and magnetized, compressible and incompressible, and flow around objects. Offered: odd years, Sp.

**GPHYS 563 Geophysical Data Collection and Analysis (3)**

*Crosson* Theory and practical application of data collection and analysis applied to geophysical problems. Digital processing of signals; filtering and spectral analysis. Laboratory sessions include problem solving on computer-based processing system. Offered: A.

**GPHYS 564 Geophysical Inverse Theory (3)**

*Booker* Introduction to the mathematical techniques for estimating properties of physical systems, such as the earth or atmosphere, from data that is insufficient for a precise specification of the system. Emphasis is on the concept of the resolving power of data sets. The ideas developed are quite general and have a wide range of applicability in the field of data interpretation. Prerequisite: GPHYS 563 or permission of instructor. Offered: odd years; Sp.

**GPHYS 571 Geodynamics (3)**

Advanced study of various aspects of the dynamics of the solid Earth. Topics may include plate tectonics, mantle convection, rotational dynamics, post-glacial rebound, fault mechanics, and geodetic measurement of crustal deformation. Offered: odd years.

**GPHYS 572 Geomagnetism (3)**

*Merrill* Advanced aspects of earth magnetism intended for specialists in this field. Extensive discussion of origin theories and their implications; physical basis and theories of magnetism in rocks; paleomagnetic techniques and results. Prerequisite: permission of instructor. Offered: even years.

**GPHYS 573 Mineral Physics (3)**

*Brown, Merrill* Applications of solid-state physics to various geophysical problems. Topics vary, but usually include the thermal properties of relevant geophysical materials, the equation of state for the earth's mantle and core, defects in solids and their roles in tectonophysics. Prerequisite: permission of instructor. Offered: alternate years.

**GPHYS 574 Electromagnetic and Potential Field Methods (3)**

*Booker* Development of equations of electromagnetic fields in conducting media. Solution of forward and inverse problems with natural and controlled sources: magnetotelluric and related methods. Includes the special case of static fields: DC resistivity, gravity, and magnetic interpretation. Prerequisite: GPHYS 403 or GPHYS 503, GPHYS 563 and PHYS 323 or permission of instructor. Offered: even years; W.

**GPHYS 575 Physics and Chemistry of the Earth's Interior (3)**

*Brown, Creager, Irving, Merrill* Emphasizes current issues in global tectonics and mantle dynamics. Examples include global seismic tomography and its bearing on geodynamics, the fate of subducted lithosphere and geochemical constraints on mantle convection. Prerequisite: permission of instructor. Offered: jointly with GEOL 575; A.

**GPHYS 580 Special Topics in Geophysics (2-6, max. 12)**

Intensive treatment of a selected topic in geophysics presented by lectures or seminars for students in geophysics and related special fields. Subject is selected from all areas in geophysics and varies from year to year. Prerequisite: permission of instructor. Offered: A/WSp.

**GPHYS 600 Independent Study or Research (\*)**

Offered: A/WSpS.

**GPHYS 700 Master's Thesis (\*)**

Offered: A/WSpS.

**GPHYS 800 Doctoral Dissertation (\*)**

Offered: A/WSpS.

## Germanics

340C Denny



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/germanics.html](http://www.washington.edu/students/genecat/academic/germanics.html)



Department Web page:  
[depts.washington.edu/uwgerman/](http://depts.washington.edu/uwgerman/)

The Department of Germanics focuses on the language, literature, and civilization of the German-speaking countries; on the role of their history, literature, and philosophy in Western civilization; and on linguistic analysis, especially historic, of the Germanic languages.

## Graduate Program

Graduate Program Coordinator  
345 Denny, Box 353130  
(206) 543-6025  
[uwgerman@u.washington.edu](mailto:uwgerman@u.washington.edu)

The Department of Germanics offers a closely integrated program leading to the Master of Arts and Doctor of Philosophy degrees. The doctoral curriculum serves the needs of the future professors at universities and colleges, stressing scholarship and research. The master's curriculum requires a minimum of 40 credits, a final comprehensive examination, and two papers. The study period of the doctoral program is two years (minimum number of post-master's credits is 60). The completion of the necessary course work is followed by general written and oral examinations. A third doctoral year is reserved for the writing of the dissertation.

The M.A. and Ph.D. programs concentrate on German literature, civilization, and philosophical traditions, with an option to include Germanic linguistics and courses outside the department. The doctoral dissertation must be an original contribution to scholarship and must demonstrate mastery of the pertinent methods of investigation.

The Department of Germanics also participates in the joint-doctoral program in literature and critical theory. Study in this program leads to a Ph.D. in Germanics and Critical Theory. For details see the program description under Comparative Literature.

## Special Requirements

Aspirants for advanced degrees in German must have the equivalent of an undergraduate major in German. A reading knowledge of one foreign language (usually German) is a prerequisite for the M.A. degree. Reading knowledge of a second language is required before the student is admitted to the Ph.D. General Examination. The languages chosen are subject to approval by the department.

## Financial Aid

A limited number of teaching assistantships and fellowships are available. The teaching load consists of a five-hour course on the first- or second-year level. The teaching assistants are supervised by experienced faculty members.

## Faculty

### Chair

Richard T. Gray

### Professors

Ammerlahn, Hellmut H. \* 1968; PhD, 1965, University of Texas (Austin); Goethe, eighteenth to early twentieth century, comparative literature.

Barrack, Charles M. \* 1968; PhD, 1969, University of Washington; Germanic linguistics.

Behler, Diana I. \* 1971; PhD, 1970, University of Washington; romanticism, nineteenth century, comparative literature.

Brown, Jane K. \* 1988; PhD, 1971, Yale University; seventeenth, eighteenth and nineteenth century, comparative literature.

Gray, Richard T. \* 1991; PhD, 1981, University of Virginia; eighteenth-, nineteenth- and early twentieth-century literature, literary sociology, critical theory.

Hertling, Gunter H. \* 1961, (Emeritus); PhD, 1963, University of California (Berkeley); eighteenth- and nineteenth-century literature.

Hruby, Antonin F. \* 1961, (Emeritus); PhD, 1946, Charles University (Czechoslovakia); medieval literature, comparative literature.

Jaeger, C. Stephen \* 1985; PhD, 1970, University of California (Berkeley); medieval German and Latin literature, medieval intellectual history, comparative literature.

Rey, William H. 1950, (Emeritus); PhD, 1937, University of Frankfurt (Germany); nineteenth and twentieth century German literature.

Voyles, Joseph B. \* 1965; PhD, 1965, Indiana University; Germanics and linguistics.

Wilke, Sabine \* 1988; PhD, 1986, University of Mainz (Germany); critical theory, contemporary theatre and film, literature and philosophy.

### Associate Professors

Bansleben, Manfred \* 1988; PhD, 1979, University of Vienna (Austria); German language and methodology, history, culture studies.

McLean, Sammy K. \* 1967, (Emeritus); PhD, 1963, University of Michigan; Western drama, twentieth-century poetry, psychoanalysis and literature, literary translation, comparative literature.

Prutti, Brigitte \* 1991; DPhil, 1988, University of Graz (Austria); PhD, 1995, University of California (Irvine); eighteenth-century literature, twentieth-century Austrian literature, theory and history of drama.

Rabura, Horst M. \* 1961, (Emeritus); MA, 1966, University of Washington; German language and methodology.

Sauerlander, Anne M. 1949, (Emeritus); PhD, 1936, Cornell University; Germanics.

### Assistant Professor

Ostmeier, Dorothee \* 1993; PhD, 1993, Johns Hopkins University; eighteenth and twentieth century literature and philosophy, critical theory, German studies.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**GERMAN 401 Advanced Writing and Conversation (3-5) VLPA** Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

**GERMAN 403 Advanced Writing and Conversation (3-5) VLPA** Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

**GERMAN 406 Intensive Elementary Yiddish (5-15, max. 15)** Intensive study of Yiddish grammar, with oral and written drills and reading of selected texts. Offered: S.

**GERMAN 411 Studies in Medieval Literature and Culture (5) VLPA** Rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

**GERMAN 412 Studies in Renaissance and Baroque Literature and Culture (5) VLPA** Rotating special topics in literature and culture of the Renaissance and Baroque, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

**GERMAN 421 Studies in Eighteenth-Century Literature and Culture (5) VLPA** Rotating special topics in literature and culture of the eighteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

**GERMAN 422 Studies in Nineteenth-Century Literature and Culture (5) VLPA** Rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

**GERMAN 423 Studies in Twentieth-Century Literature and Culture: (5) VLPA** Rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

**GERMAN 444 Undergraduate Thesis in Germanics (5) VLPA** Supervised research leading to the writing of a research thesis.

**GERMAN 445 Undergraduate Honors Thesis in Germanics VLPA (5)** Supervised research for honors students leading to the writing of an honors thesis.

**GERMAN 446 Internship in German (2-5, max. 10)** Prerequisite: 6 credits of upper-level German language courses. Credit/no credit only.

**GERMAN 447 Undergraduate Research (1-5, max. 15)** Supervised research with faculty member. Offered: AWSpS.

**GERMAN 451 Linguistic Analysis of German (5) VLPA** Recommended: GERMAN 203 Offered: A.

**GERMAN 452 History of the German Language (5) VLPA** From early Germanic to the present. Recommended: GERMAN 203 Offered: W.

**GERMAN 490 Contemporary German Literature (5) VLPA** Interpretation of selected works by contemporary German authors. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

**GERMAN 493 Special Topics in German Culture (5) VLPA/IS** Recommended: GERMAN 303; either GERMAN 322 or GERMAN 323.

**GERMAN 494 Studies in German Poetry (5) VLPA** Introduction to various methods of interpretation and to their practical application. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

**GERMAN 495 Proseminar in German Literature (5, max. 15) VLPA** Special topics, the subject matter and depth of which are not included in other literature courses, arranged through consultation among students and faculty members.

**GERMAN 496 History of Germanic Philology (5) VLPA** Introduction to the works of outstanding scholars in the field of Germanics.

**GERMAN 497 Studies in German Literature (1-6, max. 15)**

**GERMAN 498 Studies in the German Language (1-6, max. 15)**

**GERMAN 499 Studies in German Culture (1-6, max. 15)**

## Courses for Graduates Only

**GERMAN 500 Literary Theory, Methodology, and Bibliography (5)** Historical survey and analysis of criticism (*Methodengeschichte*) and modern trends in contemporary theory. Methods of research and bibliography, as well as theoretical aspects of practical interpretation.

**GERMAN 501 Proseminar in Methods and Writing (5)** Introduction to research methods, presentation of research, scholarly writing, and general poetological issues. Each year a different special topic is chosen as a focus for students' research in the course.

**GERMAN 503 Contemporary German Literature (5, max. 15)** Seminar analyzing the esthetic movements and thought of contemporary German literature, the social and political problems dealt with in the works of representative authors, and major experimental concepts. Some previous exposure to the German literature and civilization after 1945 is expected.

**GERMAN 504 Special Studies in Literary Criticism and Theory (5, max. 15)** Literary criticism and theory, focusing on special topics proposed by the instructor. Taught in English. Prerequisite: GERMAN 500 or equivalent.

**GERMAN 510 Studies in Medieval Literature and Culture (5, max. 15)** Seminar on rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems.

**GERMAN 511 Studies in Renaissance and Baroque Literature and Culture (5, max. 15)** Seminar on rotating special topics in literature and culture of the Renaissance and Baroque, such as particular movements, authors, genres, themes, or problems.

**GERMAN 512 Studies in Eighteenth-Century Literature and Culture (5, max. 15)** Seminar on rotating special topics in literature and culture of the eighteenth century, such as particular movements, authors, genres, themes, or problems.

**GERMAN 514 Studies in Nineteenth-Century Literature and Culture (5, max. 15)** Seminar on rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems.

**GERMAN 516 Studies in Twentieth-Century Literature and Culture (5, max. 15)** Seminar on rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems.

**GERMAN 518 Foreign Language Teaching Methodology (2)** *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/NEAR E 518/SCAND 518/SLAV 518.

**GERMAN 525 Seminar in Romanticism (5, max. 15)**

**GERMAN 526 Seminar in Nineteenth-Century Drama (5, max. 15)**

**GERMAN 527 Seminar in Nineteenth-Century Prose (5, max. 15)**

**GERMAN 528 Nineteenth-Century Poetry (5, max. 15)** Representative selections from Hölderlin, the late Goethe, and from prevalent trends in nineteenth-century poetry, such as romanticism, "Young Germany," poetic realism, and the experimental poetry of naturalism.

**GERMAN 529 Studies in Literature 1870-1920 (5, max. 15)** Seminar on rotating special topics drawn from the period 1870-1920, such as particular movements, authors, genres, themes, or problems.

**GERMAN 533 Seminar in Eighteenth-Century Literature (5, max. 15)** Study of one or more of the literary movements: Enlightenment, sentimentalism, anacreontics, storm and stress, classicism, early romanticism, and works by principal authors such as Gottsched, Bodmer, Gellert, Lessing, Wieland, Klopstock, Herder, Lenz, Goethe, Schiller, Jean Paul.

**GERMAN 534 Storm and Stress (5, max. 15)** Extensive investigation of poetological and esthetic concepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and implementations of the new theoretical concepts.

**GERMAN 535 Classicism: Goethe, Schiller (5, max. 15)**

**GERMAN 537 Studies in Literature 1770-1830 (5, max. 15)** Seminar on rotating special topics drawn from the period 1770-1830, such as particular movements, authors, genres, themes, or problems.

**GERMAN 540 Twentieth-Century Poetry (5, max. 15)** Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Benn, the Expressionists and the Dadaists, Brecht, and Enzensberger, to such contemporaries as Eich, Heissenbüttel, the concrete poets, Celan, and Bachmann.

**GERMAN 541 Twentieth-Century German Drama (5, max. 15)** Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms.

**GERMAN 542 Twentieth-Century Prose (5, max. 15)** Selected modern German novels, short novels, and short stories by representative authors dealing with the social and political problems of Germany as well as with individual problems of existence and identity.

**GERMAN 550 Gothic (5)**

**GERMAN 551 Seminar in Germanic Philology and Linguistics (5, max. 15)** Topics vary. Prerequisite: basic knowledge of German and at least one elementary linguistics course.

**GERMAN 552 Old High German (5)**

**GERMAN 555 Old Saxon (5)**

**GERMAN 556 Middle High German (5)**

**GERMAN 558 Middle High German Literature (5)**

**GERMAN 560 Modern Dialects (5)**

**GERMAN 565 Seminar in Courtly Epic (5)** Aspects and methods of literary analysis pertaining to the study of medieval courtly epics.

**GERMAN 566 Late Middle High German Narrative (3)**

**GERMAN 567 Minnesang (3)** In-depth study of medieval German lyrics in the context of German and European literary and intellectual development. Poems of the period from Kurenberger through Walther are analyzed with stress on grammatical, formal, stylistic, and ideological interpretation. Prerequisite: adequate knowledge of Middle High German.

**GERMAN 568 Seminar in Heroic Epic (5)** Literary and historic problems of the German heroic epic, with special emphasis on the *Nibelungenlied* and the *Dietrichsepik*.

**GERMAN 575 Teaching of German Literature and Civilization (3)** Teaching of German language and literature on the advanced level in secondary schools and colleges. Credit/no credit only.

**GERMAN 576 Modern Methods and Materials in Teaching German (3)** The audiolingual method and its application; current developments in foreign-language teaching; evaluation of teaching materials. Credit/no credit only.

**GERMAN 580 Seminar in German Literature (5, max. 15)** Open topics seminar with varying content.

**GERMAN 581 Seminar in Poetry (5, max. 15)** Open topics seminar with varying content.

**GERMAN 582 Seminar in Drama (5, max. 15)** Open topics seminar with varying content.

**GERMAN 583 Seminar in Prose (5, max. 15)** Open topics seminar with varying content.

**GERMAN 590 Philosophical Issues in German Culture (5, max. 15)** Seminar on rotating special topics dealing with the impact of particular thinkers, movements, or philosophical problems in German culture.

**GERMAN 591 Studies in German Intellectual History (5, max. 15)** Seminar on rotating special topics dealing with interactions of history, literature, and culture in the German tradition.

**GERMAN 592 Cultural Studies (5, max. 15)** Seminar on rotating special topics dealing with periods, themes, or particular problems in German life and culture.

**GERMAN 600 Independent Study or Research (\*)**

**GERMAN 700 Master's Thesis (\*)**

**GERMAN 800 Doctoral Dissertation (\*)**

## History

315 Smith



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/history.html](http://www.washington.edu/students/genecat/academic/history.html)



Department Web page:  
[depts.washington.edu/clio/](http://depts.washington.edu/clio/)

History undertakes the study of human affairs in a manner that seeks to understand change and development rather than the state of things at a given moment, taking into account societies in diverse parts of the world from the earliest times for which written records exist to the present.

## Graduate Program

Graduate Program Coordinator  
206C Smith, Box 353560  
(206) 543-8291  
[histgrad@u.washington.edu](mailto:histgrad@u.washington.edu)

The Department of History offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in a large number of fields within the discipline. Students in the programs prepare for careers as college teachers who combine teaching with scholarship and professional writing. A few graduates enter government service, college administration, or publishing. The M.A. program is normally completed in four or five full-time academic quarters or their equivalent. The Ph.D. program requires at least three years of full-time work beyond the M.A. degree. Graduate training at both levels includes (1) course work and independent study leading to examinations in special historical fields, and (2) sustained investigation and interpretation of historical problems in seminars involving the writing of essays. A dissertation must be prepared for the Ph.D.

## Special Requirements

Admission to the graduate program requires a sound undergraduate major in history or in one of the basic disciplines related to history completed within a college of liberal arts and sciences. The department also requires evidence of the applicant's ability to write cogently and lucidly and to interpret historical data.

## Financial Aid

Beginning graduate students may qualify for a limited number of fellowships, readerships, and work-study assistantships. Students with, or who expect to receive, the M.A. degree by the time they begin their duties may apply for teaching assistantships and may, with continued satisfactory scholarly progress, expect reappointment for a total of three years, provided adequate funds are available.

## Faculty

### Chair

Robert C. Stacey

### Professors

Alden, Dauril \* 1959; MA, 1952, PhD, 1959, University of California (Berkeley); Latin American history, colonial history.

Bacharach, Jere L. \* 1967; MA, 1962, Harvard University; PhD, 1967, University of Michigan; history of the Middle East, Islam.

Barlow, Tani E. \* 1994, (Adjunct); MA, 1979, PhD, 1985, University of California (Davis); history of modern China, gender studies, feminist theory, historiography.

Behlmer, George K. \* 1979; MA, 1972, PhD, 1977, Stanford University; modern Britain, social history of family.

Benson, Keith R. \* 1981, (Adjunct); MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Bergquist, Charles W. \* 1989; MA, 1968, PhD, 1973, Stanford University; modern Latin American history, labor history.

Bridgman, Jon M. \* 1961, (Emeritus); PhD, 1960, Stanford University; modern European history (especially military).

Butow, Robert J. C. \* 1960, (Emeritus); PhD, 1953, Stanford University; East Asian diplomatic history.

Conlon, Frank F. \* 1968; PhD, 1969, University of Minnesota; history of India, modern South Asia.

Ebrey, Patricia B. \* 1997; PhD, 1975, Columbia University; early Imperial China, Song dynasty, social history.

Ellison, Herbert J. \* 1968; PhD, 1955, University of London (UK); modern Russian history.

Ferrill, Arthur L. \* 1964; PhD, 1964, University of Illinois; Ancient Rome, military history.

Findlay, John M. \* 1987; PhD, 1982, University of California (Berkeley); history of the American West, Pacific.

Fowler, Wilton B. \* 1969; PhD, 1966, Yale University; U.S. foreign policy, diplomatic.

Gil, Carlos \* 1974; PhD, 1975, University of California (Los Angeles); Hispanics of the United States, Latin America.

Glenn, Susan A. \* 1993; PhD, 1983, University of California (Berkeley); twentieth-century U.S. social and cultural history including women's history.

Griffiths, Gordon 1959, (Emeritus); PhD, 1942, University of California (Berkeley); MA, 1946, Oxford University (UK); Renaissance and Reformation.

Hankins, Thomas L. \* 1964; PhD, 1964, Cornell University; history of science.

Hanley, Susan B. \* 1970, (Adjunct); PhD, 1971, Yale University; premodern Japanese history.

Johnson, Richard R. \* 1972; PhD, 1972, University of California (Berkeley); early American history, constitutional history.

Jonas, Raymond A. \* 1985; PhD, 1985, University of California (Berkeley); modern France.

Kirkendall, Richard S. \* 1988, (Emeritus); PhD, 1958, University of Wisconsin; twentieth-century US, agricultural.

Lebsock, Suzanne D. \* 1995; MA, 1973, PhD, 1977, University of Virginia; history of women, American social history, history of the American South.

Levy, Fred J. \* 1960; PhD, 1960, Harvard University; Tudor-Stuart England, English historiography.

McCormick, Richard L. \* 1995; PhD, 1976, Yale University; U.S. political history.

Palais, James B. \* 1968; PhD, 1968, Harvard University; Korean history.

Pease, Otis A. \* 1966, (Emeritus); PhD, 1954, Yale University; United States in the twentieth century.

Pressly, Thomas J. \* 1949, (Emeritus); PhD, 1949, Harvard University; nineteenth-century United States, Civil War and Restoration.

Pyle, Kenneth B. \* 1964; PhD, 1965, Johns Hopkins University; modern Japanese history.

Ramet, Sabrina P. \* 1983, (Adjunct); PhD, 1981, University of California (Los Angeles); politics and history of former Yugoslavia, East European religion and culture.

Rorabaugh, William J. \* 1976; PhD, 1976, University of California (Berkeley); United States social history, nineteenth-century US.

Saum, Lewis O. \* 1965, (Emeritus); PhD, 1962, University of Missouri; U.S. intellectual history.

Stacey, Robert C. \* 1988; PhD, 1983, Yale University; medieval.

Sullivan, Woodruff T. III \* 1973, (Adjunct); PhD, 1971, University of Maryland; radio astronomy, galactic and extragalactic structure, history of astronomy.

Taylor, Quintard \* 1995; MA, 1971, PhD, 1977, University of Minnesota; African American, American west.

Thomas, Carol G. \* 1964; PhD, 1965, Northwestern University; ancient Greece.

Toews, John E. \* 1979; PhD, 1973, Harvard University; European intellectual and cultural.

Ullman, Joan Connelly \* 1966, (Emeritus); PhD, 1963, Bryn Mawr College; modern Spain.

Walter, John C. \* 1989, (Adjunct); PhD, 1971, University of Maine; Afro-American studies; Afro-American, American, Caribbean immigrant, sport, and women's history.

White, Richard \* 1990, (Affiliate); PhD, 1975, University of Washington; American West, American Indian, environmental history.

Whorton, James C. \* 1970, (Adjunct); PhD, 1969, University of Wisconsin; history of medicine, public health, pharmacy and alternative healing.

Williams, Michael A. \* 1976, (Adjunct); PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Wineburg, Samuel S. \* 1989, (Adjunct); PhD, 1990, Stanford University; educational psychology, cognitive psychology of school subjects, historical cognition.

#### Associate Professors

Felak, James R. \* 1989; PhD, 1989, Indiana University; Eastern European history.

Gamboa, Erasmo \* 1976, (Adjunct); MA, 1973, PhD, 1984, University of Washington; history, Pacific Northwest, Chicano and Latino, social, labor and immigration.

Gowing, Alain M. \* 1988, (Adjunct); PhD, 1988, Bryn Mawr College; Latin and Greek historiography, Latin literature of the Empire.

Gregory, James N. \* 1993; PhD, 1983, University of California (Berkeley); twentieth-century United States, race, politics, labor.

Guy, R. Kent \* 1980; PhD, 1981, Harvard University; late imperial China.

Hevly, Bruce W. \* 1989; PhD, 1987, Johns Hopkins University; history of technology and science.

Leiren, Terje I. \* 1977, (Adjunct); PhD, 1978, North Texas State University; Scandinavian history, nationalism, immigration, ethnicity, Norwegian language.

McKenzie, Robert T. \* 1988; PhD, 1988, Vanderbilt University; nineteenth-century United States, U.S. economic, civil war and reconstruction.

O'Neil, Mary R. \* 1983; PhD, 1982, Stanford University; Renaissance/Reformation, early modern Europe.

Salas, Elizabeth 1987, (Adjunct); MA, 1977, California State University, Los Angeles; PhD, 1987, University of California (Los Angeles); New Mexican history and politics, Chicana, Mexicana and Chicano history, minorities in the military.

Sears, Laurie J. \* 1989; PhD, 1986, University of Wisconsin; Southeast Asia, historiography.

Stacey, Robin C. \* 1988; PhD, 1986, Yale University; medieval history, Celtic.

Waugh, Daniel Clarke \* 1972; PhD, 1972, Harvard University; medieval Russian history.

Yee, Shirley J. \* 1988, (Adjunct); PhD, 1987, Ohio State University; U.S. women's history, African-American history, nineteenth-century U.S. social history.

Young, Glennys J. \* 1992; PhD, 1989, University of California (Berkeley); Imperial and Soviet Russia, religion, women.

#### Assistant Professors

Camp, Stephanie M. H. 1998; PhD, 1998, University of Pennsylvania; African American history.

Dong, Yue 1996, (Adjunct); MA, 1991, University of Oregon; PhD, 1996, University of California (San Diego); late 19th and 20th century China, social and cultural history, urban history, gender studies.

Harmon, Alexandra J. \* 1991, (Adjunct); PhD, 1995, University of Washington; history of U.S. race relations, American Indians, and legal culture.

Nash, Linda L. 1999, (Acting); MS, 1989, University of California (Berkeley); environmental, American west.

Poiger, Uta G. \* 1995; MA, 1990, PhD, 1995, Brown University; modern German history, European, women, gender, historiography.

Schmidt, Benjamin \* 1996; MA, 1988, PhD, 1994, Harvard University; early modern European history, the Netherlands.

Singh, Nikhil Pal \* 1999; PhD, 1995, Yale University; U.S. intellectual, African American, ethnicity and nationalism.

Thomas, Lynn M. \* 1997; MA, 1989, Johns Hopkins University; MA, 1993, Northwestern University; PhD, 1997, University of Michigan; Africa, cultural and social.

Walker, Joel T. 1997; PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

## History

### HIST 412 Science and the Enlightenment (5) I&S

The role of science in relation to intellectual, social, economic, and religious forces in the eighteenth century, and growth of the international community in science during the same period.

### HIST 425 History of the British Empire and Commonwealth Since 1783 (5) I&S

Britain in the Caribbean, Africa, India, Southeast Asia, and the Pacific; and the settlement, economic development, and political evolution of Canada, Australia, New Zealand, and South Africa.

### HIST 449 Issues in Comparative Labor History (5)

**I&S** Role of labor in the modern world. Emphasis on the centrality of workers' struggles in the evolution of national societies on the conceptual, research, and expository strategies of contemporary students of the labor movement and on differences and relationships between labor in developed and underdeveloped countries.

**HIST 451 Eastern and Central Africa Since 1500 (5) I&S** Explores the history of Eastern and Central Africa from the period prior to the slave trade through European colonialism to the post-colonial present. Focuses on political, economic, and social change and continuity. Emphasis on understanding how various historical actors and historians have interpreted these processes.

**HIST 452 Southern Africa Since 1500 (5) I&S** Explores the history of Southern Africa from pre-colonial social institutions through European colonialism and industrialization to the post-apartheid present. Focuses on the interplay between race, class, ethnicity, and gender in the structuring of political relations. Emphasis on understanding how various historical actors and historians have interpreted these processes.

**HIST 455 Topics in African History (5) I&S** Explores important issues in the history and historiography of sub-Saharan Africa since 1500. Content varies. Possible topics include labor and the family; health and healing; and resistance, ethnicity, and nationalism.

**HIST 461 History of the Middle East: 622-1300 (5) I&S** Political and economic analysis of the period circa AD 600, preliminary to rise of Islam, to arrival of the Turks. Muhammad's teaching and impact; Islamization and Arabization.

**HIST 462 History of the Middle East: 1258-1798 (5) I&S** Conquests by successors of Ghengis Khan; creation in Egypt, Syria, and Iran of cavalry-based states; domination of political, social, and economic history by Ottoman and Safavid empires. The Napoleonic invasion.

**HIST 463 History of the Middle East Since 1789 (5) I&S** Critical issues and themes in the changing Middle East, including Westernization, growth of nationalism, Arab-Israeli dispute, Iranian revolution, and the role of Islam.

**HIST 467 Nations and States in the Modern World (5) I&S** Development of national consciousness in the "old nations" of Europe before the French Revolution. Replacement by new nationalism, spreading into East Central Europe, Russia, Ibero-America, Asia, and Africa. Offered: jointly with SIS 467.

**HIST 470 History of the Jews in the Twentieth Century (5) I&S** Historical experience of the Jews since World War I in Europe, North America, and the Middle East under the impact of three developments: growth of mass-based American Jewish community, destruction of Jewish life in Central and Eastern Europe, and creation of the State of Israel. Offered: jointly with SISJE 470.

**HIST 481 Economic History of Europe (5) I&S** Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with ECON 460.

**HIST 490 Senior Thesis (5, max. 10) I&S** Preparation of the senior thesis for the History and Science emphasis.

**HIST 491- Honors Historical Method (5-) I&S** The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

**HIST -492 Honors Historical Method (-5) I&S** The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

**HIST 495 History Internship (1-5, max. 10)** Off-campus independent fieldwork with a community agency in an apprenticeship or internship situation. Work to be jointly supervised by a member of the History Department and an on-site field supervisor.

**HIST 496- Public and Local History (5-) I&S** Reviews the nonacademic applications of history (museums, parks, business, archives, planning, policy-making, popular media). Includes directed research and writing on local topics in one applied setting. Students ordinarily undertake a lengthy research project in an internship-like role.

**HIST -497 Public and Local History (-5) I&S** Reviews the nonacademic applications of history (museums, parks, business, archives, planning, policy-making, popular media). Includes directed research and writing on local topics in one applied setting. Students ordinarily undertake a lengthy research project in an internship-like role.

**HIST 498 Colloquium in History (3-5, max. 15) I&S** Each seminar examines a different subject or problem. A quarterly list of the seminars and their instructors is available in the Department of History undergraduate advising office.

**HIST 499 Undergraduate Research (1-5, max. 15)**

### Courses for Graduates Only

**HIST 501 Ancient Greece and Rome: Writings and Interpretations (3-6, max. 6)** Study of historians, development of historical study as a distinct pursuit, focus of attention in historical scholarship in the ancient world and comparison with modern interpretation of antiquity.

**HIST 502 Medieval Europe: Writings and Interpretations (3-6, max. 6)** Study of historians, schools of history, and interpretations of medieval European history.

**HIST 504 Comparative Ethnicity and Nationalism (3)** Theoretical approaches to, and historical case studies of, the phenomena of ethnicity, nationalism, and ethnic conflict in the modern world. Emphasis on Europe and Asia.

**HIST 511 History of Science (3-6, max. 6)**

**HIST 512- Seminar in the History of Science (3-6, max. 6)-)**

**HIST -513- Seminar in the History of Science (-3-6, max. 6)-)**

**HIST 530 Comparative Colonialisms: Methodological and Conceptual Approaches (3)** Introduces students to the historiography of modern European/American colonialisms, focusing on Africa, Asia, and/or the Americas. Addresses methodological and conceptual issues by examining relationship between capitalism and colonialism; violence and routinization of colonial power; colonial categories of race, ethnicity, class, and gender; and resistance movements and nationalist politics.

**HIST 552 Field Course in African History (3)** Methodological and conceptual issues in African historiography, focusing on 1500 to the present. Examines topics including pre-colonial politics and economics, slavery and the slave trades, European conquest and colonization, resistance movements and nationalist politics, and post-colonial debates and dilemmas. Special attention to issues of gender, race, ethnicity, and class.

**HIST 561 Islamic History (3-6, max. 6)** Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

**HIST 562 Ottoman History (3-6, max. 6)** Field course. Introduction to the major periods and problems of Ottoman history, 1300-1914, by acquainting the student with the major works in at least two languages. An attempt is made to teach some use of Ottoman materials. A minor problem is investigated in detail by every student. Prerequisite: knowledge of at least one major language besides English (French, German, Russian, or other).

**HIST 563 Modern Near East (3-6, max. 6)** Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present.

**HIST 571 Orientation to an Academic Career in History (3)** Course for prospective college and university history instructors, preparing them for the nonacademic aspects of their duties. Prerequisite: Master of Arts degree in history or permission of instructor.

**HIST 580 Gender and History (5)** Introduction to gender as category of historical analysis, examining the impact of feminist theory within the discipline of history. Course traces historiographical debates in women's and gender history and explores, through cross-cultural comparisons, how scholars have conceived the relationship between gender and categories such as class, race, ethnicity, and sexuality.

**HIST 590 Topics in History (3, max. 9)** Seminar on selected topics in general history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

**HIST 595 Historical Practices (5)** Emphasizes the interrelatedness of theoretical issues and historical research. Students read works that encourage the rethinking of sources and their historical meaning and experiment with sources, methods, and questions in a set of practical assignments.

**HIST 598 Methods of Historical Research (5)** Exploration of new historical and scholarly techniques employed in historical research. Use of social science methodology and literary theory in the evaluation and interpretation of historical sources. Use of feminist theory, deconstruction, critical theory, and orality/literacy studies. Student research paper is based upon a chosen theoretical approach.

**HIST 600 Independent Study or Research (\*)**

**HIST 700 Master's Thesis (\*)**

**HIST 800 Doctoral Dissertation (\*)**

### History of the Americas

**HSTAA 401 American Revolution and Confederation (5) I&S** Causes of separation of the United States from the British empire; political theory of the Revolution; its military history; diplomacy of the Revolution; the Revolution as a social movement; intellectual aspects; readjustment after independence; the formation of the American union; the Constitution.

**HSTAA 404 New England: From the Foundings to the Civil War (5) I&S** New England from colonial beginnings to the region's emergence to national leadership in the mid-nineteenth century. Emphasis on Puritanism, the New England town, adjustment to empire, revolution and constitution making, the growth of party, abolitionism, the flowering of a regional culture, and the personalities who embodied these key themes and periods.

**HSTAA 409 American Social History: The Early Years (5) I&S** Survey of American society and institutions from the colonial era through the Civil War, with special attention to reform, labor, immigration, education, law enforcement and the city.

**HSTAA 410 American Social History: The Modern Era (5) I&S** Survey of American society and institutions from Reconstruction to the present with special attention to reform, poverty, social mobility, immigrant and ethnic groups, the city and law enforcement.

**HSTAA 411 The United States During the Era of Civil War and Reconstruction (5) I&S** Conflicting interests, ideologies, and ways of life in the United States from the 1840s to the 1870s.

**HSTAA 412 The Westward Movement, 1700-1850 (5) I&S** Anglo-American advance into interior of continental United States culminating in occupation of Far West. Rivalry with New France and New Spain in colonial period; role of federal government in westward expansion; land policy and land distribution; migration, settlement, and the pioneering experience; federal Indian policies and implementation; political evolution, urbanization, and economic development of trans-Appalachian West; shaping of national character and institutions.

**HSTAA 413 History of the Trans-Mississippi West (5) I&S** Anglo-American exploration, conquest, occupation, and exploitation of the trans-Mississippi West, with emphasis on economic development into the twentieth century. Considers wide range of developmental themes (social, political, cultural) in historiography of American West.

**HSTAA 414 The Canadian West, 1670-1990 (5) I&S** Examines the history of colonization and settlement of Canada's four westernmost provinces with emphasis on their economic, social, and Native history.

**HSTAA 416 American Law and the American Indian (3) I&S** Relationship between Indians and the United States from 1789 to the present. Significant constitutional, legislative, and judicial actions. Legal events explored within their political, military, social, and cultural contexts. Comparisons with other minority-group experiences. Offered: jointly with LAW 467.

**HSTAA 417 Indians in Western Washington History (3) I&S** *Harmon* Relations of Indians and non-Indians in the Puget Sound region, 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with AIS 425.

**HSTAA 420 Farmers in United States History (5) I&S** From pre-colonial practices to the modern agricultural system with emphasis on the demographic, geographic, and technological dimensions and their social, economic, and political implications.

**HSTAA 421 American Environmental History (5) I&S** American attitudes toward the natural environment. Impact of settlement on the major natural regions of the United States. Evolution of the conservation movement, including development of the national park system and national forest system and emergence of the ecological perspective.

**HSTAA 426 American Urban History Since 1870 (3/5) I&S** Development of American cities for the past century. Topics include physical development, immigration, politics, and changes in society and culture.

**HSTAA 431 American Politics and Society Since 1920 (5) I&S** Political, social, economic, and intellectual developments in the United States from 1920 to the present.

**HSTAA 432 History of Washington and the Pacific Northwest (5) I&S** Exploration and settlement; economic development; growth of government and social institutions; statehood.

**HSTAA 436 American Jewish History Since 1885 (5) I&S** Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with SISJE 436.

**HSTAA 445 Economic History of the United States (5) I&S** Growth and development of the United States economy from the colonial period to the present. Follows the course of economic change, examines contemporary reactions, and analyzes implications for American society and politics.

**HSTAA 450 Class and Labor in American History (5) I&S** The history of workers and class formation from early industrialization to the present. Emphasizes the interaction of class with race, ethnicity, gender, and political culture within the context of American economic development. Explores the role of unions, labor politics, and radical movements.

**HSTAA 451 Constitution Making in America, 1776-89 (5) I&S** Intensive study of the framing of the Articles of Confederation, the state constitutions, the territorial ordinances, the United States Constitution of 1787, and the Bill of Rights. Class discussions and term paper, in addition to required attendance at lectures offered in 351, which cover the English and colonial backgrounds and developments to 1840. Credit cannot be received for both 351 and 451.

**HSTAA 454 The Intellectual History of the United States (5) VLPA/I&S** Lectures and discussions devoted to the development of the American mind, from historical beginnings to the present.

**HSTAA 456 The American Character (5) I&S** Explores prevailing explanations for the American character and tries to assess its historical consequences. Lectures, discussion, reading, reports.

**HSTAA 461 Diplomatic History of the United States, 1776-1901 (5) I&S** Foreign policy of the United States government prior to the twentieth century. Emphasis on international wars, territorial expansion, and the peculiarities of the American position in world politics.

**HSTAA 462 Diplomatic History of the United States, 1901-Present (5) I&S** Foreign policy of the United States government during the twentieth century. International wars and the other major episodes in diplomacy are emphasized.

**HSTAA 470 Colloquium in American History: the Progressive Era, 1900-1917 (5) I&S** The principal problems and themes of the Progressive Era, emphasizing political, economic, social, and cultural aspects.

**HSTAA 471 Colloquium in American History: the 1920s in America (5) I&S** Achievements and issues of the New Era; causes and consequences of the stock-market crash and Great Depression, with emphasis on political, economic, social, and cultural analysis.

**HSTAA 472 Colloquium in American History: Franklin D. Roosevelt and the New Deal (5) I&S** Analysis of the key political, economic, social, and cultural factors in the New Deal, including the role played by President Roosevelt.

**HSTAA 473 Colloquium in History: the American Experience in World War II (5) I&S** Problems and policies of the people of the United States and their government in World War II; the role of the United States in winning the war; impact of the war on American society.

**HSTAA 480 Labor and Popular Movements in Latin America (5) I&S** Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-English-language Latin American studies courses. Offered: jointly with SISLA 480.

**HSTAA 482 The History of Brazil: Colonial Period to the Present (5) I&S** Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

**HSTAA 483 Southern South America (5) I&S** History of the four countries that form southern South America: Argentina, Uruguay, Paraguay, and Chile, focusing on economic, social, and political change in the nineteenth and twentieth centuries. Governments of Juan Perón in Argentina and Salvador Allende in Chile. Relations of the four countries with Europe and the United States.

**HSTAA 486 History of Mexico: Colonial Origins to 1822 (5) I&S** Political, social, and economic history of Mexico from its discovery by the Spanish to its independence from Spain.

**HSTAA 487 History of Mexico: 1822 to the Present (5) I&S** Political, social, and economic history of Mexico from its independence from Spain to the present.

**HSTAA 488 History of the Caribbean and Central America (5) I&S** Political, social, and economic history of principal countries in the Caribbean and Central America from their discovery to the present.

### Courses for Graduates Only

**HSTAA 501 American History: Early (3-6, max. 6)**

**HSTAA 503- Seminar in American History, Early (3-)** Research seminar in early American History, 1600-1875.

**HSTAA -504 Seminar in American History, Early (3-6, max. 12)** Research seminar in early American History, 1600-1875.

**HSTAA 512 American History: Western (3-6, max. 6)**

**HSTAA 513- Seminar in American History: Western (3-6, max. 12)-**

**HSTAA -514 Seminar in American History: Western (-3-6, max. 12)**

**HSTAA 516 Hispanics of the United States (3-6, max. 6)**

**HSTAA 517 Field Course in American Indian History (5)** Field-reading course. Survey of major problems and literature concerning indigenous peoples of North America and their descendents.

**HSTAA 521 American History: Writings and Interpretations, 1770-1870 (4-6)**

**HSTAA 522 American History: Writings and Interpretations Since 1870 (4-6)**

**HSTAA 524 American Social History Before 1860 (3-6, max. 6)** Field course. Survey of major problems and literature in American social history before 1860.

**HSTAA 525 American Social History After 1860 (3-6, max. 6)** Field course. Survey of major problems and literature in American social history after 1860.

**HSTAA 531 American History: Twentieth Century (3-6, max. 6)**

**HSTAA 532- Seminar in American History: Recent Period (3-6, max. 12)-**

**HSTAA -533- Seminar in American History: Recent Period (-3-6, max. 12)-**

**HSTAA -534 Seminar in American History: Recent Period (-3-6, max. 12)**

**HSTAA 549 Culture, Politics, and Power in Nineteenth-Century Black America (5) Camp** Canonical issues, problems, and topics in nineteenth-century black social history. Traces major developments during the period; engages historiographical debates; and explores methodological questions such as the intersection of social and cultural history, and the challenges and possibilities of writing the history of a people with few written records.

**HSTAA 550 African-American History to Reconstruction (5)** Comprehensive introduction to the major topics and writings in African-American history from the colonial era to 1900, including the inception of slavery, free Blacks, slave revolts, Black abolition, Blacks in the Civil War and Reconstruction, and the Black female role in the struggle for freedom.

**HSTAA 551 African-American History Since Reconstruction (5)** Comprehensive introduction to the major topics and writings in African-American history in the twentieth century, including Jim Crow era, Black Women's Movement, Harlem Renaissance, legal origins of Civil Rights Revolution, Second Reconstruction, and Politics of Cultural Pluralism.

**HSTAA 552- Graduate Seminar in African-American History (3-)** Research experiences and opportunities in African-American history. Provides students with skills and methodology to pursue advanced research in the field.

**HSTAA -553 Graduate Seminar in African-American History (-3)** Research experiences and opportunities in African-American history. Provides students with skills and methodology to pursue advanced research in the field.

**HSTAA 554 American History: Intellectual (3-6, max. 6)**

**HSTAA 555- Seminar: American Intellectual History ([3-6, max. 6]-)** Develops research and writing competence in American intellectual history. Prerequisite: permission of instructor or graduate program coordinator.

**HSTAA -556 Seminar: American Intellectual History (-[3-6, max. 6])** Develops research and writing competence in American intellectual history. Prerequisite: permission of instructor or graduate program coordinator.

**HSTAA 561 History of American Foreign Policy (3-6, max. 6)**

**HSTAA 562- Seminar in American Diplomatic History ([3-6, max. 6]-)**

**HSTAA -563 Seminar in American Diplomatic History (-[3-6, max. 6])**

**HSTAA 570 American Environmental History (5)** Readings in environmental history emphasizing theory, methodology, and principal themes in the field. Readings emphasize the environmental history of North America and the United States.

**HSTAA 581 Latin American History: Colonial Period (3-6, max. 6)**

**HSTAA 582 Latin American History: National Period (3-6, max. 6)**

**HSTAA 583- Seminar in Latin American History ([3-6, max. 12]-)** Problems of historical research in the history of Latin America from colonial beginnings to the present.

**HSTAA -584- Seminar in Latin American History (-[3-6, max. 12]-)** Problems of historical research in the history of Latin America from colonial beginnings to the present.

**HSTAA -585 Seminar in Latin American History (-[3-6, max. 12])** Problems of historical research in the history of Latin America from colonial beginnings to the present.

**HSTAA 590 Topics in American History (3, max. 9)** Seminar on selected topics in American history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

## Ancient and Medieval History

**HSTAM 401 Early Greece (5) I&S** Bronze and Dark Age Greece: realities of the heroic age of ancient Greece.

**HSTAM 402 Classical Greece (5) I&S** The classical civilization of ancient Greece, with special emphasis on the legacy of Greece to Western civilization.

**HSTAM 403 Alexander the Great and the Hellenistic Age (5) I&S** Rise of Macedonia, conquest of Near East by Alexander, and division into lesser kingdoms after Alexander's death. Special emphasis on fusion of cultures and change from city-state to world-state.

**HSTAM 405 Topics in Ancient History (5, max. 10) I&S** Select topics in the history of the ancient world, from the Neolithic Near East to the late Roman Empire. Offered by various faculty/instructors.

**HSTAM 411 The Early Roman Republic (3) I&S** Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

**HSTAM 412 The Late Roman Republic (3) I&S** Political, social, and cultural history, with special emphasis on the period of Cicero and Caesar.

**HSTAM 413 The Early Roman Empire (3) I&S** Political, social, economic, and cultural history, with emphasis on the Julio-Claudians.

**HSTAM 414 The Late Roman Empire (3) I&S** Political, social, economic, and cultural history, with emphasis on the decline of ancient civilization.

**HSTAM 421 The Byzantine Empire (5) I&S** Political, social, economic, and cultural history of the eastern Roman Empire from the fourth to fifteenth centuries.

**HSTAM 431 Topics in Medieval History, 500-1000 (5) I&S** Study in depth of one or more topics in the history of Europe during the early Middle Ages.

**HSTAM 443 Kievan and Muscovite Russia: 850-1700 (5) I&S** Development of Russia from earliest times to the reign of Peter the Great. Offered jointly with SISRE 443.

**HSTAM 446 Medieval Russian Chronicles (5) I&S** History of Russian chronicle writing; study of the chronicles as literature and as historical sources, with emphasis on the latter.

**HSTAM 460 Medieval England, 1042-1485 (5) I&S** Upper level survey of English history from the Norman conquest until 1485. Emphasis on political, social, and economic history, with special attention to the peculiarities of English development as these had emerged by 1485.

**HSTAM 472 Intellectual and Religious History of the Later Middle Ages (5) I&S** Selected topics in intellectual and religious history, 1250 to 1550. Concentration on Europe north of the Alps and on philosophical and theological issues rather than on "humanism" and the history of scholarship. Most reading in original sources in translation.

## Courses for Graduates Only

**HSTAM 501 Greek History Field Course (3-6, max. 6)** Examines various topics and themes in Greek history. Content varies.

**HSTAM 511 Roman History Field Course (3-6, max. 6)** Examines various topics and themes in Roman history. Content varies.

**HSTAM 512- Seminar in Ancient History ([3-6, max. 6]-)** Detailed study of special topics in ancient history.

**HSTAM -513 Seminar in Ancient History (-[3-6, max. 6])** Detailed study of special topics in ancient history.

**HSTAM 530 Early Middle Ages (3-6, max. 6)** Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research.

**HSTAM 531 Medieval European History (3-6, max. 6)**

**HSTAM 532 Medieval European Seminar (3-6, max. 6)** Prerequisite: reading knowledge of Latin.

**HSTAM 533 Medieval European Seminar (3-6, max. 6)** Prerequisite: reading knowledge of Latin.

**HSTAM 534 Medieval European Seminar (3-6, max. 6)** Prerequisite: reading knowledge of Latin.

**HSTAM 535 Later Medieval Europe (3-6, max. 6)** Field course. Surveys European history from ca. 1250 to 1500, with particular attention to historiography.

**HSTAM 536 Topics in Early Medieval History (3-6, max. 6)** Graduate level study of specific topics in early medieval history. Topics vary from quarter to quarter; for information, please see instructor.

**HSTAM 590 Topics in Ancient and Medieval History (3, max. 9)** Seminar on selected topics in ancient and medieval history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

## History of Asia

**HSTAS 401 History of Ancient India (5) I&S** India in ancient times; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

**HSTAS 402 History of Medieval and Mughal India (5) I&S** Medieval India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

**HSTAS 403 History of Modern India to 1900 (5) I&S** Modern India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

**HSTAS 404 History of Twentieth-Century India (5) I&S** Analysis of the problems in the fields of social life, international and domestic politics, education, economics, and other areas that confront India today.

**HSTAS 422 History of Tokugawa Japan (5) I&S** Background to the unification of Japan in 1600; establishment of the Tokugawa political structure; and the social, economic, and cultural history of the period 1600-1868. Offered: jointly with SISEA 422.

**HSTAS 423 History of Modern Japan (5) I&S** Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly with SISEA 423.

**HSTAS 424 The Emergence of Postwar Japan (5) I&S** The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with SISEA 440.

**HSTAS 431 Tibetan History (3) I&S** Tibet from earliest times to the present. Emphasis on the status and relations of Tibet in Asian affairs and on the evolution of the political institutions of a lama-ruler state.

**HSTAS 441 Economic and Social History of Japan to 1900 (5) I&S** Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: either SISEA 341 or HSTAS 341. Offered: jointly with SISEA 441.

**HSTAS 451 Chinese History: Earliest Times to 221 BC (5) I&S** Preimperial China.

**HSTAS 452 Chinese History from Earliest Times to 1276(5) I&S** *Ebrey* Traces the development of Chinese civilization from earliest times through the Song dynasty. Examines social, cultural, political, and economic history.

**HSTAS 453 Chinese History: AD 906 to 1840 (5) I&S** *Guy* Political, social, economic, and intellectual history from the time of the Mongol conquest of China to the Sino-Japanese war. Focus on the evolution of the late imperial Chinese state and the "early modern" era in China.

**HSTAS 454 History of Modern China (5) I&S** Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with SISEA 454.

**HSTAS 456 Topics in Chinese Social History (5) I&S** Surveys major issues and approaches to the study of the role of the Chinese people in China's historical development. Historical focus of course varies with instructor. Prerequisite: HSTAS 211. Offered: jointly with SISEA 456.

**HSTAS 462 Southeast Asian History to 1800 (5) I&S** Absorption and modification of cultures (Indian and Chinese), religions (Islam, Buddhism, Catholicism), and peoples (northern European) by island and mainland-Southeast Asians. Main themes are cultural contact and the growth of states and peoples.

**HSTAS 463 Southeast Asian History from 1800 to the Present (5) I&S** Post-eighteenth-century history of the present countries of Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, Brunei, Indonesia, and the Philippines. Deals with colonial rule, emerging nationalism, and political independence. Investigates broad themes of social, economic, and cultural history.

**HSTAS 465 The Vietnam Wars (5) I&S** Analyzes Vietnamese, Cambodian, and Laotian wars fought in Southeast Asia from 1946 to present. Examines how the Vietnamese managed to defeat both the French and Americans. Questions whether these wars were wars of independence, civil wars, or "proxy wars" in which local forces served the interests of great powers.

**HSTAS 469 Topics in Southeast Asian History (5) I&S** Introduces major issues within the history and culture of one country of Southeast Asia. Content varies. Topics may include religion, economics, colonialism, perspectives on gender, labor history, literatures, popular culture, and performing arts. Focuses on a different Southeast Asian country each time offered. Offered: jointly with SISSE 469.

**HSTAS 481 History of Traditional Korea: Earliest Times to the Nineteenth Century (5) I&S** Korean history from earliest times to the modern period.

**HSTAS 482 History of Modern Korea: 1860 to the Present (5) I&S** Traditional institutions and society, Japanese colonial rule, liberation and the Korean War, early Korean communist movement, and North Korea and South Korea since 1945.

## Courses for Graduates Only

**HSTAS 501 Indian History (3-6, max. 6)** Prerequisite: permission of instructor.

**HSTAS 502 Seminar: History of India (3-6, max. 12)** Seminar on selected topics and problems in the history of medieval and modern India. Prerequisite: HSTAS 501 and permission of instructor.

**HSTAS 503 Seminar: History of India (3-6, max. 12)** Seminar on selected topics and problems in the history of medieval and modern India. Prerequisite: HSTAS 501 and permission of instructor.

**HSTAS 520 Premodern Japanese History (5)** Field course; Japanese history prior to 1868. Prerequisite: HSTAS 421 and HSTAS 422, or SISEA 441 and SISEA 541, or permission of instructor.

**HSTAS 521 Modern Japanese History (3-6, max. 6)** Field course. Prerequisite: HSTAS 422, HSTAS 423, or permission of instructor.

**HSTAS 530 Field Course in Southeast Asian History (3)** Introduction to major English-language works on Southeast Asian history and to the major historiographical issues of the era.

**HSTAS 532 Seminar in Southeast Asian History (3)** Selected topics in Southeast Asian history and historiography. Preparation for theses and doctoral dissertations on Southeast Asian History.

**HSTAS 541 Economic and Social History of Japan to 1900 (5)** Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken HSTAS 441. Offered: jointly with SISEA 541.

**HSTAS 551 Field Course in Chinese History: Pre-Sung Period (3-6, max. 6)** *Ebrey* Introduction to the English-language literature on Chinese history through the Song dynasty. Recommended: HSTAS 452 or equivalent.

**HSTAS 552- Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]-)** *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

**HSTAS -553- Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]-)** *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

**HSTAS -554 Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12])** *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

**HSTAS 560- Field Course in Chinese History: 1276-1895 ([3-6, max. 6]-)** *Guy* Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

**HSTAS -561 Field Course in Chinese History: 1276-1895 ([3-6, max. 6])** *Guy* Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

**HSTAS 562- Seminar in Chinese History: 1268-1895 ([3-6, max. 6]-)** *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

**HSTAS -563- Seminar in Chinese History: 1268-1895 ([3-6, max. 6]-)** *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

**HSTAS -564 Seminar in Chinese History: 1268-1895 ([3-6, max. 6])** *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

**HSTAS 571- Field Course in Modern Chinese History ([3-6, max. 6]-)** Introduction to the major English-language literature on modern Chinese history and to the major historiographical issues of the period. Prerequisite: HSTAS 454 or equivalent, and permission of instructor.

**HSTAS -572 Seminar in Twentieth Century Chinese History ([3-6, max. 6])** *Dong* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

**HSTAS 573- Seminar in Twentieth Century Chinese History ([3-6, max. 12]-)** *Dong* Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

**HSTAS -574- Seminar in Twentieth Century Chinese History ([3-6, max. 12]-)** *Dong* Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

**HSTAS -575 Seminar in Chinese History: Modern Period ([3-6, max. 12])** Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers. Prerequisite: HSTAS 571-572 or permission of instructor and reading knowledge of Chinese.

**HSTAS 581 Modern Korean History (3-6, max. 6)** Field course. Prerequisite: permission of instructor.

**HSTAS 582- Seminar in Korean History ([3-6, max. 6]-)** Selected topics in Korean history and historiography.

**HSTAS -583- Seminar in Korean History ([3-6, max. 6]-)** Selected topics in Korean history and historiography.

**HSTAS -584 Seminar in Korean History ([3-6, max. 6])** Selected topics in Korean history and historiography.

**HSTAS 590 Topics in Asian History (3, max. 9)** Seminar on selected topics in Asian history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

## Modern European History

**HSTEU 401 The Reformation (5) I&S** Origins of the disunity of Europe in the crisis of the sixteenth century with emphasis on the relations between religion and politics.

**HSTEU 405 European Intellectual History: Eighteenth Century (5) VLPA/I&S** Development of the social sciences, moral theory, political theory, and religious thought in eighteenth-century Europe. Rationalism, empiricism, utilitarianism, and the sources of idealism.

**HSTEU 406 European Intellectual History: Nineteenth Century (5) VLPA/I&S** Selected topics in intellectual history up to 1890. The philosophical consequences of the French Revolution, the development of idealism, conservatism, romanticism, and early socialist theory; positivism, the problems of historicism, new forms of Christian apologetics, utilitarianism in decline, liberalism as philosophy, the early Marx.

**HSTEU 407 European Intellectual History: Twentieth Century (5) VLPA/I&S** Selected topics in the intellectual history of the late nineteenth and early twentieth centuries. The aftermath of Darwinism, the problems of methodology in modern social science, historicism and moral relativism, irrationalism in philosophy and social theory, revisionism in secular and orthodox religions.

**HSTEU 410 The Renaissance: 1300-1560 (5) I&S** Conditions of Renaissance culture: Italian republics and despots, humanism, the classical ideal of the arts, Machiavelli and the foundations of modern political thought; the end of an era.

**HSTEU 411 Europe: 1814-70 (5) I&S** Development of Europe during the age of Metternich, the revolutions of 1848, and the emergence of new national states.

**HSTEU 413 Europe: 1914-45 (5) I&S** Politics and society of Europe in the age of the concentration camp.

**HSTEU 415 Europe in the Six Years' War: 1939-45 (5) I&S** Inquiry to discover what the war of 1939-45 was about and what it did to more than five hundred million Europeans.

**HSTEU 421 France: 1429-1789 (5) I&S** Political and cultural history, from Joan of Arc to the eve of the French Revolution. Villon, Rabelais, Montaigne, Molière, Voltaire, Rousseau, de Tocqueville.

**HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5) I&S** Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

**HSTEU 423 France Since 1814 (5) I&S** Political, economic, and social history since the Congress of Vienna. Special emphasis upon the continuity of the revolutionary tradition.

**HSTEU 425 Topics in the History of France (5) I&S** An exploration of the political, social, cultural, or psychological dimensions of key themes in the history of France.

**HSTEU 431 Germany: 1648-1914 (5) I&S** Culture(s) and politics in central Europe from the end of the Thirty Years' War to the formation of the first German national state. Emphasis on the self-perception of societies and on the variety of interpretations of this period's history that are offered by different "schools" of historians.

**HSTEU 432 Germany: 1914-1945 (5) I&S** Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

**HSTEU 433 Central Europe: the Habsburg Monarchy, 1740-1918 (5) I&S** Social, political, cultural history of Europe's second-largest state, from the reign of Maria Theresa to the dissolution of the empire at the end of World War I. Topics include: state formation, nineteenth-century revolutions, nationality conflicts, political radicalism and anti-Semitism, and literature and the arts.

**HSTEU 434 Germany 1871-1989 (5) I&S** Society and politics from Germany's first unification to its reunification; domestic and foreign policy; political, economic, social, and cultural developments; high emphasis on German society's self-perception and on the variety of interpretations of this period's history offered by different "schools" of historians.

**HSTEU 435 World War I (5) I&S** European society on the eve of the war. War experience of the Europeans. Long term consequences of the war on European social, political, and economic institutions. Impact of the war on non-European world. The war in European literature.

**HSTEU 439 Soviet Union Since World War II (5) I&S** Domestic and foreign policy; political, economic, social, and cultural developments.

**HSTEU 440 History of Communism (5) I&S** Communism from its origins in the Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with SIS 440.

**HSTEU 444 Imperial Russia: 1700-1900 (5) I&S** Development of Russia from Peter the Great to Nicholas II. Offered jointly with SISRE 444.

**HSTEU 451 East-Central Europe Since 1342 (5) I&S** Focus on the lands of today's Poland, Czechoslovakia, Hungary, and Germany from the time they were great powers to the present. Traces the major changes in the fortunes of these lands in both local and international settings.

**HSTEU 452 Eastern Europe Since 1918 (5) I&S** Poland, Czechoslovakia, Hungary, Romania, Yugoslavia, Bulgaria, and Albania, from the end of World War I to the present.

**HSTEU 453 History of the Balkans, 1400 to the Present (5) I&S** Centuries of Ottoman rule that produced a new basis for the reemergence of independent states in the nineteenth and twentieth centuries; history of these new states until the present.

**HSTEU 454 Baltic History (5) I&S** Overview of the history of the area occupied by the Baltic countries of Latvia, Lithuania, and Estonia. Emphasizes their emergence as modern European nation-states. Era from World War I to present treated in depth, including the historical role and present situation of non-Baltic peoples, particularly Russians.

**HSTEU 461 Spain and Its Golden Age, 1469-1700 (5) I&S** History and culture of Spain and its empire from the late Middle Ages through the seventeenth century.

**HSTEU 462 Spain: 1700 to the Present (5) I&S** Political, economic, and cultural attempts of Spain to adjust to capitalism, liberalism, and secularism.

**HSTEU 464 The Jews in Spanish History (5) I&S** Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition. Offered: jointly with SISJE 464.

**HSTEU 465 The Jews of Eastern Europe (5) I&S** Jewish society in Poland, Russia, the Hapsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with SISJE 465.

**HSTEU 466 The Sephardic Diaspora: 1492-Present (5) I&S** *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with SISJE 466.

**HSTEU 467 Medieval Jewish History (5) I&S** Social and intellectual history of the Jews in western Europe to the fifteenth century. Jews under Islam and Christianity; the church and the Jews; the Crusades and their legacy; intellectual achievements; conflict and cooperation. Offered: jointly with SISJE 467.

**HSTEU 468 Early Modern Jewish History, 1492-1789 (5) I&S** Jews in the early-modern period. The Spanish expulsion in 1492 to the onset of political and social emancipation in western Europe and America. Offered: jointly with SISJE 468.

**HSTEU 469 Enlightenment, Emancipation, Antisemitism: History of the Jews, 1770-1914 (5) I&S** The Jewish experience in the modern world from the European Enlightenment to the First World War. Focus on the debates surrounding Jewish emancipation, the reception of Jews within European society, modern antisemitism, nationalist movements, mass migration, and war. Offered: jointly with SISJE 469.

**HSTEU 470 The Jacobethan Age: England 1580-1630 (5) I&S** Emphasis on arts and society instead of the traditional kings, battles, and politics; the way people at all levels of society lived, in towns and in the countryside, within the bounds of the royal court or outside in the political wilderness. Classes on poetry, drama, music, architecture, painting, interior decoration, and some of the minor arts, as well as on demography and some of the traditional historical subjects. Not open for credit to students who have taken 471 or 472.

**HSTEU 471 England in the Sixteenth Century (5) I&S** Political, administrative, and social history from Henry VII to Elizabeth I, with emphasis on the Reformation and its effects and on conditions of life in Elizabethan England. Not open to students who have taken 470.

**HSTEU 472 England in the Seventeenth Century (5) I&S** Political, administrative, and social history from the accession of James I to the Glorious Revolution. Not open to students who have taken 470.

**HSTEU 474 England in the Nineteenth Century (5) I&S** Political, social, and cultural development; the agrarian, industrial, and French revolutions; the rise of parliamentary democracy; the Victorian age; political thought from utilitarianism to Fabianism; Irish home rule.

**HSTEU 475 England in the Twentieth Century (5) I&S** From the Boer War to the present; conservatism, liberalism, and socialism; England in two world wars; the decline of British imperialism.

**HSTEU 476 Modern Irish History (5) I&S** Political and social history from 1800 to the present; the Irish Question after the Act of Union; development of Irish nationalism in the Home Rule and Sinn Fein periods; the Irish Free State and Northern Ireland since 1921; current problems in Northern Ireland.

**HSTEU 480 European Socialism (5) I&S** Origins and development of socialist theory and practice in Europe since the French Revolution. Socialism as a political movement.

**HSTEU 482 Fascism in Europe (5) I&S** History of the fascist era in modern Europe from 1919 to 1945. A study of the principal examples of national fascism and fascist-like movements coupled with a general theoretical consideration of the phenomenon.

## Courses for Graduates Only

**HSTEU 501 Renaissance Field Course (3-6, max. 6)** Topics in the cultural, political, and social history of the Renaissance era.

**HSTEU 502 Reformation Field Course (3-6, max. 6)** Topics in the religious, political, and social history of the Reformation era.

**HSTEU 505 Early Modern European History (3-6, max. 18)** Select topics in early modern European history. Topics vary from quarter to quarter. Prerequisite: permission of instructor.

**HSTEU 510- Core Seminar in the History of Modern Europe (3-)** An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

**HSTEU -511- Core Seminar in the History of Modern Europe (-3-)** An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

**HSTEU -512 Core Seminar in the History of Modern Europe (-3)** An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

**HSTEU 515 Modern European Intellectual History (3-6, max. 6)**

**HSTEU 516- Seminar: European Intellectual History ([3-6, max. 6]-)**

**HSTEU -517 Seminar: European Intellectual History (-[3-6, max. 6])**

**HSTEU 521 Modern European History: France (3-6, max. 6)**

**HSTEU 531 Modern European History: Germany (3-6, max. 6)**

**HSTEU 532- Seminar in Modern European History: Germany ([3-6, max. 6]-)**

**HSTEU -533- Seminar in Modern European History: Germany (-[3-6, max. 6]-)**

**HSTEU -534 Seminar in Modern European History: Germany (-[3-6, max. 6])**

**HSTEU 544 Modern Russian History (3-6, max. 6)**

**HSTEU 545- Seminar in Modern Russian History (3-6, max. 6]-)** Prerequisite: reading knowledge of Russian and either French or German.

**HSTEU -546- Seminar in Modern Russian History (-[3-6, max. 6]-)** Prerequisite: reading knowledge of Russian and either French or German.

**HSTEU -547 Seminar in Modern Russian History (-[3-6, max. 6])** Prerequisite: reading knowledge of Russian and either French or German.

**HSTEU 548 Field Course in Soviet History (3-6, max. 6)** Specialized course for graduate history students in the scholarly literature of Russian history since 1917. Intended for graduate students preparing for MA or Ph.D. field examination in Russian history of the Soviet period.

**HSTEU 551 History of Eastern Europe: 1772-1939 (5)** Study of the east-central European region: Poland, Czechoslovakia, Hungary, Romania, and the Balkan countries, from their rebirth to World War II. Prerequisite: reading knowledge of German, French, Russian, or one East European language.

**HSTEU 552 History of Eastern Europe: 1939 to the Present (5)** Prerequisite: reading knowledge of one major European or one East European language.

**HSTEU 553- Seminar in Modern East European History ([3-6, max. 6]-)** Study and research involving special methods dealing with the histories of the East European countries in the modern period.

**HSTEU -554- Seminar in Modern East European History (-[3-6, max. 6]-)** Study and research involving special methods dealing with the histories of the East European countries in the modern period.

**HSTEU -555 Seminar in Modern East European History (-[3-6, max. 6])** Study and research involving special methods dealing with the histories of the East European countries in the modern period.

**HSTEU 563 Modern Spanish History (3-6, max. 6)** Problems in the history of Spain, 1500 to the present.

**HSTEU 571 English History: Tudor and Stuart (3-6, max. 6)**

**HSTEU 572 English History (3-6, max. 6)**

**HSTEU 573- Seminar in Modern English History ([3-6, max. 6]-)**

**HSTEU -574 Seminar in Modern English History (-[3-6, max. 6])**

**HSTEU 575- Seminar in Tudor-Stuart History ([3-6, max. 6]-)** History of England under the Tudors and the Stuarts. Prerequisite: HSTEU 571 or permission of instructor.

**HSTEU -576 Seminar in Tudor-Stuart History (-[3-6, max. 6])** History of England under the Tudors and the Stuarts. Prerequisite: HSTEU 571 or permission of instructor.

**HSTEU 590 Topics in European History (3, max. 9)** Seminar on selected topics in European history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

## Humanities (Simpson Center for the Humanities)

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

**HUM 498 Special Topics in the Humanities (1-5, max. 15) I&S/VLPA** Examination of selected topics in the humanities and the study of the arts. Taught by U.W. faculty and visiting scholars and artists.

### Courses for Graduates Only

**HUM 520 Seminar in Textual Theory (5)** Introduction to the theoretical perspectives that have shaped the emerging interdisciplinary field of Textual Studies. Included in curriculum of Textual Studies Program.

**HUM 521 Seminar in Scribal Texts (5)** Relationship between oral and written texts and of the social and cultural systems which enable their production, transmission, and preservation. Included in curriculum of Textual Studies Program.

**HUM 522 Seminar in Printed Texts (5)** Study of printing as a means of textual transmission in the ages of the hand press, machine press, and electronic press; of current theories of editing; and of preparing critical editions of printed texts.

**HUM 523 Seminar in Hypertext and Textual Studies (5)** Several views of hypertext conceptually explored as a basis for research and evaluation of selected hypertext works. Includes initiating the construction of a World Wide Web hypertext of resources for the study of oral, graphical, hand-written, and printed texts. Included in curriculum of Textual Studies Program.

**HUM 596 Humanities Research Seminar (1-5, max. 15)** Exploration of current research in the Humanities and the study of the arts. Offered by specially selected U.W. faculty and visiting scholars in the arts and humanities.

## International Studies

401 Thomson



General Catalog Web page:  
[www.washington.edu/students/genccat/academic/internat\\_studies.html](http://www.washington.edu/students/genccat/academic/internat_studies.html)



Department Web page:  
[jsis.artsci.washington.edu](http://jsis.artsci.washington.edu)

The Henry M. Jackson School of International Studies organizes and supports interdisciplinary teaching and research in international affairs. The school consists of a group of interdisciplinary area-studies programs on major world regions, as well as topical and comparative programs of study that transcend national and regional boundaries.

## Graduate Program

Graduate Program Information  
111 Thomson, Box 353650  
(206) 543-6001  
[jsinfo@u.washington.edu](mailto:jsinfo@u.washington.edu)

The Jackson School offers six area-studies programs that lead to a Master of Arts in International Studies degree. These include China Studies; Japan Studies; Korea Studies; Middle East Studies; Russian, East European, and Central Asian Studies; and South Asian Studies. Specific requirements vary from one program to another, but all stress interdisciplinary study within the context of the historical cultures, contemporary situations, and languages of the world areas. In addition, the Jackson School offers a program in Comparative Religion for the Master of Arts in International Studies.

The Jackson School also offers a general program in International Studies that concentrates on the interaction of international economic, political, and cultural processes with states and societies around the world. This program was developed in conjunction with several professional schools and is designed as a concurrent degree program.

**Admission Requirements:** Applicants must meet the requirements of the Graduate School: a 3.00 GPA in the last 90 quarter (60 semester) graded credits and a baccalaureate degree from an accredited university. Submission of the scores of the general Graduate Record Examination is required. Applicants must also meet the requirements of the specific Jackson School program to which they are applying. Most of them require or strongly recommend previous study of an appropriate foreign language.

**Graduation Requirements:** Students must meet Graduate School requirements for the Master of Arts, as well as individual Jackson School program requirements. Programs are designed to be completed in two years.

**Financial Aid:** Financial support is available in the form of Title VI Foreign Language and Area Studies Fellowships. Some Jackson School programs have additional fellowships available for specific areas of study. Graduate students are also eligible for a limited number of teaching or research assistantships and reader-ships.

*Research Facilities (East Asia):* Research and training facilities include the East Asia Library, with a comprehensive collection of manuscripts, books, and serials on China, Japan, and Korea. In addition, the University is affiliated with the Inter-University Program for Chinese Language Studies in Beijing and Taipei, language programs in the People's Republic of China sponsored by the Council on International Educational Exchange, and the Inter-University Center for Japanese Language Studies in Yokohama, which provide intensive language training for advanced undergraduate and graduate students. The School has ongoing projects on China, Japan, and Korea in which advanced graduate students and recognized scholars from the United States and foreign institutions regularly participate.

See also descriptions of research facilities on Russia, East Europe, and Central Asia as well as South Asia under the appropriate headings below.

## China Studies

David Bachman, Chair

The China Studies program provides a broad understanding of the Chinese people and their culture, historical development, and contemporary problems. The curriculum emphasizes the attainment of facility in Chinese language, a grounding in history, and a familiarity with the approaches of the social sciences to China studies. The cultural aspects of China are covered through offerings of several departments, with special strengths in art history and literature. The breadth of offerings allows students to select courses to meet career goals in business, government, or other professions, or to prepare for further graduate study in an academic discipline.

*Admission Requirements:* See above under Graduate Program. While not required for admission, some previous study of Chinese language is highly recommended.

*Graduation Requirements:* Chinese language training through the third year; two seminars: SISEA 521-522 (5 credits each) plus 26 credits in discipline study related to China from at least two different disciplines; two seminar papers or a thesis; comprehensive oral examination.

## Comparative Religion

Martin S. Jaffee, Chair

The Comparative Religion program leading to the Master of Arts in International Studies offers an interdisciplinary curriculum in the study of religion, with several choices for areas of concentration. The required core seminars focus on methodology and comparative perspective in the study of religion. For the remaining course requirements, primary and secondary curricular concentrations are available in Buddhism, Hinduism, Judaism, Islam, Christianity, and religion and culture; further secondary curricular concentrations are available in Greco-Roman religions, East Asian indigenous traditions, and African religious traditions.

*Admission Requirements:* See above under Graduate Program. The Comparative Religion faculty reserve the right to determine in each case whether an applicant has sufficient language preparation and background in the study of religion for acceptance into the program.

*Graduation Requirements:* Completion of the third year in a language of the primary sources in the chosen concentration, and first-year reading proficiency in a secondary foreign language necessary for reading published research (e.g., German, French); certification of basic competency in the history of world religions; RELIG 501-502; one course focused on historical relations between religious traditions; at least four courses in a major concentration and two in a minor; one or two final research paper(s); and a comprehensive examination including both oral and written segments.

## International Studies

Resat Kasaba, Chair

The general program in International Studies provides students with broad knowledge and skills in analyzing international affairs. Designed for students entering a variety of professional fields, the program trains them in international and comparative studies in a multidisciplinary setting. Students are prepared to undertake sophisticated analyses of international affairs and typically will hold positions after graduation with the international divisions of federal and state governments, international divisions of banks, trading companies, policy-study institutes, corporations with international operations, and international development and educational organizations. The program usually entails concurrent enrollment in a graduate professional-degree program and adds approximately one year to the student's course of study.

*Admission Requirements:* See above under Graduate Program. Those applying concurrently to a professional program (Business Administration, Public Affairs, Marine Affairs, Forest Resources, Law, or Public Health and Community Medicine) must first be accepted by the professional school. For non-concurrent applicants, preference is given to those who have a professional interest, or previous professional experience or education. Prior study of a foreign language and preparation in intermediate-level microeconomics and macroeconomics are highly recommended.

*Graduation Requirements:* Japanese or Chinese language through the third year or any other modern foreign language through the second year; SIS 500, 501, 502, 511, and 512 (3 credits each); SIS 591, 592, and 593 (1 credit each); courses in two of the following three fields: a regional studies field, a professional field, or a special topics field (minimum three classes—9 credits—for each field); two seminar papers; and an oral examination. Students in concurrent graduate-degree programs also must meet Graduate School requirements for the second degree.

## Japan Studies

The graduate program in Japan Studies gives students in-depth knowledge of many facets of Japan, including its history, political economy, and language. Course work helps prepare students for careers in business, government, journalism, secondary-school teaching, and a wide variety of other professional fields. The program is specifically designed (1) for students with bachelor's degrees in a discipline who need language and interdisciplinary training on Japan to pursue their career goals, and (2) as preparation for doctoral work in an academic discipline involving Japan for students who have had little or no training on Japan or in the language.

*Admission Requirements:* See above under Graduate Program. At least one year of prior training in Japanese language is strongly recommended.

*Graduation Requirements:* Japanese language training through the third year (15 credits minimum training at the UW); SISEA 554-555 (6 credits) and SISEA 558-559 (5 credits each); 20 credits in discipline study of Japan to include at least one history course and one social science course; essay of distinction; and an oral examination.

## Korea Studies

Clark W. Sorensen, Chair

The graduate program in Korea Studies offers courses in Korean language, history, and society. Regular offerings are supplemented by visiting faculty from political science, economics and economic development, folklore, and literature. The program emphasizes the study of Korea in the context of East Asian civilization and the modern world economy, not simply as a single country in isolation from its neighbors. The objective of the program is to provide students with a broad back-

ground which will be of use for further graduate study, or in a variety of professions such as teaching, business, and government.

*Admission Requirements:* See above under Graduate Program. Previous language training is recommended.

*Graduation Requirements:* Korean language through the third year of instruction (through the second year of instruction if the student is admitted with no previous language training); HSTAS 481-482, SISEA 584 (5 credits each), and SISEA 585 (6 credits); 15 credits in discipline study of East Asia or international studies; two seminar papers; comprehensive oral examination.

## Middle Eastern Studies

The Middle East program is designed for students who wish to study the region within an interdisciplinary framework, focusing especially on the social, political, economic, and legal systems of the Middle East and/or Islamic Central Asia. To provide a thorough grounding in this region, students take courses in the social sciences, humanities, and a Middle Eastern or Central Asian language.

*Admission Requirements:* See above under Graduate Program. Although knowledge of a Middle Eastern or Central Asian language is not a prerequisite for admission, applicants are generally expected to have had at least the equivalent of one year's study of the language in which they plan to concentrate. Students accepted with no language training may wish to begin their language study in an intensive summer program.

*Graduation Requirements:* Three 3-credit or two 5-credit Middle Eastern language courses beyond the second-year (native speakers as well as non-native speakers); 20 credits on the modern Middle East from at least two social science or humanities disciplines; one approved Jackson School course; two courses in one social science discipline or in one professional school other than courses taken for preceding requirements; either a thesis or two seminar papers and a four-hour written examination.

## Russian, East European, and Central Asian Studies

Stephen E. Hanson, Chair

Designed primarily for students with bachelor's degrees in a discipline, the program offers a background for professional pursuits in government and nongovernmental organizations, journalism, business, or teaching, or for advanced graduate study leading to the Ph.D. degree in a discipline. The program includes language training, a concentration of study in a chosen discipline, and a combination of courses in other disciplines that deal with aspects of the area. Students usually focus on one region (Russia, East Europe, the Baltics, Central Asia), although the program provides flexibility to take courses on another region.

*Admission Requirements:* See above under Graduate Program. A prerequisite for all applicants is two years of college-level language courses or the equivalent; for Russian Studies the language must be Russian; for other regions of the former Soviet Union and East Europe, two years of a language of the region, or another relevant language.

*Graduation Requirements:* Including the two years required for entry, four years of a language of the region being studied or two years each of two relevant languages (four years of Russian required for Russian focus); SISRE 500, 501, and 502 (3 credits each); 30 credits in disciplines other than language, with 15-20 credits in a discipline of concentration and 10-15 credits in at least two additional disciplines; a thesis (9 credits of SISRE 700); a written examination in the discipline of concentration and an oral interdisciplinary examination.

*Research Facilities:* The University of Washington is a major center for research on Eastern Europe, Russia, and the other newly independent states of the former Soviet Union, notably the Baltics and the countries of Central Asia. In addition to extensive holdings in Russian, East European, and Baltic language materials, the library has one of the best Central Asian language collections in the country and the largest collection of Latvian books outside Latvia. The strengths of the program are complemented by strong programs in East Asian and Middle Eastern Studies.

## South Asian Studies

Frank F. Conlon, Chair

The South Asian Studies program has been designed for students whose career objectives involve teaching and research in a traditional discipline with geographical interests within South Asia (i.e., India, Pakistan, Bangladesh, Sri Lanka, Afghanistan, Tibet, and Nepal); those planning to enter professional-training programs (e.g., education, business administration, journalism, law, or public affairs); or students planning a career in government service (e.g., the foreign service) who wish to acquire a special understanding of the South Asia area.

*Admission Requirements:* See above under Graduate Program.

*Graduation Requirements:* Completion of the third year of a South Asian language to include at least 7 credits at the 400 level or above; SISSA 510 and 511 (5 credits each); 26 credits in discipline course work other than language, from at least two different departments; two seminar papers; and a comprehensive oral examination.

*Research Facilities:* The University of Washington library holds an extensive collection of books and serials relating to South Asia. The library participates in the U.S. Library of Congress Public Law 480 program, which supplies current publications from India, Pakistan, and Sri Lanka; and is a member of the South Asian Microfilm Program of the Center for Research Libraries, providing access to a large collection of microfilm newspapers, journals, and documents on South Asia.

## Faculty

### Director

Jere L. Bacharach

### Professors

Bacharach, Jere L. \* 1967; MA, 1962, Harvard University; PhD, 1967, University of Michigan; history of the Middle East, Islam.

Brass, Paul R. \* 1965, (Emeritus); PhD, 1964, University of Chicago; comparative politics (South Asia).

Butow, Robert J. C. \* 1960, (Emeritus); PhD, 1953, Stanford University; East Asian diplomatic history.

Chiro, Daniel \* 1974; PhD, 1973, Columbia University; political sociology, ethnic conflict.

Ebrey, Patricia B. \* 1997; PhD, 1975, Columbia University; early Imperial China, Song dynasty, social history.

Ellison, Herbert J. \* 1968; PhD, 1955, University of London (UK); modern Russian history.

Hanley, Susan B. \* 1970; PhD, 1971, Yale University; premodern Japanese history.

Hellmann, Donald C. \* 1967; PhD, 1964, University of California (Berkeley); Japanese politics and international relations.

Jackson, W. A. Douglas \* 1955, (Emeritus); PhD, 1953, University of Maryland; Canada, political systems, nature and culture.

Jaffee, Martin S. \* 1987; PhD, 1980, Brown University; rabbinic religion and literature in late antiquity.

Kasaba, Resat \* 1985; PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Keyes, Charles F. \* 1965; PhD, 1965, Cornell University; ethnic group relations, sociology of Theravada Buddhism, mainland Southeast Asia.

Legters, Lyman H. \* 1966, (Emeritus); PhD, 1958, Freie University of Berlin (Germany); Russian and East European Studies.

Migdal, Joel S. \* 1980; MA, 1968, PhD, 1972, Harvard University; state-society relations, rules of public space, Israel-Palestine.

Palais, James B. \* 1968; PhD, 1968, Harvard University; Korean history.

Pempel, T. J. \* 1995; PhD, 1972, Columbia University; comparative politics in Japan.

Poznanski, Kazimierz \* 1987; PhD, 1974, University of Warsaw (Poland); comparative economic systems, technological change, political economy of Eastern Europe.

Pyle, Kenneth B. \* 1964; PhD, 1965, Johns Hopkins University; modern Japanese history.

Ramet, Sabrina P. \* 1983; PhD, 1981, University of California (Los Angeles); politics and history of former Yugoslavia, East European religion and culture.

Taylor, George E. 1939, (Emeritus); MA, 1928, LittD, 1957, University of Birmingham (UK); East Asian studies.

Townsend, James R. \* 1968, (Emeritus); PhD, 1965, University of California (Berkeley); comparative government (China), politics of development.

Webb, Eugene \* 1966; MA, 1962, PhD, 1965, Columbia University; modern English, French, and German literature, comparative religion.

Williams, Michael A. \* 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Wong, Christine P. W. 2000; PhD, 1979, University of California (Berkeley); Chinese public finance, rural industrialization in China, transition economies of Asia.

Yamamura, Kozo \* 1972, (Emeritus); PhD, 1964, Northwestern University; economic development and economic history of Japan, comparative economic history.

### Associate Professors

Anchordoguy, Marie C. \* 1989; PhD, 1986, University of California (Berkeley); Japan's political economy; East Asian economic development.

Bachman, David M. \* 1991; PhD, 1984, Stanford University; Chinese politics and foreign policy and China's political economy (1949-present); US-China relations.

Guy, R. Kent \* 1980; PhD, 1981, Harvard University; late imperial China.

Ingebritsen, Christine \* 1992; PhD, 1993, Cornell University; politics, international political economy, European integration, environmental policy.

Jones, Christopher D. \* 1984; PhD, 1975, Harvard University; post-Cold War security issues in Europe and East Asia, political economy.

Lavelly, William R. \* 1985; PhD, 1982, University of Michigan; social demography of China.

Sorensen, Clark W. \* 1989; PhD, 1981, University of Washington; Korea, social change in East Asia, development, ethnic identity.

Waugh, Daniel Clarke \* 1972; PhD, 1972, Harvard University; medieval Russian history.

Young, Glennys J. \* 1992; PhD, 1989, University of California (Berkeley); Imperial and Soviet Russia, religion, women.

### Assistant Professors

Callahan, Mary P. 1999; PhD, 1996, Cornell University; Southeast Asia, military politics, historical memory.

Dong, Yue 1996; MA, 1991, University of Oregon; PhD, 1996, University of California (San Diego); late 19th and 20th century China, social and cultural history, urban history, gender studies.

Giebel, Christoph \* 1998; PhD, 1996, Cornell University; Vietnamese studies, Southeast Asian history.

Johnson, David T. 2000; PhD, 1996, University of California (Berkeley); comparative public law, Japanese law and politics, sociology of law, socio-legal theory.

Noegel, Scott B. \* 1995; PhD, 1994, Cornell University; ancient Near Eastern languages.

Sparke, Matthew \* 1995; MA, 1991, PhD, 1996, University of British Columbia (Canada); geopolitics, Cascadia, borderlands studies, globalization.

Stein, Sarah A. \* 1999; PhD, 1999, Stanford University; Jewish history, Russian history, Ottoman history, nationalism/ethnicity.

Warren, Jonathan W. 1996; MA, 1990, PhD, 1997, University of California (Berkeley); race and ethnicity, Latin American studies, cultural studies, Native American studies.

### Senior Lecturer

Clowes, James D. 1988; MA, 1988, University of Montana; modern European intellectual history, early German romanticism, pedagogy.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsat/](http://www.washington.edu/students/crsat/).

### International Studies

**SIS 401 International Political Economy (5) I&S** *Ingebritsen, Poznanski* Establishment, maintenance, and decay of the post-1945 international economic order. Political economy of international trade, monetary relations, inflation, and North-South relations. Prerequisite: SIS 201 which may be taken concurrently; ECON 201 which may be taken concurrently.

**SIS 406 Political Islam and Islamic Fundamentalism (5) I&S** Study of resurgence, since mid-1970s, of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with POL S 432.

**SIS 419 Comparative Media Systems (5) I&S** Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with CMU 420/POL S 468.

**SIS 421 National Security and International Affairs (5) I&S** *Jones* Major military aspects of contemporary international politics. Uses and limitations of military capabilities for sustaining a stable international order and national security. Processes by which states detect and assess threats to their security; practice of deterrence; transfer of arms among states; pursuit of arms control. Recommended: one SIS or international relations course.

**SIS 422 The United States in the Contemporary International System (5) I&S** United States in the world: ways in which international circumstances shape the political-strategic, economic, and cultural dimensions of America's policy. Case studies from post-1945 period. Recommended: one international relations or foreign policy course.

**SIS 423 Practicing American Foreign Policy (5) I&S** Develops familiarity with tools available to promote international objectives of the United States. International case studies selected to illustrate the diverse considerations inherent in the policy process and evaluate the strengths and weaknesses of the national institutions involved. Prerequisite: SIS 201.

**SIS 426 World Politics (5) I&S** *Caporaso, Modelski* Nation-state system and its alternatives; world distributions of preferences and power; structures of international authority; historical world societies and their politics. Offered: jointly with POL S 426.

**SIS 430 International Population (5) I&S** *Lavelly* Demographic situation of the world and of major world regions. The demographic transition. Topics include public health, policies of fertility and mortality control, international migration, relation of population growth to economic development, social change, and resource constraints. Exploration and manipulation of international demographic data.

**SIS 432 Population and Modernization (3) I&S** *Hirschman, Lavelly* Examines role of demographic factors in process of social modernization and economic growth. Approach is historical, focusing on populations of developed countries since 1700, and analytic, stressing attempts made by different disciplines to model demographic relationships, with attention to less developed regions. Offered: jointly with SOC 432.

**SIS 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) I&S** Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Offered: jointly with POL S 436.

**SIS 440 History of Communism (5) I&S** *Ellison, Ramet* Communism from its origins in Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with HSTEU 440.

**SIS 444 Peasants in Politics (5) I&S** *Young* Interdisciplinary study of peasants, with special attention to questions of rural transformation. Peasant involvement in an increasingly independent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with POL S 446.

**SIS 449 Social Transformation of Modern East Asia (5) I&S** *Sorensen* Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with ANTH 449.

**SIS 450 Political Economy of Women and Family in the Third World (5) I&S** Theoretical and empirical aspects of the political economy of women and the family in the Third World during the process of development, with a focus on labor. Main theoretical approaches examined and applied to case studies from Asia and Latin America. Offered: jointly with SOC 450.

**SIS 455 Industry and the State (5) I&S** *Whiting* Builds on states and markets approach of 200 and 201 through specific examination of effects of industry and industrial structure on political outcomes and roles of state. Emphasis on late-developing and newly developing economies. Prerequisite: SIS 200; SIS 201.

**SIS 456 State-Society Relations in Third World Countries (5) I&S** *Bachman, Kasaba* Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of economic and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with POL S 450.

**SIS 460 Law, State, and Society (5) I&S** *Migdal* Examination of both state law and non-state law (rules and ways of ordering behavior such as customary law, religious law, and social conventions). Focuses on the ways non-state law interacts with and affects state law and is affected by state law.

**SIS 465 Deeply Divided Societies (5) I&S** *Migdal* Ethnic conflict seen from two perspectives: 1. the study of theoretical approaches as a means of understanding deeply divided societies; 2. a focus on one or more specific conflicts. Recommended: SIS 201 or POL S 204.

**SIS 467 Nations and States in the Modern World (5) I&S** Development of national consciousness in the "old nations" of Europe before the French Revolution. Replacement by the new nationalism and its spread into East Central Europe, Russia, Ibero-America, Asia, and Africa. Offered: jointly with HIST 467.

**SIS 476 Comparative International Political Economy (5) I&S** *Ingebritsen, Pempel, Pozanski* Comparative analysis of four major approaches to international political economy: mercantilism, Marxism, liberalism, and evolutionary approach. Focus on international cooperation, social change, and economic institutions. Theoretical analysis of the four paradigms and applications to historic and current issues in international political economy: hegemonic cycle, post-communist transition, and cross-national income inequality.

**SIS 480 The Catholic Church in World Politics (5) I&S** *Ramet* Acquaints students with the self-identity, theology, ecclesiology, and political role of the Catholic Church in the contemporary era, with emphasis on its role in the United States, the USSR, China, Eastern Europe, and Latin America. Recommended: SIS 201, SIS 202, or RELIG 201.

**SIS 490 Special Topics (1-5, max. 15) I&S** Content varies from quarter to quarter.

**SIS 491- Senior Honors Seminar (5-) I&S** Study of issues related to students' thesis topics. Develops thesis-writing skills. Open only to Jackson School honors students.

**SIS -492 Senior Honors Seminar (-5) I&S** Students write a senior thesis working with their individual writing advisers.

**SIS 495 Task Force (5) I&S** Small-group seminars address current problems in international affairs, each focusing on one specific policy question and producing a joint task force report. Restricted to senior majors in International Studies. Prerequisite: SIS 200; SIS 201; SIS 202; SIS 401.

**SIS 497 Internship (1-5, max. 15)** Credit for the completion of an approved internship in international studies. Credit/no credit only.

**SIS 498 Readings in International Studies (5) I&S** Reading and discussion of selected works of major importance in interdisciplinary international studies. Restricted to majors in International Studies.

### Courses for Graduates Only

**SIS 500 Seminar: Origins of the Modern Global System (3)** *Kasaba, Migdal* Development of global interdependence from the fifteenth century to World War II. Interrelationship of politics and economics. International political economy from contextual, institutional, and historical perspectives.

**SIS 501 Seminar: International Political Economy (3)** *Poznanski, Pempel* Institutional and historical perspective on the international political economy, focusing on the developing interrelationship of politics and economics. Prerequisite: ECON 200, ECON 201.

**SIS 502 Seminar: Change and Stability in International Affairs (3)** *Jones* Examines major differences in the nature of cultural and economic adaptation to the challenge of the West, as well as the tensions these differences have generated within particular societies. Regional phenomena in the context of powerful international forces.

**SIS 511 Practicum: Methods in International Studies (3)** *Chirof, Pempel* Assumptions underlying leading methodologies for comparative study of societies and other large-scale social entities. Quantitative and nonquantitative methods illustrated by recent research.

**SIS 512 Task Force in International Affairs (3)** *Chirof, Pempel* Seminar addressing a current problem in international affairs and resulting in a joint task-force report. Results presented to, and critiqued by, a distinguished outside evaluator at end of term.

**SIS 520 Introduction to Theories and Quantitative Methods for Social Science Research (5)** Selected social scientific theories and quantitative methods for students in international and area-studies programs. Introduction to methodological neoclassicism, neo-institutional analysis, "developmentalism," rational choice and dynamic institutionalist approaches, and selected theories from political science. Essentials of statistical analysis.

**SIS 522 Special Topics in Ethnicity and Nationalism (3, max. 6)** Topics vary, but always focus on ethnic group relations and nationalism viewed from a broad, comparative, interdisciplinary perspective. Emphasis is heavily cross-cultural, and the geographical coverage world-wide. Prerequisite: graduate standing in any social science or education, or by permission of instructor.

**SIS 534 International Affairs (3)** Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 534/POL S 534.

**SIS 542 Seminar: State and Society (5)** *Migdal* Examines the mutually conditioning relationship between states and the societies they seek to govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with POL S 542.

**SIS 551 Comparative Administrative Systems (3)** Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered: jointly with PB AF 551.

**SIS 575 Advanced Political Geography (5) Sparke** Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with GEOG 575.

**SIS 580 Teaching International Studies (2, max. 4) Migdal** For current and prospective teaching assistants. Includes teaching writing, leading effective discussions, the art of evaluation, and teaching critical reading skills; videotaping of actual teaching sessions of participants in class. Credit/no credit only.

**SIS 590 Special Topics (2-5, max. 10) Seminar.** Course content varies. Offered occasionally by visiting or resident faculty.

**SIS 591- Colloquium in International Studies (1-) Migdal, Kasaba** Required colloquium for first-year Master in International Studies (MAIS) students. Informal introduction to the faculty and major avenues of research in international studies. Credit/no credit only.

**SIS -592- Colloquium in International Studies (-1-) Migdal, Kasaba** Required colloquium for first-year Master in International Studies (MAIS) students. Informal introduction to the faculty and major avenues of research in international studies. Credit/no credit only.

**SIS -593 Colloquium in International Studies (-1) Migdal, Kasaba** Required colloquium for first-year Master in International Studies (MAIS) students. Informal introduction to the faculty and major avenues of research in international studies. Credit/no credit only.

**SIS 600 Independent Study or Research (\*)**

## African Studies

**SISAF 444 African Studies Seminar (5, max. 15) I&S** Interdisciplinary seminar focusing upon one particular aspect of the African continent. Emphasis may be humanistic, social scientific, or historical. African Studies faculty and visiting scholars lecture on areas of their own expertise.

**SISAF 490 Special Topics (1-5, max. 15) I&S**

## Asian Studies

**SISA 490 Special Topics (1-5, max. 15) I&S** Content varies.

## Canadian Studies

**SISCA 424 Canadian Media Systems (5) I&S** Structure and operation of Canadian mass media and telecommunications industries. Impact of United States media on Canadian culture. Role of domestic media in lives of minorities. Laws and policies governing communications. Offered: jointly with CMU 424.

**SISCA 430 Canadian Documentary Film Traditions (5) VLPA/I&S** History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with CMU 430.

**SISCA 441 Québécois Literature (5) VLPA** Readings of novels, plays, and occasionally, poetry. Special attention paid to how Québécois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with FRENCH 441.

**SISCA 490 Special Topics (1-5, max. 15)** Content varies.

**SISCA 495 Multiculturalism in Canada (5) I&S** History of the multi-racial and multi-ethnic character of Canadian society. Impact of federal policy of bilingualism and multiculturalism. Current issues of language rights, retention of cultural heritage, self-government for aboriginal peoples, and improving race and ethnic relations.

**SISCA 498 Seminar: Canadian Problems (5) I&S** Major issues pertaining to Canadian society, government, and economic development.

## Courses for Graduates Only

**SISCA 507 Research Seminar: Canadian Problems (3, max. 6)** Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with GEOG 507.

**SISCA 590 Special Topics (2-5, max. 10)** Offered occasionally by visitors or resident faculty. Course content varies.

**SISCA 600 Independent Study (\*)**

## Comparative Religion

**RELIG 400 The Jewish Mystical Tradition (5) I&S Jaffee** Jewish esoteric thought from antiquity to early modern times. Emergence of Spanish Kabbalah. The thought of Isaac Luria and its immense influence in Jewish history through other movements—specifically the mystical messiah. Sabbetai Sevi, and the rise of Hasidism. Recommended: RELIG 201 or RELIG 210.

**RELIG 405 Scripture in Judaism (5) I&S Jaffee** Explores the phenomenon of religious interpretation of sacred books by attending to the destiny of the Bible as read within Judaism. Begins with the canonization of the biblical text itself and continues into the rationalist and mystical interpretive innovations of the Middle Ages. Recommended: HIST/SISJE 250, RELIG 201, or RELIG 210.

**RELIG 415 Modern Jewish Thought (5) I&S Jaffee** Major trends in Jewish religious thought since the European Enlightenment, focusing on encounters between Judaism and the modern world. Includes Haskalah; varieties of religious reform and accommodation; Zionism; socialism; the philosophy of Rosenzweig, Buber, and Kaplan; and theological responses to the Holocaust. Recommended: HIST/SISJE 250, HSTEU/SISJE 469, RELIG 201, or RELIG 210.

**RELIG 420 The World of the Early Church (5) I&S Williams** Early Christian church within the context of the Greco-Roman sociopolitical, philosophical, and religious environment. Covers the period from about AD 100 to 300. Christian thinkers and documents studied include both the classical "orthodox" and the "heretical." Recommended: HIST 307, RELIG 220, or RELIG 324.

**RELIG 421 The Age of St. Augustine (5) I&S Williams** Christian church in the fourth and fifth centuries as a major institution in the Roman Empire. Great figures of patristic theology, such as Athanasius, Gregory Nazianzus, Gregory of Nyssa, and Augustine. Recommended: HIST 307, RELIG 320, or RELIG 324.

**RELIG 426 Gnosticism and Early Christianity (5) I&S Williams** Impact of Gnosticism on the development of Christianity and several other religious groups of that period. Readings dating from the first through the third centuries AD.

**RELIG 428 Modern Christian Theology (5) I&S Webb** Modern Protestant and Catholic thought since the nineteenth century: Kierkegaard, Barth, Bultmann, Rahner, Lonergan, and other major figures. Recommended: RELIG 301.

**RELIG 430 Scripture in Islam (5) VLPA/I&S Wheeler** Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with NEAR E 430.

**RELIG 432 Ritual and Law in Islam (5) VLPA/I&S** Comparative study of Islamic ritual practices and related development of jurisprudence and law. Focus on sacrifice, political and social legal theory, pilgrimage, regulation of the body, and the diversity of contemporary practices. In English. Offered: jointly with NEAR E 432; W.

**RELIG 433 Life of Prophet Muhammad (5) VLPA/I&S Wheeler** Examines historical and religious traditions associated with the life of the Prophet Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with NEAR E 433.

**RELIG 442 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) VLPA/I&S Kartsonis** Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with ART H 422.

**RELIG 445 Greek and Roman Religion (3) VLPA/I&S Harmon, Langdon** Religion in social life of Greeks and Romans; emphasis on their public rituals and festivals. Priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Recommended: RELIG 201. Offered: jointly with CLAS 445.

**RELIG 449 Religious Movements: The Sociology of Cults and Sects (5) I&S Stark** Understanding religion, what it is and what it does. Examines the formation of new religious movements, cults, and sects and the conditions under which they succeed or fail. Offered: jointly with SOC 445.

**RELIG 456 Women in Ancient Judaism (3) I&S/VLPA Noegel** Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with NEAR E 456.

**RELIG 457 The History of Biblical Interpretation (3) I&S/VLPA Noegel** Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a "hands-on" approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with NEAR E 457.

**RELIG 490 Special Topics (1-5, max. 15) I&S** Topics vary with each offering.

**RELIG 491 Seminar: Topics and Issues in Judaism (5) I&S Jaffee** Topics vary. Recommended: RELIG 210; RELIG 400, RELIG 405, or RELIG 410.

**RELIG 492 Seminar: Topics in Early Christianity (5) I&S** *Williams* Topics vary. Recommended: one early Christian history or literature course.

**RELIG 497 Field Archaeology (1-10, max. 20)** Professionally-guided archaeological fieldwork at a recognized archeological dig in the United States or abroad. Offered: S.

**RELIG 498 Honors Thesis (5) I&S** Required course for Comparative Religion honors students.

### Courses for Graduates Only

**RELIG 501 Approaches to the Study of Religion (5)** *Cox, Jaffee, Williams* Major approaches employed by modern scholarship in the study of religion, including historical, phenomenological, anthropological, sociological, and psychological. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

**RELIG 502 Religion in Comparative Perspective (5, max. 15)** *Ellingson, Jaffee, Keyes, Pauwels* Analysis of selected theme or symbols in relation to several different religious traditions. Topics vary. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

**RELIG 504 Religion and Culture (5)** Study of the relations between religion and culture, with attention to the role of religion in defining conceptions of order and grounding socio-political and artistic traditions.

**RELIG 520 Seminar On Early Christianity (5)** *Williams* Problems in the history and literature of early Christianity.

**RELIG 570 Religion and Literature (5)** The relation of religious thought to the study of imaginative literature. Includes both critical theory and practical criticism of exemplary texts.

**RELIG 590 Special Topics (2-5, max. 10)** Offered occasionally by visitors or resident faculty. Course content varies.

**RELIG 600 Independent Study or Research (\*)**

### East Asian Studies

**SISEA 422 History of Tokugawa Japan (5) I&S** Background to the unification of Japan in 1600; establishment of the Tokugawa political structure; and the social, economic, and cultural history of the period 1600-1868. Offered: jointly with HSTAS 422.

**SISEA 423 History of Modern Japan (5) I&S** *Pyle* Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly with HSTAS 423.

**SISEA 424 Perspectives on East Asia for Teachers (3, max. 6) I&S** Substantive concepts, resources, and materials employed in teaching about East Asia. Requirements may vary in relation to the background of participants.

**SISEA 434 Demographic Issues in Asia (3-5) I&S** *Hirshman, Lavelly* Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. Addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SOC 434.

**SISEA 435 Japanese Government and Politics (5) I&S** *Hellmann* Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with POL S 435.

**SISEA 440 The Emergence of Postwar Japan (5) I&S** *Pyle* The making of modern Japan; World War II and surrender; American occupation; post-occupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with HSTAS 424.

**SISEA 441 Economic and Social History of Japan to 1900 (5) I&S** *Hanley* Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: SISEA 341/HSTAS 341. Offered: jointly with HSTAS 441.

**SISEA 442 Political Economy of Postwar Japan (5) I&S** *Anchorodoguy* Political and economic problems of Japan since 1945. Utility of competing theoretical approaches to analysis of government and economy of Japan. Policy-making processes and effects of policies adopted. Some knowledge of postwar Japan desirable. Recommended: SISEA 440/HSTAS 424.

**SISEA 443 Class and Culture in East Asia (5) I&S** Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hierarchy, resistance, and the formation of class identity. Offered: jointly with ANTH 446.

**SISEA 444 Politics of Representation in Modern China (5) I&S** Focuses on issues of representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with ANTH 444.

**SISEA 445 Religion in China (5) I&S** *Harrell* Religion in Chinese society, doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Prerequisite: either one 200-level ANTH course, ANTH 370, ANTH 403, LING 203, HSTAS 211, HSTAS 454, RELIG 202, SISEA 370, or SISEA 443. Offered: jointly with ANTH 447.

**SISEA 448 Modern Korean Society (5) I&S** *Sorensen* Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/SISEA 212. Offered: jointly with ANTH 448.

**SISEA 449 Government and Politics of China (5) I&S** *Whiting* Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with POL S 442.

**SISEA 454 History of Modern China (5) I&S** *Dong* Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with HSTAS 454

**SISEA 459 United States-China Relations (5) I&S** *Bachman* Surveys the history of United States-China relations and examines the evolution of bilateral relations, particularly since 1949. Focus on the period since 1972 and the major issues as they have evolved since that time, including trade, human rights, security, and Taiwan. Offered: jointly with POL S 419.

**SISEA 468 China's Economic Reforms: Integration Into World Economy (5) I&S** A systematic survey of China's economic reforms since 1978, including China's increasing integration into world economy. Prerequisite: ECON 201. Offered: jointly with ECON 468.

**SISEA 470 Minority Peoples of China (5) I&S** *Harrell* Interaction between China and the peoples of its periphery, including Inner Asia, Tibet, Northern Mainland, Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: either ANTH/SISEA 370, HSTAS 454, LING 203, or one 200-level ANTH course. Offered: jointly with ANTH 470.

**SISEA 475 Japanese Society (5) I&S** *Hanley* Discusses rapidly changing Japanese society and history of its unique aspects. Readings and lectures in sociology, anthropology, economics, and politics; emphasis on Japanese search for cultural identity and prevalent interpretations of Japanese society and behavior. Recommended: SISEA 341/HSTAS 341.

**SISEA 478 Readings in the Social Sciences in Japanese (3-5) I&S** Introduction to articles and short works in economics, history, political science, and other social sciences. Assignments chosen from major Japanese monthlies and academic works. All readings in Japanese. Prerequisite: JAPAN 313.

**SISEA 479 Readings in the Social Sciences in Japanese (3-5) I&S** Introduction to articles and short works in economics, history, political science, and other social sciences. Assignments chosen from major Japanese monthlies and academic works. All readings in Japanese. Prerequisite: JAPAN 313.

**SISEA 480 New Orders in East Asia (5) I&S** *Pyle* Rise and fall of successive international systems in East Asia over the past 150 years: Sino-centric, imperialist, Washington Treaty system, Japan's East Asian order, Yalta system, cold-war system. Post-cold-war search for a new order. Special attention to triangular relations among the United States, China, and Japan.

**SISEA 482 Japanese Business and Technology (5) I&S** *Anchorodoguy* Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future.

**SISEA 490 Special Topics (1-5, max. 15) I&S** Course content varies.

**SISEA 494 Economy of Japan (5) I&S** *Yamamura* Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with ECON 494.

### Courses for Graduates Only

**SISEA 517- Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4) I&S** Introduction to the regulatory regime governing foreign trade and investment in China and in-depth coverage of key aspects of the regime, with focus on issues faced by U.S. businesses. Covers specific regulations, their implementation in practice, as well as the political and economic background. Offered: jointly with LAW E 517.

**SISEA 521- Seminar: Introduction to the Interdisciplinary Study of China (5-)** *Guy, Harrell*

**SISEA -522 Seminar: Introduction to the Interdisciplinary Study of China (-5)** *Guy, Harrell*

**SISEA 530 Seminar on China (3, max. 6)** Problems of Chinese history. Prerequisite: permission of instructor.

**SISEA 532 The Chinese Political System (5)** Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with POL S 532.

**SISEA 533 Seminar on Contemporary Chinese Politics (5)** Research on selected problems in contemporary Chinese politics. Prerequisite: SISEA 532 or permission of instructor. Offered: jointly with POL S 533.

**SISEA 535 International Relations of Modern China (5)** Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with POL S 535.

**SISEA 540 Law in East Asia: Japan (4)** *Footie, Haley* Basic institutions and processes of the Japanese legal system. Historical development and traditional role of law, reception of Western law, and cultural and structural factors that influence the function of law and legal institutions. Offered: jointly with LAW B 540.

**SISEA 541 Economic and Social History of Japan to 1900 (5)** *Hanley* Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken 441. Offered: jointly with HSTAS 541.

**SISEA 543 Law in East Asia: China (3)** *Clarke* Introduction to the basic institutions and processes of the Chinese legal system. Development and role of law in both the traditional and contemporary periods. Offered: jointly with LAW B 541.

**SISEA 550 Japan, the United States, and New Orders in Asia (5)** *Pyle* Seeks historical understanding of establishment of new order in contemporary East Asia. Analyzes the imperialist, Washington conference, and cold war systems and explores the present post-cold war search for a new order. Prerequisite: one course in modern Japanese history, political economy, or political science.

**SISEA 551 International Relations of Northeast Asia (5)** *Hellmann* Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with POL S 539.

**SISEA 554- Introduction to Japanese Studies (2-)** *Hanley* Interdisciplinary introduction to the study of Japan, with emphasis on historical development. Required seminar for first-year graduate students.

**SISEA -555 Introduction to Japanese Studies (-[4/6])** *Hanley* Interdisciplinary introduction to the study of Japan, with emphasis on historical development. Required seminar for first-year graduate students.

**SISEA 558 Readings on Japan in the Social Sciences (5)** Seminar discussing articles in Japanese in economics, history, political science, and other social sciences. Assignments from major Japanese monthlies and academic works. Prerequisite: JAPAN 313 or equivalent and permission of instructor.

**SISEA 559 Interdisciplinary Seminar on Japan (5)** Advanced readings in history and the social sciences. Prerequisite: permission of instructor.

**SISEA 575 Seminar on Japanese Society (5)** *Hanley* Interdisciplinary seminar with class-led discussions on readings from anthropology, history, sociology, and nondiscipline-specific articles on Japanese society. Prerequisite: background on Japan. Not open to students who have taken SISEA 475.

**SISEA 577 Readings on Political Economy of Japan (5)** *Anchorodoguy* Analysis of major issues such as the Japanese state's role in industrial development, Japan's trade and investment in Asia, US-Japan trade and security relations, and Japan's model of capitalism.

**SISEA 582 Japanese Business and Technology (5)** *Anchorodoguy* Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future.

**SISEA 584 Survey of Korean Society (5)** *Sorensen* Introduction to the social and political institutions of North and South Korea with an opportunity to master the most important literature on modern Korea. Focuses on the twentieth century with the major emphasis on the post-1945 period. Offered: A.

**SISEA 585 Research Seminar: Modern Korea (6)** *Sorensen* Advanced instruction in problems and methods of research in Korean history. Foreign language not required. Prerequisite: permission of instructor.

**SISEA 590 Special Topics (2-5, max. 10)** Seminar. Course content varies. Offered occasionally by visiting or resident faculty.

**SISEA 600 Independent Study or Research (\*)**

**SISEA 700 Master's Thesis (\*)**

## European Studies

**EURO 425 European Media Systems (5) I&S** Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contemporary economic, social, political, and cultural milieu in which they operate. Offered: jointly with CMU 425.

**EURO 481 August Strindberg and European Cultural History (5) I&S/VLPA** Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with SCAND 481.

**EURO 490 Senior Seminar I (5) I&S** Introduction to research into European topics and to the analysis of problems.

**EURO 491 Senior Seminar II (5) I&S** Writing and discussion of senior thesis. Prerequisite: EURO 490. Offered: Sp.

**EURO 498 Special Topics (1-5, max. 15) I&S**

## Jewish Studies

**SISJE 436 American Jewish History Since 1885 (5) I&S** Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with HSTAA 436.

**SISJE 452 The Biblical Song of Songs (3) VLPA** *Noegel* Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 452

**SISJE 453 The Biblical Prophets (3) VLPA I&S** *Noegel* Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 453.

**SISJE 454 Israel: The First Six Centuries BCE (3) VLPA I&S** *Noegel* Traces the Israelites, from the Babylonian destruction of the Jerusalemite Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 454.

**SISJE 455 The Kings of Monarchic Israel (3) VLPA I&S** *Noegel* Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 455.

**SISJE 464 The Jews in Spanish History (5) I&S** *Ullman* Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition. Offered: jointly with HSTEU 464.

**SISJE 465 The Jews of Eastern Europe (5) I&S** Jewish society in Poland, Russia, the Habsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with HSTEU 465.

**SISJE 466 The Sephardic Diaspora: 1492-Present (5) I&S** *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with HSTEU 466.

**SISJE 467 Medieval Jewish History (5) I&S** *Stacey* Social and intellectual history of the Jews in Western Europe to fifteenth century. Jews under Islam and Christianity; the church and the Jews; the Crusades and their legacy; intellectual achievements; conflict and cooperation. Offered: jointly with HSTEU 467.

**SISJE 468 Early Modern Jewish History, 1492-1789 (5) I&S** *Stein* Jews in the early-modern period. The Spanish expulsion in 1492 to the onset of political and social emancipation in western Europe and America. Offered: jointly with HSTEU 468.

**SISJE 469 Enlightenment, Emancipation, Antisemitism: History of the Jews, 1770-1914 (5) I&S** *Stein* The Jewish experience in the modern world from the European Enlightenment to the First World War. Focus on the debates surrounding Jewish emancipation, the reception of Jews within European society, modern antisemitism, nationalist movements, mass migration, and war. Offered: jointly with HSTEU 469.

**SISJE 470 History of the Jews in the Twentieth Century (5) I&S** Historical experience of the Jews since World War I in Europe, North America, and the Middle East under the impact of three developments: growth of mass-based American Jewish community, destruction of Jewish life in Central and Eastern Europe, and creation of the State of Israel. Offered: jointly with HIST 470.

**SISJE 490 Special Topics (1-5, max. 15) I&S** Content varies.

**SISJE 495 Seminar in Jewish Studies (5) I&S** *Jaffee* History of Jewish Studies as an organized field of academic inquiry. Explores the implications for Jewish Studies of its present setting within the context of the humanities and the social sciences.

**SISJE 497 Field Archaeology (1-10, max. 20)** Professionally-guided archaeological fieldwork at a recognized archeological dig in the United States or abroad. Offered: S.

## Latin American Studies

**SISLA 451 Cultural Geography of Latin America (5) I&S** Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with GEOG 451.

**SISLA 470 Latin American Studies Internship (1-5, max. 10)** Off-campus fieldwork with a community national, or international organization, in an apprenticeship or internship situation. Supervised by on-site field supervisor and Latin American Studies faculty member.

**SISLA 480 Labor and Popular Movements in Latin America (5) I&S** Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-language Latin American studies courses. Offered: jointly with HSTAA 480.

**SISLA 485 Cultural Studies of Latin America (5) VLPA/I&S** Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include, cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 485.

**SISLA 486 Photography and Cultural Studies in Latin America (5) VLPA/I&S** Interdisciplinary exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Offered jointly with SPAN 486.

**SISLA 490 Special Topics (1-5, max. 15) I&S** Content varies.

**SISLA 492 Latin American Studies Seminar (5, max. 15) I&S**

## Middle Eastern Studies

**SISME 400 The Middle East in the Modern World (5) I&S** *Kasaba* Economic, political, and cultural ties between the Middle East and the modern world between the eighteenth century and the present. Particular attention to the transformation of societies, formation of modern states, the relationship between Islam and democracy, and gender and society in the Middle East.

**SISME 430 Economic Development of the Middle East (5) I&S** *Kasaba* Comparative examination of economic development in the Middle East. Includes population growth, agrarian change, industrialization, foreign trade, capital flows, and fiscal and monetary policies.

**SISME 490 Special Topics (1-5, max. 15) I&S** Content varies.

**SISME 495 Trends in the Contemporary Middle East (3) I&S** Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military confrontations. Topics vary. Offered: jointly with NEAR E 495.

## Courses for Graduates Only

**SISME 530 Reading Seminar on Middle East Studies (2)** Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

**SISME 531 Reading Seminar on Middle East Studies (2)** Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

**SISME 532 Reading Seminar on Middle East Studies (2)** Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

**SISME 590 Special Topics (3-5, max. 10)** Content varies.

**SISME 600 Independent Study or Research (\*)**

**SISME 700 Master's Thesis (\*)**

## Russian, East European, and Central Asian Studies

**SISRE 418 Eastern Europe: the Political Economy of the Region (5) I&S** *Poznanski* Focus on the classical command-type economy and the most recent economic and political transition in Eastern Europe. Analysis of current institutional reform, privatization, and trade relations.

**SISRE 424 Security Affairs of Russia and Eurasia (5) I&S** *Jones* Surveys history of Soviet military and Soviet empire from 1917 to 1985, breakup of the USSR during 1985 to 1991, and the emergence of new security issues among those Eurasian states that formally constituted the national components of the USSR and its communist military allies.

**SISRE 425 Anthropology of the Post-Soviet States (5) I&S** Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with ANTH 425.

**SISRE 443 Kievan and Muscovite Russia: 850-1700 (5) I&S** Development of Russia from earliest times to the reign of Peter the Great. Offered jointly with HSTAM 443.

**SISRE 445 Politics and Society Eastern Europe (5) I&S** *Ramet* Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with POL S 445.

**SISRE 448 Twentieth-Century Russia (5) I&S** Russia and the USSR from Nicholas II to the present. Offered: jointly with HSTEU 445.

**SISRE 455 Marine Business Environment in Russia and Eastern Europe (3) I&S** *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SMA 455.

**SISRE 457 Senior Colloquium (5) I&S** Required for majors. Involves writing of senior thesis. Prerequisite: SISRE 343; either RMN/ROMN 406, BULGR 406, CR SB 406, CZECH 406, POLSH 406, ROMN 406, or RUSS 203.

**SISRE 490 Special Topics (1-5, max. 15) I&S** Topics vary.

## Courses for Graduates Only

**SISRE 500 Interdisciplinary Seminar (3)** Contemporary problems in the societal, political, and economic development of Russia and East Europe. Seminars are devoted to specific topics, such as comparative cultures and ethnic minorities; economic development and environmental degradation; comparative communism; problems of a similar interdisciplinary nature. Prerequisite: permission of instructor. Required of all first-year MAIS students.

**SISRE 501 Bibliography and Research Methods (3)** Introduction to bibliography and other scholarly resources in field; development of research techniques. Some use of relevant language required. Required of all first-year MAIS students. Credit/no credit only.

**SISRE 502 Thesis Seminar (3)** Required of all second-year MAIS students. Credit/no credit only.

**SISRE 504 Approaches to East European Politics (3-5)** *Ramet* Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and south-eastern Europe. Prerequisite: permission of instructor. Offered: jointly with POL S 537.

**SISRE 505 Seminar: Problems of Social and Political Development in Eastern Europe (3-6, max. 6)** *Ramet* Research seminar dealing with selected problems of continuity and change in eastern Europe. Prerequisite: some previous course work on eastern Europe.

**SISRE 555 Russian Ocean Policy (3)** *Kaczynski* Russian ocean policy following perestroika and disintegration of Soviet empire. Discusses Russian navy, fishery industry, merchant marine, ocean research fleet, in light of international agreements, and joint ventures and new political, economic, and social environments. Prerequisite: knowledge of Soviet/Russian socio-economic problems or permission of instructor. Offered: jointly with SMA 555.

**SISRE 590 Special Topics (2-5, max. 10)** Course content varies. Offered occasionally by visitors or resident faculty.

**SISRE 600 Independent Study or Research (\*)**

**SISRE 700 Master's Thesis (\*)**

## South Asian Studies

**SISSA 434 International Relations of South Asia (5) I&S** Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with POL S 434.

**SISSA 490 Special Topics (1-5, max. 15) I&S** Topics vary.

## Courses for Graduates Only

**SISSA 510 Introduction to Interdisciplinary Study of South Asia (5)** *Conlon* Examines work done in the various disciplines focusing on South Asia.

**SISSA 511 Seminar on South Asia (5)** Interdisciplinary seminar for graduate students in which research and writing on individual research topics are critically developed. Designed to provide each student with an opportunity to synthesize his or her studies on South Asia. Prerequisite: SISSA 510 or permission of graduate program coordinator.

**SISSA 590 Special Topics (2-5, max. 10)** Seminar. Course content varies. Offered occasionally by visitors or resident faculty.

**SISSA 600 Independent Study or Research (\*)**

**SISSA 700 Master's Thesis (\*)**

## Southeast Asian Studies

**SISSE 445 Literature and Society in Southeast Asia (5, max. 10) VLPA/I&S** Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with ANTH 445.

**SISSE 469 Topics in Southeast Asian History (5) I&S** Introduces major issues within the history and culture of one country of Southeast Asia. Content varies. Topics may include religion, economics, colonialism, perspectives on gender, labor history, literatures, popular culture, and performing arts. Focuses on a different Southeast Asian country each time offered. Offered: jointly with HSTAS 469.

**SISSE 490 Special Topics in Southeast Asian Studies (2-5, max. 15) I&S** Content varies.

## Japan Studies

See International Studies.

## Jewish Studies

See International Studies.

## Korea Studies

See International Studies.

## Latin American Studies

See International Studies.

## Linguistics

A210 Padelford



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/linguistics.html](http://www.washington.edu/students/genocat/academic/linguistics.html)



Department Web page:  
[depts.washington.edu/lingweb/](http://depts.washington.edu/lingweb/)

Linguistics is the scientific study of language, which is one of the most characteristic human attributes. Courses provide training in the method and theory of language analysis and description, as well as studies of language change and language in society. The Romance Linguistics program allows the student to specialize in the analysis and history of one or more Romance languages.

## Graduate Program

Graduate Program Coordinator  
A210B Padelford, Box 354340  
(206) 543-2046  
phoneme@u.washington.edu

The Department of Linguistics offers a program of study for graduate students leading to the degrees of Master of Arts and Doctor of Philosophy. The program is administered by the departmental faculty. The major interest of the core faculty lies in syntax, semantics, phonetics, phonology, sociolinguistics, and in theoretical aspects of second-language acquisition.

Some course work is also available in various cooperating departments. Among those fields represented outside the department are anthropological linguistics, psycholinguistics, philosophy of language, and the structure and history of a number of individual languages and language families.

*Admission Requirements:* At least one previous course in linguistics is highly recommended, as is proficiency in one language other than the student's native language. Three letters of recommendation and Graduate Record Examination scores are required for all applicants. Doctoral degree applicants should send the department a copy of their master's thesis or a paper of high quality, or both.

### Master of Arts

(1) Two courses each in syntax and phonetics/phonology. (2) One course in semantics. (3) Three courses not in categories (1) and (2) above. (4) Three courses at the 400 or 500 level. At least two of these must be 500-level courses for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement. Also note the University requirement for 9 credits at the 500 to 600 level.) (5) No course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option. (6) Demonstrated ability to read the linguistic literature in a language other than English. This can be satisfied at any time during the program by arrangement with the Graduate Program Coordinator. (7) An M.A. exam in any areas in which the grade point average for the required course work in that area is below 3.30. (8) A short M.A. thesis (30 to 50 pages), which will typically be an expansion of a term paper. Students must register for 9 credits of LING 700.

### Doctor of Philosophy

Direct admission to the Ph.D. program will be considered on an individual basis for applicants holding a degree from a comparable M.A. thesis program in linguistics or a closely related field. Some applicants may be granted admission directly into the Ph.D. program, with the stipulation that they make up one or more M.A.-level deficiencies.

Requirements for the Ph.D. degree are an M.A. degree plus the following:

- 35 additional credits of course work. At least 18 credits at the 500 level and above must be completed before the General Exam, 9 credits of which must follow the M.A. A minimum cumulative GPA of 3.00 is required for graduate course work. One year (three quarters) of full-time registration is required by the Graduate School.
- During the course of the entire M.A.-Ph.D. program, the student must have completed at least three courses each in syntax and phonetics/phonology and at least two courses in semantics, and have taken a total of five 500-level classes for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement.) There is also a major, minor, and breadth requirement as follows: *Major*—six courses in the student's primary area of specialization; *Minor*—four courses in a second area (the major and minor together should form a coherent research area); *Breadth*—eight courses in other areas of the field. The students supervisory committee will be the final judge of what courses might qualify to meet these requirements. However, it is worth noting that (a) courses fulfilling these requirements do not necessarily have to be offered from within the Department of Linguistics; (b) non-language instruction courses in a language area can fulfill the major or minor requirement; and (c) no course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option.
- 27 credits of LING 800.
- An exotic language requirement as follows: (a) for native speakers of an Indo-European language, a year of a non-Indo-European language; (b) for native speakers of a non-Indo-European language, a year of a language that is not English or in the same sub-family as their language. The student has the right to petition the supervisory committee to allow a language excluded in (a) or (b) above.
- Two linguistic papers delivered at a colloquium or conference. Each will be evaluated by a member of the student's Ph.D. committee with expertise in the area of the paper. The evaluation may be either of the oral presentation or of the paper in written form. The student should request evaluation by a faculty member for any paper to be considered for this requirement.

## Faculty

### Chair

Frederick J. Newmeyer

### Professors

Augerot, James E. \* 1960, (Adjunct); MA, 1959, New Mexico Highlands University; PhD, 1968, University of Washington; Slavic linguistics, Romanian, Bulgarian.

Brame, Michael K. \* 1974; PhD, 1970, Massachusetts Institute of Technology; syntax, phonology, structure of Arabic and English.

Contreras, Heles \* 1964, (Emeritus); PhD, 1961, Indiana University; Spanish linguistics, syntax and semantics.

Dale, Philip S. \* 1968, (Adjunct); PhD, 1968, University of Michigan; psycholinguistics, language and cognitive development in normal and exceptional children.

Kaisse, Ellen \* 1976; PhD, 1977, Harvard University; phonology, historical linguistics, ancient and modern Greek, Spanish, syntax-phonology interface.

Klausenburger, Jurgen \* 1969; PhD, 1969, University of Michigan; Romance linguistics.

Micklesen, Lew R. \* 1966, (Emeritus); PhD, 1951, Harvard University; Slavic linguistics.

Newmeyer, Frederick J. \* 1969; PhD, 1969, University of Illinois; theoretical and English syntax, history of linguistics.

Shapiro, Michael C. \* 1970, (Adjunct); PhD, 1973, University of Chicago; Indo-Aryan languages and linguistics.

Silberstein, Sandra V. \* 1982, (Adjunct); PhD, 1982, University of Michigan; TESL, critical theory, discourse analysis, sociolinguistics, language and culture.

Tarlinkskaya, Marina \* 1984, (Research); DPhil, 1976, Moscow Institute of Foreign Languages; theory of translation, theory of versification, second language acquisition, semantics.

Tollefson, James W. \* 1984, (Adjunct); PhD, 1978, Stanford University; English as a second language, language planning.

Voyles, Joseph B. \* 1965, (Adjunct); PhD, 1965, Indiana University; Germanics and linguistics.

### Associate Professors

Coats, Herbert S. \* 1968, (Adjunct); MA, 1964, Fordham University; PhD, 1970, University of Illinois; Slavic linguistics, Russian phonology, Russian syntax, Slavic accentuation.

Hargus, Sharon Louise \* 1985; PhD, 1985, University of California (Los Angeles); phonology, morphology, northwestern Native American languages, lexicography, phonetics.

Herschensohn, Julia R. \* 1985; PhD, 1976, University of Washington; Romance linguistics, French syntax, second language acquisition.

Ogihara, Toshiyuki \* 1991; PhD, 1989, University of Texas (Austin); semantic theory, structure of Japanese, syntax-semantics interface.

Riggenbach, Heidi R. \* 1989, (Adjunct); PhD, 1989, University of California (Los Angeles); teaching English as a second language, discourse analysis, sociolinguistics.

Strozer, Judith R. \* 1987; PhD, 1976, University of California (Los Angeles); comparative Romance syntax, second language acquisition, foreign language teaching.

Zagona, Karen T. \* 1987; PhD, 1982, University of Washington; syntactic theory and Spanish syntax, tense, and aspect.

### Assistant Professors

Kim, Soowon \* 1992; PhD, 1991, Brandeis University; syntactic theory, syntax-semantics interface, argument structure, Japanese/Korean linguistics.

Wassink, Alicia Beckford \* 1998; PhD, 1999, University of Michigan; sociolinguistics, experimental phonetics, creole linguistics.

Wright, Richard A. \* 1998; PhD, 1996, University of California (Los Angeles); production and perception of language, phonetics and phonology of African and Austronesian languages.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Linguistics

**LING 400 Survey of Linguistic Method and Theory (4) I&S/VLPA, QSR** Major linguistic theories in phonology, syntax and semantics; linguistic analysis and argumentation. Intended for students who plan to pursue further linguistic or language-related study. Students who have taken LING 200 or 201 should not take LING 400, although credit is allowed for both if 400 is taken after 200 or 201.

**LING 402 Survey of the History of Linguistics (3) VLPA/I&S** *Newmeyer* Main trends in linguistic theory and philosophy of linguistics from ancient times through advent of transformational-generative grammar. Includes nineteenth-century comparative and historical grammar, Prague school grammar, American structuralist grammar, major concerns of linguistics today. Prerequisite: LING 451.

**LING 403 Structure of American Sign Language (5) VLPA** *Hargus* Introduction to the phonological, morphological, and syntactic structure of American Sign Language. Topics include acquisition, sociolinguistics, neurolinguistics, lexicography, history, and culture. Knowledge of American Sign Language is not required. Prerequisite: LING 200, 201, 203, or 400.

**LING 404 Indo-European (3) VLPA** *Voyles* Overview of the Indo-European languages, of comparative method, and of the phonology, morphology, and syntax of reconstructed Indo-European. Grammatical analyses and texts from various attested ancient and modern Indo-European languages, selected according to the interests of the students.

**LING 432 Sociolinguistics I (5) VLPA/I&S** *Wassink* Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: LING 400; recommended: prior or concurrent registration in LING 451. Offered: jointly with ANTH 432.

**LING 433 Language Politics and Cultural Identity (3) VLPA/I&S** *Bilaniuk* Theories and case studies of the power of language and how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with ANTH 464.

**LING 434 Sociolinguistics II (3) VLPA/I&S** *Wassink* Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of linguistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with ANTH 433.

**LING 442 Semantics I (4) VLPA/NW** *Ogihara* Introduction to the study of meaning as part of linguistic theory. Relation of semantics to syntax. Emphasis on formal semantics and pragmatics. Discussion of various semantic phenomena in natural language that are theoretically relevant. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

**LING 444 Philosophy of Language-Pragmatics (3) VLPA/I&S** *Potter* Language as communicative activity. Speech act theory in Austin, Grice, and contemporary writings. Applications to problems of reference, presupposition, metaphor, relativism. Offered: jointly with PHIL 444.

**LING 446 Descriptive Aspects of English: Phonology and Morphology (3) VLPA** *Hargus, Kaisse* Descriptively oriented analysis of English phonology and morphology; dialect differences. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

**LING 447 Psychology of Language II (4) VLPA/I&S** *Corina, Osterhout* Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: jointly with PSYCH 447.

**LING 449 Second-Language Learning (3) VLPA** *Herschensohn, Tarlinkskaja* Issues related to the psychological aspects of second-language learning. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

**LING 450 Introduction to Linguistic Phonetics (5) VLPA/NW** *Wright* Introduction to the articulatory and acoustic correlates of phonological features. Issues covered include the mapping of dynamic events to static representations, phonetic evidence for phonological description, universal constraints on phonological structure, and implications of psychological speech-sound categorization for phonological theory. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

**LING 451 Phonology I (4) VLPA/I&S** *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 450.

**LING 452 Phonology II (4) VLPA/I&S** *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 451.

**LING 453 Phonology III (4) I&S/NW/VLPA** *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 451.

**LING 455 Areal Linguistics (3, max. 6) VLPA/I&S** Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Processes such as borrowing, vocabulary specialization, lexical change, and language death and revival. Offered: jointly with ANTH 455.

**LING 457 Language Development (5) VLPA/I&S** *Dale* First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: either PSYCH 306, LING 200, or LING 400. Offered: jointly with PSYCH 457.

**LING 458 Language and Gender (5) I&S, VLPA** *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450 and WOMEN 450.

**LING 461 Syntax I (4) VLPA/I&S** *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

**LING 462 Syntax II (4) VLPA/I&S** *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: LING 461.

**LING 472 Introduction to Computational Linguistics (3) VLPA** *Hoard* Introduction to computer applications of linguistic theory, including syntactic processing, semantic and pragmatic interpretation, and natural language generation. Prerequisite: LING 461. Offered: jointly with CSE 472.

**LING 476 Philosophy of Language (5) VLPA/I&S** Current theories of meaning, reference, predication, and related concepts. Offered: jointly with PHIL 453.

**LING 479 Semantics II (3) VLPA/I&S/NW** *Ogihara* Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal semantics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with PHIL 479.

**LING 480 Topics in Linguistics (3, max. 12) VLPA** Introduction to an area of linguistic study not covered by the regular departmental course offerings.

**LING 481 Introduction to Morphology (4) VLPA** *Brame, Hargus, Kaisse, Newmeyer* Structure of words and the processes by which they are formed. Morphological processes in a wide variety of languages. Prerequisite: LING 451; LING 461.

**LING 484 Lexical Semantics and the Lexicon (3) VLPA** *Kim* Role of the lexicon in syntax and semantics. Topics include the syntax-lexicon mapping; theories of argument structure; complex predicate formation and lexical subordination; the lexicon and language acquisition; the role of the lexicon in linguistic theory; and the lexicon and sentence processing. Prerequisite: LING 461.

**LING 499 Undergraduate Research (1-5, max. 5)** Credit/no credit only.

## Courses for Graduates Only

**LING 501 Field Methods (3)** Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisite: LING 453, LING 462, or permission of instructor.

**LING 507 Syntactic Theory I (4)** Introduction to the principles and parameters model of syntactic theory. The lexicon and its relation to syntactic representations. Syntactic modules and principles. Problem solving.

**LING 508 Syntactic Theory II (4)** Historical antecedents of the principles-and-parameters theory. Lexicalism versus transformationalism. The unification of transformational operations and conditions. Origins of subtheories. Extensive reading list of primary sources. Practical training in syntactic argumentation. Prerequisite: LING 507 or permission of instructor.

**LING 509 Syntactic Theory III (4)** Current issues in syntactic theory, including logical form, empty categories, the range of parametric variation, barriers, minimality, and the status of functional categories. Training in the methodology of syntactic research. Prerequisite: LING 508 or permission of instructor.

**LING 514 Seminar in Comparative Linguistics (3)** *Kaisse* Nineteenth- and twentieth-century theories of phonological change. Prerequisite: LING 404 or permission of instructor.

**LING 519 Mathematical Models of Grammar (3)** *Brame, Ogihara* Study of some mathematical models of language recognition, emphasizing context-free and context-sensitive grammars. Prerequisite:

graduate standing in mathematics, linguistics, or psychology, or permission of instructor.

**LING 522 Topics in the History of Linguistics (3)** *Newmeyer* Intensive investigation of the main trends in the history of linguistics, concentrating on the development of nineteenth-century historical linguistics, the various schools of structural linguistics, and transformational-generative grammar. Prerequisite: LING 451, LING 461.

**LING 525 Seminar in Theoretical Phonology (4, max. 12)** Individual and joint research on selected topics in theoretical phonology. Topics vary. Typical offerings include phonology and the lexicon, syntax and phonology, phonological representations. Prerequisite: LING 453.

**LING 531 Problems in Romance Linguistics (2-5, max. 15)** Group seminar, or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with ROLING 531.

**LING 550 Advanced Phonology (2-3)** *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 451, LING 452, LING 453.

**LING 551 Advanced Phonology (2-3)** *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 451, LING 452, LING 453.

**LING 552 Advanced Phonology (2-3)** *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 451, LING 452, LING 453.

**LING 553 Analysis of Linguistic Structures (3, max. 6)** Syntactic, semantic, and/or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with ANTH 553.

**LING 554 Advanced Linguistic Phonetics (3, max. 9)** *Wright, Wassink* Individual and joint projects on selected topics in theoretical and experimental phonetics. Topics may include articulatory timing, the phonetics phonology interface, and constraints and constraint interaction. Prerequisite: LING 450 or LING 452. Offered: Sp.

**LING 562 Advanced Syntax (2-3, max. 9)** Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

**LING 563 Advanced Syntax (2-3, max. 9)** Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

**LING 580 Problems in Linguistics (2-3, max. 12)** Advanced study in current theories of syntax, semantics, phonology, or morphology.

**LING 599 Linguistics Colloquium (1, max. 6)** Seminar attended by faculty and graduate students to discuss research in progress and topics of general interest. Presentation of two seminars required for doctoral students. Prerequisite: permission of instructor.

**LING 600 Independent Study or Research (\*)**

**LING 700 Master's Thesis (\*)**

**LING 800 Doctoral Dissertation (\*)**

## French Linguistics

**FRLING 400 The Syntactic Structure of French (5) VLPA** Scientific study of the syntax of French: phrase structure and movement, with emphasis on passives, relatives, and interrogatives. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

**FRLING 401 The Morphological Structure of French (5) VLPA** *Klausenburger* Linguistic study of French morphology. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

**FRLING 402 The Phonological Structure of French (5) VLPA** *Klausenburger* The phonological component of the generative grammar of French: representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

**FRLING 403 Background of Modern French (5) VLPA** *Klausenburger* Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

**FRLING 406 Advanced French Grammar (5) VLPA** *Herschensohn* Problems of French grammar. Differences between forms and structures of French and English. Problems of effective teaching of French. Prerequisite: FRENCH 303.

**FRLING 409 The Phonetics of French (5) VLPA** *Klausenburger* Scientific study of the French sound system with special emphasis on "lower level" phonetic rules. Focus on data from standard French as well as socioeconomic and geographic variations. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

## Romance Linguistics

**ROLING 402 Historical Romance Linguistics (5) VLPA** *Klausenburger* Comparative historical survey of the development of the principal Romance tongues. Prerequisite: LING 400.

**ROLING 490 Senior Essay (2) VLPA** Essay on linguistic problem of student's choice written with faculty consultant.

## Courses for Graduates Only

**ROLING 518 Foreign Language Teaching Methodology (2)** *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology.

**ROLING 531 Problems in Romance Linguistics (2-5, max. 15)** Group seminar, or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with LING 531.

**ROLING 551 Romance Linguistics: History, Methodology, and Bibliography (5)** For new graduate students in the Romance linguistics program. History of Romance linguistics and linguistic science in the nineteenth and twentieth centuries as it relates to Romance studies. Comparative and descriptive methods used in contemporary scholarship. Prerequisite: ROLING 401 or LING 200 or equivalent.

**ROLING 600 Independent Study or Research (\*)**

## Spanish Linguistics

### SPLING 400 The Syntactic Structure of Spanish (5)

**VLPA** Strozer, Zagona Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPAN 400.

### SPLING 401 The Morphological Structure of Spanish (5)

**VLPA** Strozer, Zagona Principles of word formation, including derivational and inflectional morphology. Relationship between inflectional morphology and other components of grammar. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPAN 401.

### SPLING 402 The Phonological Structure of Spanish (5)

**VLPA** Strozer, Zagona Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPAN 402.

### SPLING 403 The Evolution of the Spanish Language (5)

**VLPA** Zagona Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPAN 403.

### SPLING 406 Advanced Spanish Grammar (5)

**VLPA** Anderson, Strozer Problems of Spanish grammar. Difference from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: SPAN 303; SPAN 323. Offered: jointly with SPAN 406.

### SPLING 409 Spanish Phonetics (5)

**VLPA** Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPAN 409.

## Mathematics

C138 Padelford



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/mathematics.html](http://www.washington.edu/students/gencat/academic/mathematics.html)



Department Web page:  
[www.math.washington.edu](http://www.math.washington.edu)

Mathematics is both a science and an art. Like any great art, mathematics has an intrinsic beauty and coherence that has attracted practitioners for centuries. Yet, unlike other arts, mathematics is a surprisingly effective tool for describing the natural world. Indeed, mathematics has come to serve as the foundation of modern science, through its language and results. Some mathematical results were initially developed in order to solve internally generated mathematical problems and only later found application in other disciplines; other mathematical results were inspired by the needs of these other disciplines. The two facets of mathematics—tool of science and subject of inquiry for its own sake—have come to be interwoven into a complex fabric.

## Graduate Program

Graduate Program Coordinator  
C36 Padelford, Box 354350  
(206) 543-6830  
[grads@math.washington.edu](mailto:grads@math.washington.edu)

The degrees of Master of Arts, Master of Science, and Doctor of Philosophy are offered. Opportunities are available within the department for study of pure and applied mathematics for each of these degree programs. The Master of Arts degree is appropriate for students who need a broad background in advanced mathematics and who expect to continue working with mathematics of approximately the same level in their careers. The Master of Science degree is appropriate for students who expect to be working with more specialized mathematics of increasing order of complexity in their careers. The Doctor of Philosophy degree is the highest professional degree in mathematics. It is appropriate for students who plan on a career of research and/or teaching of mathematics at the highest levels.

Of the master's degrees, the M.S. non-thesis program has the most demanding course requirements and most closely matches the early stages of the Ph.D. program. Most students who enroll in the department begin their studies with the Ph.D. or M.S. non-thesis program in mind. The M.S. programs with options in numerical analysis or optimization provide more focused training in these directions, which can be useful for students seeking employment in certain industries; however, students intending to do research in these areas would normally follow the requirements of the Ph.D. program. Note that the department does not offer a master's degree in mathematics education.

### Master of Arts

*Admission Requirement:* Bachelor of Arts degree with major in mathematics or equivalent background (minimum of 45 quarter credits or 30 semester credits of mathematics beyond college algebra).

Graduation Requirements:

*With Thesis*—A minimum of nine approved one-quarter courses numbered 400 or above, at least three of which are at the 500 level, plus 9 thesis credits (700). The total must include at least two courses in each of algebra, analysis, and one other field. The thesis is defended in an oral examination.

*Without Thesis*—A minimum of twelve approved one-quarter courses numbered 400 or above, at least six of which are at the 500 level. The six courses at the 500 level should be distributed over no more than three sequences. The total must include at least two courses in each of algebra, analysis, and one other field. Oral examination in area of specialization agreed upon by the student and the chair of the examining committee.

### Master of Science

*Admission Requirement:* Bachelor of Science degree with major in mathematics, Bachelor of Arts degree with strong major in mathematics or equivalent background. In particular, at least one senior-level course in abstract algebra or real analysis is expected.

Graduation Requirements:

*With Thesis*—A total of nine numerically graded one-quarter courses from MATH 402, 403, 404; 424, 425, 426; 427, 428, 429; 441, 442, 443; any 500-level mathematics course; AMATH 507; 584, 585, 586; plus 9 thesis credits (700). Courses to include at least two quarters from each of two designated core graduate courses and one other 500-level sequence. Transfer credits are not accepted at the 400 level; other transfer credits and substitutions are at the discretion of the graduate program coordinator. The thesis, which is defended in an oral examination, should demonstrate the ability to do independent research.

*Without Thesis*—A total of twelve numerically graded one-quarter courses from MATH 402, 403, 404; 424, 425, 426; 427, 428, 429; 441, 442, 443; any 500-level mathematics course; AMATH 507; 584, 585, 586. Courses to include at least two quarters from each of three designated core graduate courses, and in addition one three-quarter sequence of 500-level mathematics courses in an area of specialization approved by the graduate program coordinator and the chair of the student's examining committee. Oral examination in the area of specialization on a topic agreed upon by the student and the chair of the examining committee, or the General Examination for the Ph.D. degree.

*Numerical Analysis/Optimization Option*—A total of twelve one-quarter courses, at least six of which are at the 500 level, chosen from MATH 424, 425, 426; 427, 428, 429; 438, 439; 441, 442, 443; 461, 462; 491, 492; any 500-level mathematics course; AMATH 507; 584, 585, 586. Courses to include four from AMATH 584-586 and MATH 594-596 (numerical analysis option) or four from AMATH 507 and MATH 509, 514-517 (optimization option). Oral examination in a special topic agreed upon by the student and the chair of the student's examining committee.

### Doctor of Philosophy

*Admission Requirement:* Mathematical training equivalent to a bachelor's degree with strong major in mathematics, including rigorous course work in real analysis and abstract algebra.

*Graduation Requirements:* Completion of Graduate School requirements to include satisfactory performance in six three-quarter sequences numbered 500 or above, including three sequences from the department's list of core graduate courses; passing of three preliminary exams; demonstration of proficiency in two of three languages: French, German, or Russian; General Examination on a special topic; dissertation that is an original piece of work; and Final Examination.

### Financial Support

Most graduate students in mathematics are supported by fellowships, research assistantships, and teaching assistantships. The workload of teaching assistants allows ample time for graduate courses and thesis work.

## Faculty

### Chair

Donald E. Marshall

### Professors

Arsove, Maynard G. \* 1951, (Emeritus); MS, 1948, PhD, 1950, Brown University; potential theory, complex function theory, theory of bases.

Birnbaum, Z. W. \* 1939, (Emeritus); PhD, 1929, John Casimir State University (Poland); probability, mathematical statistics (distribution-free statistics, reliability theory).

Blumenthal, Robert M. \* 1956, (Emeritus); PhD, 1956, Cornell University; probability theory (Markov processes).

Borgs, Christian 1999, (Affiliate); PhD, 1987, University of Munich (Germany); field theory and statistical mechanics.

Brownell, Francis H. III \* 1950, (Emeritus); PhD, 1949, Yale University; spectral analysis of Hilbert space operators, mathematical quantum mechanics.

Bube, Kenneth P. \* 1986; PhD, 1978, Stanford University; numerical analysis, partial differential equations.

Burdzy, Krzysztof \* 1988; PhD, 1984, University of California (Berkeley); probability theory.

Burke, James V. \* 1985; PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

- Chayes, Jennifer T. 1999, (Affiliate); PhD, 1983, Princeton University; theoretical condensed-matter physics.
- Collingwood, David \* 1987; PhD, 1983, University of Utah; representation theory of Lie groups.
- Curjel, Caspar R. \* 1964, (Emeritus); DSc, 1960, Eidgenosse Technische Hochschule (Switzerland); algebraic topology.
- Curtis, Edward B. \* 1970; PhD, 1962, Harvard University; graph theory, networks.
- Dubisch, Roy 1961, (Emeritus); PhD, 1943, University of Chicago; teacher training, elementary and secondary curriculum.
- Duchamp, Thomas E. \* 1979; PhD, 1976, University of Illinois; differential geometry, computer graphics.
- Erickson, Kent B. \* 1973; PhD, 1970, University of Wisconsin; probability theory.
- Folland, Gerald Budge \* 1973; PhD, 1971, Princeton University; harmonic analysis and differential equations.
- Freedman, Michael H. 1999, (Affiliate); PhD, 1973, Princeton University; topology.
- Gangolli, Ramesh A. \* 1962, (Emeritus); PhD, 1961, Massachusetts Institute of Technology; probability theory, harmonic analysis on Lie groups.
- Goldstein, Allen A. \* 1964, (Emeritus); PhD, 1954, Georgetown University; approximation theory, nonlinear programming, control theory, calculus of variations.
- Goodearl, Kenneth R. \* 1998, (Affiliate); MS, 1969, PhD, 1971, University of Washington; noncommutative algebra (noetherian rings, quantum groups, regular rings,  $C^*$ -algebras).
- Graham, C. Robin \* 1984; PhD, 1981, Princeton University; partial differential equations, differential geometry, invariant theory.
- Greenbaum, Anne \* 1997; PhD, 1981, University of California (Berkeley); numerical analysis.
- Greenberg, Ralph \* 1978; PhD, 1971, Princeton University; number theory.
- Grunbaum, Branko \* 1966; PhD, 1957, Hebrew University (Israel); geometry.
- Irving, Ronald S. \* 1981; PhD, 1977, Massachusetts Institute of Technology; representations of Lie algebras and Lie groups, ring theory.
- Jans, James P. \* 1957, (Emeritus); PhD, 1955, University of Michigan; ring structures and homological algebra.
- Kas, Arnold \* 1996, (Affiliate); PhD, 1966, Stanford University; partial differential equations, applied mathematics.
- Klee, Victor \* 1953, (Emeritus); PhD, 1949, University of Virginia; convex sets, functional analysis, analysis of algorithms, optimization, combinatorics.
- Koblitz, Neal I. \* 1979; PhD, 1974, Princeton University; number theory and cryptography.
- Lee, John M. \* 1986; PhD, 1982, Massachusetts Institute of Technology; differential geometry and partial differential equations.
- Leveque, Randall J. \* 1985; PhD, 1982, Stanford University; numerical analysis, hyperbolic conservation laws, computational fluid dynamics.
- Lind, Douglas A. \* 1976; PhD, 1973, Stanford University; ergodic theory.
- Lovasz, Laszlo \* 1999, (Affiliate); PhD, 1977, Hungarian Academy of Sciences; discrete mathematics.
- Marshall, Donald E. \* 1976; PhD, 1976, University of California (Los Angeles); complex analysis.
- Michael, Ernest A. \* 1953, (Emeritus); PhD, 1951, University of Chicago; topology.
- Mitchell, Stephen A. \* 1985; PhD, 1981, University of Washington; algebraic topology.
- Morrow, James Allen \* 1969; PhD, 1967, Stanford University; complex singularities, inverse problems.
- Namioka, Isaac \* 1963, (Emeritus); PhD, 1956, University of California (Berkeley); functional analysis.
- Nijenhuis, Albert \* 1988, (Affiliate); PhD, 1952, University of Amsterdam (Netherlands); geometry, combinatorics, computational complexity.
- Nunke, Ronald \* 1958, (Emeritus); PhD, 1955, University of Chicago; category theory, Abelian groups.
- Osborne, M. Scott \* 1975; PhD, 1972, Yale University; representation theory.
- Phelps, Robert R. \* 1956, (Emeritus); PhD, 1958, University of Washington; convexity, functional analysis, geometry of Banach spaces, optimization.
- Pyke, Ronald \* 1960, (Emeritus); PhD, 1956, University of Washington; probability - Brownian and empirical processes.
- Ragozin, David \* 1971; PhD, 1967, Harvard University; approximation theory, splines, wavelets, numerical analysis, harmonic analysis.
- Rockafellar, R. T. \* 1966; PhD, 1963, Harvard University; variational analysis and optimization.
- Schramm, Oded 1999, (Affiliate); MS, 1987, Hebrew University (Israel); PhD, 1990, Princeton University; complex analysis.
- Segal, Jack \* 1960; PhD, 1960, University of Georgia; topology and shape theory.
- Shorack, Galen \* 1965, (Adjunct); PhD, 1965, Stanford University; empirical processes, robustness, nonparametric statistics.
- Smith, Hart F. \* 1991; PhD, 1989, Princeton University; partial differential equations, Fourier analysis.
- Smith, S. Paul \* 1986; PhD, 1981, University of Leeds (UK); algebra.
- Stout, Edgar L. \* 1969; PhD, 1964, University of Wisconsin; complex analysis.
- Sullivan, John B. \* 1973; PhD, 1971, Cornell University; representations of classical groups.
- Sylvester, John \* 1987; PhD, 1980, New York University; partial differential equations.
- Tseng, Paul Yun \* 1990; PhD, 1986, Massachusetts Institute of Technology; optimization.
- Tuncel, Selim \* 1986; PhD, 1982, University of Warwick (UK); ergodic theory, symbolic dynamics.
- Uhlmann, Gunther A. \* 1984; PhD, 1976, Massachusetts Institute of Technology; partial differential equations.
- Warner, Garth \* 1966; PhD, 1966, University of Michigan; algebraic topology.
- Westwater, Michael J. \* 1970; PhD, 1967, Cambridge University (UK); mathematical physics.
- Devinatz, Ethan S. \* 1991; PhD, 1985, Massachusetts Institute of Technology; algebraic topology.
- King, James Richard \* 1975; PhD, 1969, University of California (Berkeley); complex manifolds, instructional computing in geometry.
- McGovern, William M. \* 1990; PhD, 1987, Massachusetts Institute of Technology; representation theory.
- Monk, George Stephen \* 1964; PhD, 1966, University of Minnesota; mathematics education.
- Moore, Robert T. \* 1968; PhD, 1964, Princeton University; operator theory, group representation, mathematical software and experimental mathematics.
- Rohde, Steffen \* 1998; PhD, 1989, University of Berlin (Germany); complex analysis, complex dynamics, geometric function theory.
- Solomyak, Boris \* 1990; PhD, 1986, Leningrad University (Russia); fractals and dynamics.
- Toro, Tatiana \* 1996; MS, 1989, PhD, 1992, Stanford University; analysis and geometric measure theory.
- Zhang, Jian James \* 1994; MS, 1985, Fudan University (China); PhD, 1991, Massachusetts Institute of Technology; algebra and noncommutative algebraic geometry.

### Assistant Professors

- Babson, Eric K. \* 1998; PhD, 1993, Massachusetts Institute of Technology; algebraic and geometric combinatorics.
- Chen, Zhen-Qing \* 1998; PhD, 1992, Washington University; probability theory and stochastic analysis.
- Hoffman, Christopher \* 1999; PhD, 1996, Stanford University; ergodic theory and probability theory.
- Iovita, Adrian \* 1998; PhD, 1996, Boston University; p-adic co-homology of algebraic varieties.
- Ozols, Vilnis \* 1968; PhD, 1967, University of California (Berkeley); Lie groups, Riemannian geometry.
- Palmieri, John \* 1999; PhD, 1991, Massachusetts Institute of Technology; algebraic topology, modular representation theory, and the connections between them.
- Pollack, Daniel \* 1996; MS, 1986, University of Pennsylvania; PhD, 1991, Stanford University; differential geometry, nonlinear partial differential equations.

### Senior Lecturer

- Warfield, Virginia 1977; MA, 1965, PhD, 1971, Brown University; probability and the teaching of mathematics.

### Lecturers

- Averbeck, Patrick J. 1998; MS, 1993, Oregon State University; mathematics education.
- Plochinski, Kenneth 1991; MS, 1983, University of Michigan; Director of Math Study Center.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**MATH 402 Introduction to Modern Algebra (3) NW**  
Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 327, or 2.0 in MATH 340. Offered: AS.

**MATH 403 Introduction to Modern Algebra (3) NW**  
Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: 2.0 in MATH 402. Offered: WS.

**MATH 404 Introduction to Modern Algebra (3) NW** Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: 2.0 in MATH 403. Offered: Sp.

**MATH 407 Linear Optimization (3) NW** Maximization and minimization of linear functions subject to constraints consisting of linear equations and inequalities; linear programming and mathematical modeling. Simplex method, elementary games and duality. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308, or 2.0 in AMATH 352. Offered: AWS.

**MATH 408 Nonlinear Optimization (3) NW** Maximization and minimization of nonlinear functions, constrained and unconstrained; nonlinear programming problems and methods. Lagrange multipliers; Kuhn-Tucker conditions, convexity. Quadratic programming. Prerequisite: 2.0 in MATH 308; 2.0 in MATH 327. Offered: W.

**MATH 409 Discrete Optimization (3) NW** Maximization and minimization problems in graphs and networks (shortest paths, minimum spanning trees, maximum flows, minimum cost flows); transportation and trans-shipment problems, NP-completeness. Prerequisite: 2.0 in MATH 407. Offered: Sp.

**MATH 411 Introduction to Modern Algebra for Teachers (3) NW** Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Prerequisite: either 2.0 in MATH 205, 2.0 in MATH 308, or 2.0 in MATH 136. Offered: AS.

**MATH 412 Introduction to Modern Algebra for Teachers (3) NW** Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Prerequisite: 2.0 in MATH 411. Offered: WS.

**MATH 414 Number Theory (3) NW** Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: either 2.0 in MATH 301 or 2.0 in MATH 402.

**MATH 415 Number Theory (3) NW** Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: 2.0 in MATH 414.

**MATH 420 History of Mathematics (3) NW** Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisite: either 2.0 in MATH 402 or 2.0 in MATH 411, either of which may be taken concurrently. Offered: S.

**MATH 424 Fundamental Concepts of Analysis (3) NW** Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

**MATH 425 Fundamental Concepts of Analysis (3) NW** Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: either 2.0 in MATH 326 or 2.0 in MATH 335; 2.0 in MATH 424. Offered: W.

**MATH 426 Fundamental Concepts of Analysis (3) NW** Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: 2.0 in MATH 425. Offered: Sp.

**MATH 427 Topics in Applied Analysis (3) NW** Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 327 or 2.0 in MATH 335; recommended: MATH 328. Offered: AS.

**MATH 428 Topics in Applied Analysis (3) NW** Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 335, or 2.0 in MATH 309 and 2.0 in MATH 327. Offered: W.

**MATH 429 Topics in Applied Analysis (3) NW** Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 427 or 2.0 in MATH 336; 2.0 in MATH 428. Offered: Sp.

**MATH 435 Introduction to Dynamical Systems (3) NW** Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 335 or 2.0 in MATH 327; either 2.0 in MATH 309 or 2.0 in AMATH 352 and 2.0 in AMATH 353.

**MATH 436 Introduction to Dynamical Systems (3) NW** Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 435.

**MATH 441 Topology (3) NW** Metric and topological spaces, convergence, continuity, finite products, connectedness, and compactness. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

**MATH 442 Differential Geometry (3) NW** Curves in 3-space, continuity and differentiability in 3-space, surfaces, tangent planes, first fundamental form, area, orientation, the Gauss Map. Prerequisite: either 2.0 in MATH 335, or 2.0 in MATH 326 and 2.0 in MATH 328 and 2.0 in either MATH 308 or 2.0 in MATH 318. Offered: W.

**MATH 444 Geometry for Teachers (3) NW** Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models. Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 127. Offered: AS.

**MATH 445 Geometry for Teachers (3) NW** Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models. Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Prerequisite: 2.0 in MATH 444. Offered: WS.

**MATH 461 Combinatorial Theory (3) NW** Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: either 2.0 in MATH 308 or 2.0 in MATH 318.

**MATH 462 Combinatorial Theory (3) NW** Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: 2.0 in MATH 461.

**MATH 464 Numerical Analysis I (4) NW** Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308 and 2.0 in MATH 327, or 2.0 in MATH 335; 2.0 in CSE/ENGR 142. Offered: A.

**MATH 465 Numerical Analysis II (4) NW** Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: 2.0 in MATH 464. Offered: W.

**MATH 487 Advanced Mathematics Computer Laboratory (1/2, max. 6) NW** Laboratory activities in the use of computing as a tool for doing mathematics, to be taken jointly with a designated section of a 400-level mathematics course. Credit/no credit only.

**MATH 491 Introduction to Stochastic Processes (3) NW** Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 396. Offered: jointly with STAT 491; A.

**MATH 492 Introduction to Stochastic Processes (3) NW** Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 491. Offered: jointly with STAT 492; W.

**MATH 496 Honors Senior Thesis (1-5) NW** Problem seminar for honors students. Cannot be repeated for credit. Offered: AWSp.

**MATH 497 Special Topics in Mathematics for Teachers (2-9, max. 9) NW** Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered: jointly with EDC&I 478.

**MATH 498 Special Topics in Mathematics (1-5, max. 15)** Reading and lecture course intended for special needs of advanced students. Offered: AWSpS.

**MATH 499 Undergraduate Research (8)** Summer research opportunity for undergraduates. Credit/no credit only. Offered: S.

## Courses for Graduates Only

**MATH 501 Special Topics in Teaching and Learning Mathematics (2-3, max. 15)** Selected Topics dealing with issues in the teaching and learning of mathematics.

**MATH 502 Special Topics in Teaching and Learning Mathematics (2-3, max. 15)** Selected Topics dealing with issues in the teaching and learning of mathematics.

**MATH 503 Special Topics in Teaching and Learning Mathematics (2-3, max. 15)** Selected Topics dealing with issues in the teaching and learning of mathematics.

**MATH 504 Modern Algebra (5)** First quarter of a three-quarter sequence covering group theory; field theory and Galois theory; commutative rings and modules, linear algebra, theory of forms; representation theory, associative rings and modules; commutative algebra and elementary algebraic geometry. Prerequisite: MATH 404 or equivalent.

**MATH 505 Modern Algebra (5)** Continuation of MATH 504. Prerequisite: MATH 504.

**MATH 506 Modern Algebra (5)** Continuation of MATH 505. Prerequisite: MATH 505.

**MATH 509 Theory of Optimal Control (3)** Trajectories from ordinary differential equations with control variables. Controllability, optimality, maximum principle. Relaxation and existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to MATH 515. Offered: jointly with AMATH 509; even years.

**MATH 510 Seminar in Algebra (2-5, max. 5)** Credit/no credit only. Prerequisite: permission of graduate program coordinator.

**MATH 511 Special Topics in Algebra (2-3, max. 15)** In recent years the following subjects have been covered: Abelian groups, algebraic function fields, algebraic number theory, classical groups, game theory, group extensions, lattice theory, Lie algebras, number theory, and structure of rings.

**MATH 512 Special Topics in Algebra (2-3, max. 15)** In recent years the following subjects have been covered: Abelian groups, algebraic function fields, algebraic number theory, classical groups, game theory, group extensions, lattice theory, Lie algebras, number theory, and structure of rings.

**MATH 513 Special Topics in Algebra (2-3, max. 15)** In recent years the following subjects have been covered: Abelian groups, algebraic function fields, algebraic number theory, classical groups, game theory, group extensions, lattice theory, Lie algebras, number theory, and structure of rings.

**MATH 514 Networks and Combinatorial Optimization (3)** Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment problems. Algorithms and applications. Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with AMATH 514.

**MATH 515 Fundamentals of Optimization (5)** Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/AMATH 515.

**MATH 516 Numerical Optimization (3)** Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent,

quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic programming. Cutting planes and nonsmooth optimization. Prerequisite: MATH 515. Offered: jointly with AMATH 516.

**MATH 517 Optimization Under Uncertainty (3)** Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications such as to optimal stopping, inventory control, resource management. Prerequisite: MATH 308, MATH 324 and an introduction to basic concepts of probability, such as MATH 390 or MATH 394, MATH 395. Offered: jointly with AMATH 517.

**MATH 521 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with STAT 521.

**MATH 522 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with STAT 522.

**MATH 523 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with STAT 523.

**MATH 524 Real Analysis (5)** First quarter of a three-quarter sequence covering the theory of measure and integration, point set topology, Banach spaces,  $L_p$  spaces, applications to the theory of functions of one and several real variables. Additional topics to be chosen by instructor. Prerequisite: MATH 426 or equivalent.

**MATH 525 Real Analysis (5)** Continuation of MATH 524. Prerequisite: MATH 524.

**MATH 526 Real Analysis (5)** Continuation of MATH 525. Prerequisite: MATH 525.

**MATH 527 Functional Analysis (3)** First quarter of a three-quarter sequence. Review of Banach, Hilbert, and  $L_p$  spaces; locally convex spaces (duality and separation theory, distributions, and function spaces); operators on locally convex spaces (adjoints, closed graph/open mapping and Banach-Steinhaus theorems); Banach algebras (spectral theory, elementary applications); spectral theorem for Hilbert space operators. Additional topics chosen by instructor. A working knowledge of real variables, general topology, and complex variables is assumed.

**MATH 528 Functional Analysis (3)** Continuation of MATH 527. Prerequisite: MATH 527.

**MATH 529 Functional Analysis (3)** Continuation of MATH 528. Prerequisite: MATH 528.

**MATH 530 Seminar in Analysis (2-5, max. 5)** Credit/no credit only. Prerequisite: permission of graduate program coordinator.

**MATH 531 Special Topics in Analysis (2-3, max. 15)** In recent years the following subjects have been covered: functional analysis, abstract harmonic analysis, linear operations in Hilbert space, group representations, Fourier series and integrals, topological linear spaces, potential theory, and numerical analysis.

**MATH 532 Special Topics in Analysis (2-3, max. 15)** In recent years the following subjects have been covered: functional analysis, abstract harmonic analysis, linear operations in Hilbert space, group representations, Fourier series and integrals, topological linear spaces, potential theory, and numerical analysis.

**MATH 533 Special Topics in Analysis (2-3, max. 15)** In recent years the following subjects have been covered: functional analysis, abstract harmonic analysis, linear operations in Hilbert space, group representations, Fourier series and integrals, topological linear spaces, potential theory, and numerical analysis.

**MATH 534 Complex Analysis (5)** First quarter of a three-quarter sequence covering complex numbers, analytic functions, contour integration, power series, analytic continuation, sequences of analytic functions, conformal mapping of simply connected regions, and related topics. Prerequisite: MATH 426.

**MATH 535 Complex Analysis (5)** Continuation of MATH 534. Prerequisite: MATH 534.

**MATH 536 Complex Analysis (5)** Continuation of MATH 535. Prerequisite: MATH 535.

**MATH 537 Several Complex Variables (3)** First quarter of a three-quarter sequence covering Weierstrass preparation theorem and its immediate consequences, analytic continuation, domains of holomorphy, pseudoconvexity, Cartan-Oka theory of coherence, embedding theorems; the CR equations, CR manifolds, connections with algebraic geometry. Prerequisite: MATH 536.

**MATH 538 Several Complex Variables (3)** Continuation of MATH 537. Prerequisite: MATH 537.

**MATH 539 Several Complex Variables (3)** Continuation of MATH 538. Prerequisite: MATH 538.

**MATH 543 Special Topics in Applied Mathematics (2-3, max. 15)** Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

**MATH 544 Topology and Geometry of Manifolds (5)** First quarter of a three-quarter sequence covering general topology, the fundamental group, covering spaces, topological and differentiable manifolds, vector fields, flows, the Frobenius theorem, Lie groups, homogeneous spaces, tensor fields, differential forms, Stokes's theorem, deRham cohomology. Prerequisite: MATH 404 and MATH 426 or equivalent.

**MATH 545 Topology and Geometry of Manifolds (5)** Continuation of MATH 544. Prerequisite: MATH 544.

**MATH 546 Topology and Geometry of Manifolds (5)** Continuation of MATH 545. Prerequisite: MATH 545.

**MATH 547 Geometric Structures (3, max. 9)** First quarter of a three-quarter sequence covering differential-geometric structures on manifolds, Riemannian metrics, geodesics, covariant differentiation, curvature, Jacobi fields, Gauss-Bonnet theorem. Additional topics to be chosen by the instructor, such as connections in vector bundles and principal bundles, symplectic geometry, Riemannian comparison theorems, symmetric spaces, symplectic geometry, complex manifolds, Hodge theory. Prerequisite: MATH 546.

**MATH 548 Geometric Structures (3, max. 9)** Continuation of MATH 547. Prerequisite: MATH 547.

**MATH 549 Geometric Structures (3, max. 9)** Continuation of MATH 548. Prerequisite: MATH 548.

**MATH 550 Seminar in Geometry (2-5, max. 5)** Credit/no credit only. Prerequisite: permission of graduate program coordinator.

**MATH 551 Special Topics in Geometry (2-3, max. 15)** Advanced topics in geometry.

**MATH 552 Special Topics in Geometry (2-3, max. 15)** Advanced topics in geometry.

**MATH 553 Special Topics in Geometry (2-3, max. 15)** Advanced topics in geometry.

**MATH 554 Linear Analysis (5)** First quarter of a three-quarter sequence covering advanced linear algebra and matrix analysis, ordinary differential equations (existence and uniqueness theory, linear systems, numerical approximations), Fourier analysis, introductions to functional analysis and partial differential equations, distribution theory. Prerequisite: MATH 426 and familiarity with complex analysis at the level of 427 (the latter may be obtained concurrently).

**MATH 555 Linear Analysis (5)** Continuation of MATH 554. Prerequisite: MATH 554.

**MATH 556 Linear Analysis (5)** Continuation of MATH 555. Prerequisite: MATH 555.

**MATH 557 Introduction to Partial Differential Equations (3)** First quarter of a three-quarter sequence. Review of the theory of distributions and the Fourier transform. Detailed study of main linear equations: wave equation, Laplace's equation, and the heat equation. Sobolev spaces and regularity of solutions of elliptic equations. Theory of pseudodifferential operators. Initial value problem for hyperbolic equations and methods of geometrical optics. Fourier integral operators. The Dirichlet problem and eigenfunction expansions for elliptic equations. Prerequisite: MATH 556.

**MATH 558 Introduction to Partial Differential Equations (3)** Continuation of MATH 557. Prerequisite: MATH 557.

**MATH 559 Introduction to Partial Differential Equations (3)** Continuation of MATH 558. Prerequisite: MATH 558.

**MATH 564 Algebraic Topology (3)** First quarter of a three-quarter sequence covering classical and modern approaches; complexes and their homology theory; applications; fixed points, products and Poincaré duality; axiomatic approach. Prerequisite: MATH 506 and MATH 544, or equivalent.

**MATH 565 Algebraic Topology (3)** Continuation of MATH 564. Prerequisite: MATH 564.

**MATH 566 Algebraic Topology (3)** Continuation of MATH 565. Prerequisite: MATH 565.

**MATH 570 Seminar in Topology (2-5, max. 5)** Credit/no credit only. Prerequisite: permission of graduate program coordinator.

**MATH 571 Special Topics in Topology (2-3, max. 15)** Special topics from general and algebraic topology.

**MATH 573 Special Topics in Topology (2-3, max. 15)** Special topics from general and algebraic topology.

**MATH 577 Lie Groups and Lie Algebras (3, max. 9)** Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

**MATH 578 Lie Groups and Lie Algebras (3, max. 9)** Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

**MATH 579 Lie Groups and Lie Algebras (3, max. 9)** Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

**MATH 590 Seminar in Probability (2-5, max. 5)** Credit/no credit only. Prerequisite: permission of instructor.

**MATH 591 Special Topics in Probability (2-3, max. 15)** Advanced topics in probability and stochastic processes.

**MATH 592 Special Topics in Probability (2-3, max. 15)** Advanced topics in probability and stochastic processes.

**MATH 593 Special Topics in Probability (2-3, max. 15)** Advanced topics in probability and stochastic processes.

**MATH 594 Special Topics in Numerical Analysis (2-3, max. 15)** Various advanced topics in numerical analysis and scientific computing, such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 594.

**MATH 595 Special Topics in Numerical Analysis (2-3, max. 15)** Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 595.

**MATH 596 Special Topics in Numerical Analysis (2-3, max. 15)** Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with AMATH 596.

**MATH 597 Seminar on Teaching Math (1, max. 3)** Issues in the teaching and learning of college mathematics, such as discovering and working with student background and expectations, increasing student engagement with course material, and evaluating student achievement. For graduate students who are, or soon will be, teaching mathematics courses on their own. Credit/no credit only.

**MATH 598 Seminar on Technology (1, max. 3)** Explores the use of computer technology in teaching and research in mathematics. Develops the basic skills required for using computer mathematics software.

**MATH 600 Independent Study or Research (\*)**

**MATH 700 Master's Thesis (\*)**

**MATH 800 Doctoral Dissertation (\*)**

## Middle Eastern Studies

See International Studies.

## Music

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 *General Catalog Web page:*  
[www.washington.edu/students/genecat/academic/music.html](http://www.washington.edu/students/genecat/academic/music.html)

 *Department Web page:*  
[depts.washington.edu/musicweb/](http://depts.washington.edu/musicweb/)

The School of Music prepares students for careers as composers, performers, teachers, or researchers. It also offers general courses to nonmajors, designed to enhance the student's understanding of the art of music.

## Graduate Program

Graduate Program Coordinator  
116 Music, Box 353450  
(206) 543-2726  
musicadv@u.washington.edu

Graduate programs in the School of Music take into consideration the dual nature of music's subject matter. First, it is one of the creative arts, requiring constant renewal through the efforts of composers, performers, and teachers. Second, it is a branch of the humanities, subject to scholarly study and interpretation of its theoretical concepts and historical development. Advanced study presupposes an emphasis in one or the other direction without entirely neglecting the alternate aspect.

## Special Requirements

Before admission to the Graduate School as a music major, the student must further qualify for a specific area of specialization. See below.

## Financial Aid

A limited number of teaching and staff assistantships are available. Accompanists are also employed at hourly rates. Competitive auditions for performance scholarships for new and returning students are held each year. The School of Music office may be contacted for details.

## Research Facilities

The Music Building contains the music library, an electronic composition laboratory, a listening center, ethnomusicology archives, and the usual studio, practice, and classroom facilities of a modern music department. Ensembles available for student participation include Opera, Contemporary Group, Collegium Musicum, and several non-Western ensembles among the many traditional large and small choral and instrumental groups.

## Master of Music, Doctor of Musical Arts

The programs with more creative emphasis lead to the degrees of Master of Music and Doctor of Musical Arts. Areas of specialization: performance (piano, organ, harpsichord, voice, strings, other orchestral instruments), instrumental conducting, choral conducting, composition, and opera production. Except for composition, the Graduate Record Examination is not required for application to these graduate programs. All graduate students must maintain a GPA of at least 3.00, and a minimum grade of 3.0 in courses used to fulfill School of Music graduation requirements.

## Master of Music

*Admission Requirements:* Audition required for entrance to performance and composition. Entrance to other areas by permission. Details of requirements for each of the areas of specialization are available from the School of Music Office of Graduate and Undergraduate Advising.

*Graduation Requirements:* 45 credits, of which 18 must be in courses at the 500 level or above. Demonstration of proficiency in one language from French, German, Italian, and Latin (required in composition and voice). *With Thesis*—Program to include 9 credits in thesis. *Without Thesis*—A final oral examination is required.

## Doctor of Musical Arts

*Admission Requirements:* Audition required for performance and composition. Entrance to other areas by permission. Details of requirements for each of the areas of specialization are available from the School of Music Office of Graduate and Undergraduate Advising.

*Graduation Requirements:* Three academic years of study; dissertation—in lieu of a full-length dissertation, a thesis in three parts may be substituted, of which one must be a research paper and two may be additional research papers, musical compositions, documented public performances, or documented lecture demonstrations. Demonstration of proficiency in one language (two languages for voice) from among French, German, Italian, Spanish, and Latin, as soon as possible, but in any case, before taking the General Examination.

## Master of Arts, Doctor of Philosophy

The research-oriented programs lead to the degrees of Master of Arts and Doctor of Philosophy. Areas of specialization are music theory, music history, ethnomusicology, and music education. Both the standard and advanced music sections of the Graduate Record Examination are required for application to some of these graduate programs. Check individual program requirements. All graduate students must maintain a GPA of at least 3.00, and a minimum grade of 3.0 in courses used to fulfill School of Music graduation requirements.

## Master of Arts

*Admission Requirements:* Requirements vary for the different areas of specialization. Details of requirements for each of the areas of specialization are available from the School of Music Office of Graduate and Undergraduate Advising.

*Graduation Requirements:* 45 credits, of which 18 must be in courses at the 500 level or above and 9 in thesis. Except for music education, demonstration of proficiency in one language from among French, German, Italian, and Latin or another language as is necessary for research.

## Doctor of Philosophy

*Admission Requirements:* Requirements vary for the different areas of specialization. Details of requirements for each of the areas of specialization are available from the School of Music Office of Graduate and Undergraduate Advising.

*Graduation Requirements:* Three academic years of study; dissertation. Except for music education, demonstration of foreign language proficiency as soon as possible, but in any case, before taking the General Examination. Details of the General Examination requirements for each of the areas of specialization are available from the School of Music graduate program coordinator.

## Faculty

### Chair

Robin L. McCabe

### Professors

Beale, James M. \* 1948, (Emeritus); MMus, 1947, Yale University; theory/composition.

Bernard, Jonathan W. \* 1987; MA, 1973, MPhil, 1975, PhD, 1977, Yale University; theory and analysis of twentieth-century music.

Bozarth, George S. Jr. \* 1982; MFA, 1973, PhD, 1978, Princeton University; music history and literature, Brahms.

Campbell, Patricia S. \* 1989; MM, 1975, University of Akron; PhD, 1981, Kent State University; music and child development, multicultural music education, comparative music education.

Carlsen, James C. \* 1967, (Emeritus); MA, 1958, Washington University; PhD, 1962, Northwestern University; systematic musicology, psychomusicology, research methodology, theories of music instruction.

Chaloupka, Vladimir \* 1981, (Adjunct); PhD, 1975, University of Geneva (Switzerland); experimental elementary-particle physics.

Curtis-Verna, Mary \* 1969, (Emeritus); BA, 1943, Hollins College (Virginia); voice.

Dahlstrom, Robert A. \* 1971, (Adjunct); MA, 1967, University of Illinois; scene design.

Dempster, Stuart R. \* 1968, (Emeritus); MA, 1967, San Francisco State; trombone, contemporary music.

Eros, Peter S. \* 1989; Diploma, 1956, Franz Liszt Academy; orchestra and opera.

Grossman, Arthur \* 1968; Diploma, 1955, Curtis Institute of Music; bassoon.

Heinitz, Eva M. 1948, (Emeritus); studied at State Academy of Music (Berlin); violoncello.

Hokanson, Randolph H. \* 1949, (Emeritus); studied with Dame Myra Hess, Howard Ferguson (London); piano.

Jacobs, Sue-Ellen \* 1974, (Adjunct); PhD, 1970, University of Colorado (Boulder); anthropological studies of women, applied anthropology, ethnohistory, Native North America.

Jenkins, Speight 1991, (Affiliate); BA, 1957, University of Texas (Austin); LLB, 1961, Columbia University.

Kaplan, Abraham \* 1977; Diploma, 1957, Juilliard School; choral conducting.

Kappy, David L. \* 1979; MM, 1971, University of Wisconsin; French horn performance, chamber music, and theory.

Karpen, Richard S. \* 1989; MA, 1986, DMA, 1989, Stanford University; composition, computer music, and music theory.

Kechley, Gerald \* 1955, (Emeritus); MA, 1950, University of Washington; theory/composition.

Kind, Silvia E. 1969, (Emeritus); Konzert-Reife-Prüfung, 1934, Hochschule für Musik (Germany); harpsichord.

Lundquist, Barbara R. \* 1973, (Emeritus); MS, 1959, Montana State University; DMA, 1973, University of Washington; music education, sociomusicology, ethnomusicology in schools.

McCabe, Robin L. 1987; MMus, 1973, DMA, 1976, Juilliard School; concert piano performance, communication skill, pedagogy.

McCull, William D. \* 1968; Diploma, 1955, State Academy of Music (Austria); clarinet.

Moore, John T. 1948, (Emeritus); MM, 1941, University of Illinois; piano.

Patrick, Julian \* 1990; BA, 1950, Cincinnati Conservatory; music, opera, song literature, musical theater, legitimate theater, teaching voice.

Patterson, Ronald G. 1999; violin teaching and performance, chamber music, orchestral studies.

Rahn, John \* 1975; MFA, 1972, PhD, 1974, Princeton University; theory/composition.

Sakata, Hiromi L. \* 1977, (Affiliate); MA, 1968, PhD, 1976, University of Washington; ethnomusicology.

Saks, Toby \* 1976; MS, 1966, Juilliard School; performance and teaching of violoncello and chamber music.

Salzman, Timothy O. \* 1987; MM, 1979, Northern Illinois University; wind ensemble conducting, pedagogy and repertoire.

Schwarz, Gerard 1988, (Affiliate); MS, 1972, MM, 1972, Juilliard.

Siki, Bela \* 1985, (Emeritus); Diploma, 1948, Conservatoire de Musique (Switzerland); piano literature with special interest in interpretation and performance.

Skowronek, Felix E. \* 1968; BMus, 1956, Curtis Institute of Music; flute.

Smith, William O. \* 1966, (Emeritus); MA, 1952, University of California (Berkeley); theory/composition.

Sokol, Vilem 1961, (Emeritus); BMus, 1938, MMus, 1946, Oberlin College; violin, viola, conducting.

Starr, Lawrence \* 1977; PhD, 1973, University of California (Berkeley); music history and literature.

Staryk, Steven S. \* 1987, (Emeritus); studied at the Royal Conservatory of Music (Toronto); violin.

Storch, Laila \* 1968, (Emeritus); BA, 1964, Wilkes College; oboe.

Terry, Carole R. \* 1979; MM, 1973, University of Rochester; DMA, 1977, Stanford University; organ, harpsichord.

Thome, Diane \* 1977; MA, 1966, University of Pennsylvania; PhD, 1973, Princeton University; theory/composition, computer music.

Tufts, Paul Dewitt 1961, (Emeritus); MA, 1951, University of Washington; theory/composition.

Verrall, John 1948, (Emeritus); BA, 1934, University of Minnesota; Cert of Music, 1932 Liszt Conservatory (Budapest); theory/composition.

Winn, William David \* 1985, (Adjunct); PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

Zsigmondy-Liedemann, Denes 1973, (Emeritus); BA, 1940, Gymnasium, Budapest (Hungary); violin.

### Associate Professors

Benshoof, Kenneth 1963, (Emeritus); MA, 1963, San Francisco State; theory/composition.

Demorest, Steven M. \* 1993; MM, 1983, Westminster Choir College; PhD, 1989, University of Wisconsin; music education, choral ensembles.

Dunlop, William M. \* 1962, (Adjunct); MA, 1965, Cambridge University (UK); Shakespeare, nineteenth-century literature, poetry writing.

Durand, Joel-Francois \* 1991; MM, 1984, Musikhochschule, Freiburg (Germany); PhD, 1988, State University of New York (Stony Brook); composition.

Ellingson, Terry J. \* 1983; PhD, 1979, University of Wisconsin; MA, 1979, University of Chicago; ethnomusicology.

Geissmar, Else J. 1947, (Emeritus); MM, 1944, University of Michigan; piano.

Jussila, Clyde F. 1971, (Emeritus); MS, 1951, Kansas State University; music education.

Michaelian, Patricia \* 1984; Diploma, 1970, Curtis Institute of Music; concert pianist: orchestral soloist, recitalist, and chamber musician.

Pelton, Carmen 1992; BMus, 1977, University of Wisconsin; voice.

Rosinbum, Ralph 1942, (Emeritus); MA, 1948, University of Washington; opera production.

Schuyler, Philip D. 1999; MA, 1974, PhD, 1986, University of Washington; ethnomusicology, ethnography of art.

Seales, Marc A. 1987; BA, 1978, Western Washington University; jazz studies, keyboard.

Taricani, Jo Ann \* 1980; PhD, 1986, University of Pennsylvania; music history and literature.

Waterman, Christopher \* 1985, (Affiliate); PhD, 1986, University of Illinois; ethnomusicology.

### Assistant Professors

Boers, Geoffrey Paul \* 1996; MA, 1985, Portland State University; DMA, 1987, University of Arizona; choral music: literature, history, conducting, rehearsal techniques.

Callus, Helen Sarah 1996; MA, 1994, Johns Hopkins University; viola teaching and performance, chamber music.

Dudley, Shannon K. \* 1996; MA, 1988, PhD, 1996, University of California (Berkeley); ethnomusicology, steel band.

Henderson, Rebecca A. \* 1996; MM, 1985, Eastman School of Music; oboe performance and teaching, chamber music.

Immel, Don T. 1999; MM, 1996, Rice University; trombone performance, soloist, chamber music, jazz and orchestral trombone teaching.

Kopp, David 1997; MA, 1980, State University of New York (Stony Brook); PhD, 1995, Brandeis University; theory, composition.

Morrison, Steven J. \* 1997; MM, 1988, University of Wisconsin; PhD, 1995, Louisiana State University; factors in the development of music listening and performance behaviors.

Will, Richard J. \* 1993; MA, 1989, PhD, 1994, Cornell University; European music 1700-1850, popular music since 1900.

Zahn, Claudia 1998; BFA, 1976, Carnegie Mellon University; opera production.

### Senior Artist in Residence

Sheppard, Craig \* 1993; MSc, 1971, Juilliard School; piano.

### Lecturers

Brockman, Michael S. 1987; MM, 1982, New England Conservatory of Music (Boston); saxophone performance and teaching, jazz studies, music education.

Collier, Thomas W. 1980; BMus, 1971, BA, 1971, University of Washington; percussion.

Cross, David B. 1993; MM, 1971, Washington State University; vocal jazz ensemble, music education.

Herbolsheimer, Bern H. 1984; MM, 1973, University of Washington; advanced vocal repertoire, vocal accompanying/coaching, composition.

McDavid, J. Bradley 1994; MM, 1970, Arizona State University; conducting athletic band and concert band, music education.

Miller, Douglas 1993; BA, Antioch College (Seattle); jazz bass performance and teaching, jazz studies.

Novacek, Steven A. 1984; BMus, 1975, California State University, Northridge; guitar.

Vokolek, Pamela C. 1968; MM, Cleveland Institute of Music; harp performance and teaching, harp ensemble.

### Artists in Residence

Bergman, Lisa E. 1988; BA, 1978, University of Washington; MM, 1980, State University of New York (Stony Brook); MM, 1982, Juilliard School; piano accompanying and vocal (operatic) coaching.

Crusoe, Michael 1990; BMus, 1974, University of Missouri; timpani.

Harper, Thomas 1998; MM, 1976, University of Arkansas (Fayetteville).

Krishnaswami, Rajan S. 1996; MM, 1987, Juilliard School; cello teaching and performance.

Lieberman, Barry 1991; BA, 1971, Cleveland Institute of Music; string bass.

Tindemans, Margaretha E. 1987; Diploma, 1972, Conservatorium (Netherlands); viola da gamba, early music.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsccat/](http://www.washington.edu/students/crsccat/).

### Music

**MUSIC 400 Computer Applications to Music (3, max. 9) VLPA** Music workstation applications using microcomputers, music synthesizers, and analog-to-digital converters: music editing and score production, transcription, waveform and spectral analysis, and introduction to programming.

**MUSIC 401 Computer Music Seminar 1 (3) VLPA Karpen** Use of computers in musical composition, software digital sound synthesis, score generation, theoretical investigations. Prerequisite: either MUSIC 212, MUSIC 302, MUSIC 456, or PHYS 207.

**MUSIC 402 Computer Music Seminar 2 (3) VLPA Karpen** Use of computers in musical composition, digital sound synthesis, digital signal processing. Hardware used includes NeXT computers, digital recorders. Software used includes CSound, Common LISP, UNIX. Prerequisite: MUSIC 401.

**MUSIC 403 Computer Music Seminar 3 (3) VLPA Karpen** Advanced use of computers for musical composition, digital sound synthesis, digital signal processing. Advanced synthesis techniques such as LPC for speech and vocal synthesis, phase vocoders, reverberation, and spatial location. Hardware used includes NeXT computers and peripherals. Software includes CSound, Common Lisp, C, and UNIX. Prerequisite: MUSIC 402.

**MUSIC 410 ElectroAcoustic Music: History and Analysis (3) VLPA Thome** Examines the music of major electro-acoustic composers. Emphasis on the relationship between technological resources and compositional advances. Addresses issues raised by the diversity of approaches to musical composition; relates particular creative contributions to the historical, cultural, and technological contexts in which they originated. Prerequisite: MUSIC 303; MUSIC 306; MUHST 210. Offered: Sp.

**MUSIC 418 Baroque Ornamentation and Improvisation (3) VLPA Terry** The study of ornamentation and improvisation for keyboard, woodwinds, voice, and strings of selected German, Italian, French, and English repertoire from 1600 to 1800.

**MUSIC 420 Organ Improvisation and Service Playing I (2) VLPA** Prepares students to improvise, especially for the church/synagogue service. Includes a brief study of hymnology, hymn elaboration, altered harmonizations, improvisation based on existing hymn tunes, interludes, chorale preludes, ornamented chorales. Prerequisite: MUSIC 303; MUSIC 306. Offered: A.

**MUSIC 421 Organ Improvisation and Service Playing II (2) VLPA** Continuation of MUSIC 420. Includes brief review of figured bass and functional harmony, free improvisation in simple antecedent/consequent ABA forms and more complex forms (rondo, theme, and variation), improvising partitas, interludes, improvisations based on plainchant. A survey of important improvisation texts. Prerequisite: MUSIC 420. Offered: W.

**MUSIC 422 Organ Improvisation and Service Playing III (2) VLPA** Continuation of MUSIC 421. Advanced improvisation: baroque improvisation techniques, fughetts, baroque preludias and fantasias, canons, toccatas, duos, trios, and simple fugues. Prerequisite: MUSIC 421. Offered: Sp.

**MUSIC 425 Jazz History and Analysis (3) VLPA Collier** Major eras and styles of jazz with emphasis on technical aspects of jazz music: composition, arranging, improvisation practices.

**MUSIC 426 Advanced Jazz Arranging (2) VLPA Brockman** Advanced arranging techniques for jazz ensembles of various sizes, exploring methods employed by Duke Ellington, Gil Evans, and others. Assignments include one original arrangement each for small-combo and full-jazz ensemble. Prerequisite: MUSIC 336. Offered: Sp.

**MUSIC 427 Music of Africa (3) VLPA/I&S** Music cultures of sub-Saharan Africa. Traditional styles and more recent developments. Open to all students with an interest in the area. Prerequisite: MUSIC 317.

**MUSIC 428 Music of North India (3) VLPA/I&S** Classical music of North India, the Hindustani tradition with emphasis on the Dhrupad and Khyal styles. Recommended: ethnomusicology or South Asian studies background.

**MUSIC 430 Organology (3) VLPA** Systematic study of musical instruments, involving the history, acoustical phenomena, and physical topologies of instruments from around the world, with emphasis on non-Western music.

**MUSIC 433 Music of Latin America (3) VLPA/I&S** The Indian, African, and European music of the Spanish-, French-, and Portuguese-speaking New World countries.

**MUSIC 434 Pedagogy (2) VLPA** Principles of effective studio teaching; survey and evaluation of teaching materials.

**MUSIC 435 Pedagogy (2) VLPA** Principles of effective studio teaching; survey and evaluation of teaching materials.

**MUSIC 436 Pedagogy (2) VLPA** Principles of effective studio teaching; survey and evaluation of teaching materials.

**MUSIC 438 Problems in Contemporary Music Performance (3, max. 9) VLPA Kappy** An active course examining and solving problems relevant to the successful performance of twentieth-century music. Preparation for complex rhythms, odd groupings, new notation, and extended performing techniques.

**MUSIC 439 Music of Indonesia and the Philippines (3) VLPA/I&S** Includes the gong culture traditions of Sumatra, Sunda, Java, Bali, Sunda Islands, and the Philippines. Open to students in music and to students with an interest in the area. Prerequisite: MUSIC 316.

**MUSIC 444 Music of the Near East (3) VLPA/I&S** *Sakata* Classical and folk musical traditions of Iran, Turkey, and the Arab world. Prerequisite: MUSIC 316.

**MUSIC 445 Selected Topics in Ethnomusicology (3, max. 9) VLPA/I&S** Deals with topics not covered by regular courses in ethnomusicology. Frequently taught by visiting lecturers. Content varies with different instructors.

**MUSIC 447 Music of Southern India (3) VLPA/I&S** Classical music of South India, the Karnatic tradition, with emphasis on the concert repertoire. Recommended: ethnomusicology or South Asian studies background.

**MUSIC 448 Music of China (3) VLPA/I&S** Confucian philosophies that relate to music, theory, scale systems, cosmology. Development of instrumental styles, vocal and dramatic regional forms from early historical periods to the present; recommended: background in either ethnomusicology or East Asian Studies. Recommended: ethnomusicology or East Asian studies background.

**MUSIC 454 Organ Pedagogy (3) VLPA** *Terry* Pedagogical approaches to organ techniques and performance practice, provides opportunity for practical application by means of student teaching.

**MUSIC 455 Choral Arranging (3) VLPA** Primarily for choral conductors who need to modify, arrange or compose material to suit the capabilities of specific choral groups and performance situations.

**MUSIC 458 Organ Repertoire: Middle Ages through Baroque (3) VLPA** *Terry* Analysis and performance practices of organ literature, Middle Ages through baroque period. Development of the organ as musical instrument. Prerequisite: either MUHST 400, MUHST 401, MUHST 402, MUHST 403, MUHST 406, or MUHST 407.

**MUSIC 459 Organ Repertoire: Bach to Present (3) VLPA** *Terry* Analysis and performance practices of organ literature, classical period through the twentieth century. Development of the organ as a musical instrument. Prerequisite: either MUHST 408, MUHST 409, MUHST 410, MUHST 411, MUHST 412, MUHST 413, MUHST 414, MUHST 415, MUHST 417, MUHST 418, MUHST 419, MUHST 423, MUHST 424, or MUHST 426.

**MUSIC 460 Advanced Vocal Repertoire: Pre-Nineteenth-Century Art Songs (2, max. 6) VLPA** Professional preparation of pre-nineteenth-century songs with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 328.

**MUSIC 461 Advanced Vocal Repertoire: Nineteenth-Century Art Songs (2, max. 6) VLPA** Professional preparation of works from the literature of nineteenth-century German lieder, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 460.

**MUSIC 462 Advanced Vocal Repertoire: Twentieth-Century Art Songs (2, max. 6) VLPA** Preparation of works from the twentieth-century repertoire of French, German, Italian, Spanish, and English songs, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 461.

**MUSIC 464 Jazz Laboratory (1, max. 9) VLPA** *Seales* Forum for testing new technical skills, improvisational techniques, and jazz compositions and/or arrangements in a formal laboratory setting.

**MUSIC 465 Acting for Singers (2, max. 6) VLPA** Workshop designed specifically for the singing actor, focusing on character analysis, movement, and audition deportment skills.

**MUSIC 467 Advanced Jazz Improvisation I (1) VLPA** *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 369.

**MUSIC 468 Advanced Jazz Improvisation II (1) VLPA** *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 467.

**MUSIC 469 Advanced Jazz Improvisation III (1) VLPA** *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 468.

**MUSIC 470 Analysis of Tonal Music: Introduction to Schenker (3) VLPA** *Bernard, Kopp, Rahn* Introduction to the theories of Heinrich Schenker and their subsequent development; analysis of music from the common-practice period (1700-1900), with possible excursions into the twentieth century. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

**MUSIC 471 Introduction to Atonal Theory and Analysis (3) VLPA** *Bernard, Rahn* Theory of atonal music, including the "classical" twelve-tone repertoire. Analysis of works by Schoenberg, Berg, Webern, and others. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

**MUSIC 472 Analysis of Twentieth Century Music, 1900-1950 (3, max. 6) VLPA** *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of musical works of the first half of the twentieth century in Europe and the United States, with emphasis on music other than that of the second Viennese school. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

**MUSIC 473 Keyboard Harmony and Transposition (3) VLPA** *Terry* Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215. Offered: alternate years.

**MUSIC 474 Keyboard Harmony and Transposition (3) VLPA** *Terry* Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: MUSIC 473. Offered: alternate years.

**MUSIC 475 Figured Bass Realization (3) VLPA** *Terry* Various styles of continuo realization for keyboardists, emphasizing Bach cantatas, Haydn symphonies, and Mozart operas. Prerequisite: MUSIC 474. Offered: alternate years.

**MUSIC 476 Advanced Vocal Repertoire: Seventeenth and Eighteenth Centuries (2) VLPA** Opera repertoire, 1600 to the Bel Canto era (Bellini, Rossini, Donizetti); style, traditions, embellishments in Italian, French, and German arias. Prerequisite: MUSIC 328.

**MUSIC 477 Advanced Vocal Repertoire: Nineteenth Century (2) VLPA** Opera repertoire, the post Bel Canto era through Verdi, Puccini and verismo, and significant German, French, and Slavic repertoire. Prerequisite: MUSIC 476.

**MUSIC 478 Advanced Vocal Repertoire: Twentieth Century (2) VLPA** Opera repertoire, twentieth-century opera literature (Barber, Menotti, Bartok, Dvorak); understanding of style, character and overall artistic and musical needs of the present. Prerequisite: MUSIC 477.

**MUSIC 479 Senior Recital (1) VLPA**

**MUSIC 480 The Anthropology of Music (3) VLPA/I&S** Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation. e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with ANTH 430.

**MUSIC 481 Choral Repertoire: Sixteenth and Seventeenth Centuries (3) VLPA** Sacred and secular choral literature from the Renaissance through the early baroque, covering Europe and England. Various genres and styles of major composers, including performance practice, rehearsals, and conducting.

**MUSIC 482 Choral Repertoire: Eighteenth Century (3) VLPA** Sacred and secular choral literature of the baroque, covering mainland Europe and England. Choral works of Bach, his predecessors, and contemporaries. Stylistic analysis and study of performance practice.

**MUSIC 483 Choral Repertoire: Nineteenth Century (3) VLPA** Sacred and secular choral literature of the nineteenth century, covering mainland Europe and England. Analysis of accompanied and a cappella choral works by major composers with implications for conducting and programming of literature.

**MUSIC 484 Choral Repertoire: Twentieth Century (3) VLPA** Choral literature of the twentieth century, covering America, England, and mainland Europe. Various genres and styles, including score study and teaching strategies.

**MUSIC 487 Tonal Counterpoint (3) VLPA** *Durand, Karpen, Rahn* Evaluation of fugal practices from the baroque era to the present. Prerequisite: either MUSIC 311 or MUSIC 202.

**MUSIC 489 Special Topics in Music Theory (3, max. 9) VLPA** Prerequisite: either MUSIC 303 and MUHST 210 or MUSIC 312 and MUHST 314.

**MUSIC 490 Orchestration (3) VLPA** Study of the instruments of the orchestra and practical experience in combining them; to enable the student to score for various instrumental combinations. Ideally to be taken before band arranging or jazz arranging, but is not a prerequisite.

**MUSIC 491 Composition (3, max. 18) VLPA** One-hour private instruction and one-hour laboratory session each week. Prerequisite: MUSIC 391.

**MUSIC 492 Opera Direction and Production (4) VLPA** Practical experience with problems of the theater.

**MUSIC 493 Opera Direction and Production (4) VLPA** Practical experience with problems of the theater. Prerequisite: MUSIC 492.

**MUSIC 495 Music of Japan (3) VLPA/I&S** Instrumental and dramatic forms including Gagaku, Sankyoku, Noh, and Kabuki, as well as regional and popular styles. Open to students in music and East Asian area studies. Prerequisite: MUSIC 316.

**MUSIC 498- Senior Thesis (3-, max. 9) VLPA** Design and completion of an individual research project and writing of a thesis under supervision of a faculty member. Required of students in the pre-Systematic Musicology major.

**MUSIC 499 Undergraduate Research (\* max. 6)**

**Courses for Graduates Only**

**MUSIC 501 Seminar in Musical Analysis (3)** Chant to middle baroque.

**MUSIC 502 Seminar in Musical Analysis (3)** High baroque through nineteenth century.

**MUSIC 503 Seminar in Musical Analysis (3)** Impressionists to present.

**MUSIC 511 Seminar in Field and Laboratory Methods (3)** Methodology of research in ethnomusicology along with practical experience in recording and processing field and laboratory materials. Prerequisite: graduate student standing in ethnomusicology or permission of instructor.

**MUSIC 512 Seminar in Ethnomusicology (3, max. 18)** Study of methodological procedures in ethnomusicology applied to specific research problems. Prerequisite: graduate student standing in ethnomusicology or permission of instructor.

**MUSIC 526 History of Theory (3)** Ancient, medieval, early Renaissance.

**MUSIC 527 History of Theory (3)** Renaissance, baroque, early classic.

**MUSIC 528 History of Theory (3)** Classic, romantic, twentieth century.

**MUSIC 531 Proseminar in Ethnomusicology (3)** Theoretical and methodological practices in ethnomusicology based on existing major writings. Critical evaluations of works with a broad view toward developing ethnomusicological research. Prerequisite: permission of instructor.

**MUSIC 532 Opera Direction and Production (4/6, max. 12)** Practical experience with problems of the opera theatre.

**MUSIC 533 Preceptorial Readings in Ethnomusicology (5)** Significant ethnomusicological literature on the major music cultures. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

**MUSIC 534 Preceptorial Readings in Ethnomusicology (5)** Significant ethnomusicological literature on the major music cultures. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

**MUSIC 536 Transcription and Analysis (3)** Study of practice in different notational analytical systems used in non-Western music. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

**MUSIC 551 Practicum in Music Instruction (3, max. 9)** Practical application and validation of results of investigation in curriculum, music teaching and learning, performance and theoretical studies. Prerequisite: teaching experience or permission of instructor.

**MUSIC 559 Master's Recital (3, max. 6)** Public performance for students in the Master of Music degree program. Prerequisite: permission of instructor and Master of Music program standing.

**MUSIC 570 Seminar in Schenkerian Analysis (3, max. 9)** *Bernard, Kopp, Rahn* Advanced work in Schenkerian analysis. Prerequisite: MUSIC 470.

**MUSIC 571 Seminar in Serialism (3, max. 9)** *Bernard, Kopp, Rahn* Advanced theoretical and analytical work in serialism and other nontonal systems. Prerequisite: MUSIC 471 or equivalent.

**MUSIC 572 Advanced Topics in Computer Music (3)** *Karpen, Rahn* Topics vary. Offered: AWSpS.

**MUSIC 573 Seminar in Tonal Analysis (3, max. 9)** Modern theoretical and analytical methods appropriate to study of western music of the eighteenth and nineteenth centuries, conceived independently of or in response to the work of Heinrich Schenker. Prerequisite: MUSIC 470 or permission of instructor.

**MUSIC 574 Analysis of Twentieth-Century Music: 1950—Present (3)** *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of major works of second half of twentieth century. Prerequisite: MUSIC 471 and MUSIC 472 or permission of instructor.

**MUSIC 575 Seminar in Theory (3, max. 18)** *Bernard, Kopp, Rahn* Development and discussion of current student and faculty research in compositional/analytical theory and metatheory.

**MUSIC 576 Critical Theory of Music (3, max. 18)** Philosophical foundations of the criticism of music, including relevant contemporary thought in the criticism of literature and the other arts.

**MUSIC 577 Composers of the Twentieth Century (3, max. 9)** *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of the work of a major composer of the twentieth century. Prerequisite: MUSIC 574 or permission of instructor.

**MUSIC 580 Advanced Conducting (3, max. 9)** *Eros, Salzman*

**MUSIC 581 Advanced Conducting (3, max. 9)** *Eros, Salzman*

**MUSIC 582 Advanced Conducting (3, max. 9)** *Eros, Salzman*

**MUSIC 583 Advanced Choral Conducting (3, max. 27)** *Kaplan*

**MUSIC 590 Doctoral Recital (2-6, max. 18)** Public performance for students in the Doctor of Musical Arts degree program. Prerequisite: permission of instructor.

**MUSIC 591 Graduate Composition (\* max. 30)** *Bernard, Durand, Karpen, Rahn, Thome*

**MUSIC 599 Advanced Selected Topics (1-3, max. 27)** Selected readings on current issues and problems in music. Prerequisite: permission of a supervising music faculty member.

**MUSIC 600 Independent Study or Research (\*)**

**MUSIC 700 Master's Thesis (\*)**

**MUSIC 800 Doctoral Dissertation (\*)**

**Music Applied**

**MUSAP 420 Private Instruction: Voice (2-3, max. 27) VLPA** *Harper, Patrick, Pelton*

**MUSAP 421 Private Instruction: Piano (2-3, max. 27) VLPA** *Herrman, McCabe, Michaelian, Seales, Sheppard, Siki*

**MUSAP 422 Private Instruction: Organ (2-3, max. 27) VLPA** *Terry*

**MUSAP 423 Private Instruction: Harpsichord (2-3, max. 27) VLPA** *Terry*

**MUSAP 424 Private Instruction: Violin-Viola (2-3; max. 27) VLPA** *Callus, Patterson*

**MUSAP 425 Private Instruction: Violoncello (2-3; max. 27) VLPA** *Krishnaswami, Saks*

**MUSAP 426 Private Instruction: Double Bass (2-3, max. 27) VLPA** *Lieberman*

**MUSAP 427 Private Instruction: Flute (2-3, max. 27) VLPA** *Skowronek*

**MUSAP 428 Private Instruction: Oboe (2-3, max. 27) VLPA** *Henderson*

**MUSAP 429 Private Instruction: Clarinet (2-3, max. 27) VLPA** *McColl*

**MUSAP 430 Private Instruction: Bassoon (2-3, max. 27) VLPA** *Grossman*

**MUSAP 431 Private Instruction: Saxophone (2-3, max. 27) VLPA** *Brockman*

**MUSAP 432 Private Instruction: Horn (2-3, max. 27) VLPA** *Kappy*

**MUSAP 433 Private Instruction: Trumpet (2-3, max. 27) VLPA**

**MUSAP 434 Private Instruction: Trombone (2-3, max. 27) VLPA** *Immel*

**MUSAP 435 Private Instruction: Tuba (2-3, max. 27) VLPA** *Phillips*

**MUSAP 436 Private Instruction: Harp (2-3, max. 27) VLPA** *Vokolek*

**MUSAP 437 Private Instruction: Percussion (2-3, max. 27) VLPA** *Collier, Crusoe*

**MUSAP 438 Private Instruction: Guitar (2-3, max. 27) VLPA** *Novacek*

**MUSAP 439 Private Instruction: Viola da Gamba (2-3, max. 27) VLPA** *Tindemans*

**MUSAP 440 Timpani (2-3, max. 27) VLPA** *Crusoe*

**MUSAP 441 Mallet Percussion (2-3, max. 27) VLPA** *Collier*

**MUSAP 442 Jazz and Non-Western Drumming Techniques (2/3, max 18) VLPA** *Collier* Focused study of American jazz drumming and/or hand drumming techniques of various world music cultures to broaden the skills of percussion students, preparing them for new demands of contemporary musical styles. Designed primarily for music majors enrolled in the percussion program.

**Courses for Graduates Only**

**MUSAP 500 Private instruction: Voice (2-3, max. 45)** *Harper, Patrick, Pelton*

**MUSAP 501 Private Instruction: Piano (2-3, max. 45)** *Herrman, McCabe, Michaelian, Seales, Sheppard, Siki*

**MUSAP 502 Private Instruction: Organ (2-3, max. 45)** *Terry*

**MUSAP 503 Private Instruction: Harpsichord (2-3, max. 45)** *Terry*

**MUSAP 504 Private Instruction: Violin-Viola (2-3, max. 45)**

**MUSAP 505 Private Instruction: Violoncello (2-3, max. 45)** *Krishnaswami, Saks*

**MUSAP 506 Private Instruction: Double Bass (2-3, max. 45)** *Lieberman*

**MUSAP 507 Private Instruction: Flute (2-3, max. 45)** *Skowronek*

**MUSAP 508 Private Instruction: Oboe (2-3, max. 45)** *Henderson*

**MUSAP 509 Private Instruction: Clarinet (2-3, max. 45)** *McColl*

**MUSAP 510 Private Instruction: Bassoon (2-3, max. 45)** *Grossman*

**MUSAP 511 Private Instruction: Saxophone (2-3, max. 45)** *Brockman*

**MUSAP 512 Private Instruction: Horn (2-3, max. 45)** *Kappy*

**MUSAP 513 Private Instruction: Trumpet (2-3, max. 45)**

**MUSAP 514 Private Instruction: Trombone (2-3, max. 45)** *Immel*

**MUSAP 515 Private Instruction: Tuba (2-3, max. 45)** *Phillips*

**MUSAP 516 Private Instruction: Harp (2-3, max. 45)** *Vokolek*

**MUSAP 517 Private Instruction: Percussion (2-3, max. 45)** *Collier, Crusoe*

**MUSAP 518 Private Instruction: Guitar (2-3, max. 45)** *Novacek*

**MUSAP 519 Private Instruction: Viola da Gamba (2-3, max. 45)** *Tindemans*

**MUSAP 520 Private Instruction: Voice (3, max. 18)** *Harper, Patrick, Pelton*

**MUSAP 521 Private Instruction: Piano (3, max. 18)** *McCabe, Michaelian, Sheppard, Siki*

**MUSAP 522 Private Instruction: Organ (3, max. 18)** *Terry*

**MUSAP 523 Private Instruction: Harpsichord (3, max. 18)** *Terry*

**MUSAP 524 Private Instruction: Violin-Viola (3, max. 18)** *Callus, Patterson*

**MUSAP 525 Private Instruction: Violoncello (3, max. 18)** *Saks*

**MUSAP 526 Private Instruction: Double Bass (3, max. 18)** *Lieberman*

**MUSAP 527 Private Instruction: Flute (3, max. 18)** *Skowronek*

**MUSAP 528 Private Instruction: Oboe (3, max. 18)** *Henderson*

**MUSAP 529 Private Instruction: Clarinet (3, max. 18)** *McColl*

**MUSAP 530 Private Instruction: Bassoon (3, max. 18)** *Grossman*

**MUSAP 531 Private Instruction: Saxophone (3, max. 18)** *Brockman*

**MUSAP 532 Private Instruction: Horn (3, max. 18)** *Kappy*

**MUSAP 533 Private Instruction: Trumpet (3, max. 18)**

**MUSAP 534 Private Instruction: Trombone (3, max. 18)** *Immel*

**MUSAP 535 Private Instruction: Tuba (3, max. 18)** *Phillips*

**MUSAP 536 Private Instruction: Harp (3, max. 18)** *Vokolek*

**MUSAP 537 Private Instruction: Percussion (3, max. 18)** *Collier, Crusoe*

**MUSAP 538 Private Instruction: Guitar (3, max. 18)** *Novacek*

**MUSAP 540 Timpani (3, max. 18)** *Crusoe*

**MUSAP 541 Mallet Percussion (3, max. 18)** *Collier*

**MUSAP 542 Private Instruction: Viola da Gamba (3, max. 18)** *Tindemans*

**MUSAP 570 Private Instruction: Voice (3, max. 27)** *Harper, Patrick, Pelton*

**MUSAP 571 Private Instruction: Piano (3, max. 27)** *McCabe, Michaelian, Sheppard, Siki*

**MUSAP 572 Private Instruction: Organ (3, max. 27)** *Terry*

**MUSAP 573 Private Instruction: Harpsichord (3, max. 27)** *Terry*

**MUSAP 574 Private Instruction: Violin-Viola (3, max. 27)** *Callus, Patterson*

**MUSAP 575 Private Instruction: Violoncello (3, max. 27)** *Saks*

**MUSAP 576 Private Instruction: Double Bass (3, max. 27)** *Lieberman*

**MUSAP 577 Private Instruction: Flute (3, max. 27)** *Skowronek*

**MUSAP 578 Private Instruction: Oboe (3, max. 27)** *Henderson*

**MUSAP 579 Private Instruction: Clarinet (3, max. 27)** *McColl*

**MUSAP 580 Private Instruction: Bassoon (3, max. 27)** *Grossman*

**MUSAP 581 Private Instruction: Saxophone (3, max. 27)** *Brockman*

**MUSAP 582 Private Instruction: Horn (3, max. 27)** *Kappy*

**MUSAP 583 Private Instruction: Trumpet (3, max. 27)**

**MUSAP 584 Private Instruction: Trombone (3, max. 27)** *Immel*

**MUSAP 585 Private Instruction: Tuba (3, max. 27)** *Phillips*

**MUSAP 586 Private Instruction: Harp (3, max. 27)** *Vokolek*

**MUSAP 587 Private Instruction: Percussion (3, max. 27)** *Collier, Crusoe*

**MUSAP 589 World Music Laboratory (2-3, max. 18)** World music traditions taught by visiting artists with emphasis on cultural pedagogy and traditional theory. The particular culture studied changes from year to year. Required of all graduate students in ethnomusicology. Credit/no credit only.

**MUSAP 590 Timpani (3, max. 27)** *Crusoe*

**MUSAP 591 Mallet Percussion (3, max. 27)** *Collier*

**MUSAP 592 Private Instruction: Viola da Gamba (3, max. 27)** *Tindemans*

## Music Education

**MUSED 403 Part-Time Student Teaching in Music (6) VLPA** *Campbell, Demorest, Morrison* Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Offered: AWSp.

**MUSED 404 Full-Time Student Teaching in Music (15) VLPA** *Campbell, Demorest, Morrison* Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Prerequisite: MESED 403. Offered: AWSp.

**MUSED 405 Marching Band Technique (2) VLPA** *McDavid, Morrison, Salzman* Basics of marching and maneuvering discussed and used to write drill. Covers selection of music, use of marching procession, and show design. Students complete a drill for their own band or for an instrumentation determined by the instructor.

**MUSED 410 Instrumental Rehearsal Techniques (3) VLPA** *Salzman* Includes score preparation, rehearsal formats, and error detection.

**MUSED 431 Curriculum in Music Education (3) VLPA** *Campbell, Demorest, Morrison* Principles and practices of curriculum design applied to the development of the music curriculum. Individual or group work on elementary and secondary school music curriculum projects.

**MUSED 432 Comprehensive Music in the Secondary School (3) VLPA** *Demorest* The teaching of music and its literature in music classes other than traditional ensembles from grade six through adults. Prerequisite: MUSED 340.

**MUSED 440 Music for Children (3) VLPA** *Campbell* Identification and selection of appropriate objectives, materials, teaching strategies and evaluation techniques used in teaching music from birth through grade five, with consideration of various approaches (e.g., Delcroze, Kodaly, Orff) for the musical development of children. Prerequisite: MUSED 302; MUSED 340

**MUSED 442 Instrumental Curriculum: Methods and Materials (3) VLPA** *Morrison* Study of the organization and administration of school instrumental music; the selection and use of materials and teaching strategies from beginning to advanced levels of instrumental instruction. Prerequisite: MUSED 340.

**MUSED 443 Choral Curriculum: Methods and Materials (3) VLPA** *Demorest* Study of the organization and administration of school choral music; the selection and use of materials and teaching strategies from beginning to advanced levels of choral instruction. Prerequisite: MUSED 340.

**MUSED 452 Ethnomusicology in the Schools (3) VLPA** *Campbell* Issues, teaching materials, and techniques involved in incorporating music cultures of United States and related world music repertoires in K-12 classroom instruction. Prerequisite: MUSED 340.

**MUSED 453 Approaches to Classroom Instruction: K-12 (3) VLPA** *Campbell* Examines such major instructional approaches as MMCP, Orff, Kodaly, and Dalcroze. Included are the philosophy of each and the methods, materials, and instructional skills needed for classroom application. Prerequisite: MUSED 403.

**MUSED 465 Classroom Management and Evaluation in Music Education (3) VLPA** *Morrison* Provides future teachers with strategies and techniques for classroom management, motivation, assessment, and evaluation for applications to K-12 school music programs. Prerequisite: MUSED 340.

**MUSED 475 Teaching the Music of Selected Cultures (1, max. 6) VLPA** *Campbell* Music and culture of a specific world region with particular attention to songs, stories, and instrumental pieces applicable to the teaching of music and the arts in elementary and secondary schools.

**MUSED 480 Music Methods for Classroom Teachers (3) VLPA** *Campbell* Addresses the basic fundamentals of music and methods for teaching K-6 school children. Topics include repertoire appropriate for different age levels, methods and materials for integrating music into the K-6 curriculum.

**MUSED 496 Special Topics in Music Education (1-3, max. 10) VLPA** Special studies designed to reflect contemporary emphases and concerns in the music education profession.

**Courses for Graduates Only**

**MUSED 501 Introduction to Research in Music Education (3)** *Campbell, Demorest, Morrison* Seminar in research design and method with emphasis on identification of problems in music instruction, interpretation of data, and application of findings to classroom settings.

**MUSED 502 Quantitative Research in Music Education (3)** *Campbell, Demorest, Morrison* Seminar in quantitative research utilizing experimental, quasi-experimental, and descriptive design, with emphasis on the pursuit of solutions to pedagogical problems through appropriate research procedures, analysis, and interpretation of findings. Prerequisite: MUSED 501.

**MUSED 503 Qualitative Research in Music Education (3)** *Campbell, Demorest, Morrison* Examination of qualitative modes of inquiry (including ethnographic, case study, phenomenological, and historical) to music instruction in classroom, studio, and community settings. Prerequisite: MUSED 502.

**MUSED 522 Psychology of Music Learning and Teaching (3)** *Campbell, Demorest, Morrison* Examines previous research in areas related to music cognition, including music perception, music performance, musical creativity, musical affect, musical preference, and social psychology. Explores how this research relates to curriculum and practice in music education. Role of theory, method, and procedure for psychological research in music education.

**MUSED 524 Seminar in Music Education (3)** *Campbell, Demorest, Morrison* Special problems in the teaching and supervision of music in the elementary grades. Prerequisite: one year of teaching experience.

**MUSED 525 Seminar in Music Education (3)** *Campbell, Demorest, Morrison* Special problems in the teaching and administration of music in the secondary school and community college. Prerequisite: one year of teaching experience.

**MUSED 530 Administration and Supervision in Music Education (3)** *Campbell, Demorest, Morrison* Survey of issues in policy and systems for facilities, student/personnel, technology, school/community relations, and special programs in music education. Focuses on evaluating and improving existing programs. Includes supervision of student teachers.

**MUSED 535 Seminar in Musical Development (3)** *Campbell, Demorest, Morrison* Critical review of theories, methods of inquiry, designs, and conclusions of research in musical development from early childhood through adolescence. Emphasis on evaluating theories and methods of studying musical development and exploring their relationship to theories of general intellectual development; adult music cognition research; and curriculum and practice in music education.

**MUSED 540 History of American Music Education (3)** *Campbell, Demorest, Morrison* A chronological examination of individual, social, and political events, and educational philosophies, that characterized the development of music instruction in American schools from colonial times to the present.

**MUSED 542 Comparative Music Education (3)** *Campbell, Demorest, Morrison* A transcultural examination of philosophy and practice of music instruction.

**MUSED 550 Proseminar in Music Education (3)** *Campbell, Demorest, Morrison* Examination of the major literature in the philosophy, history, psychology, and sociology of formal school music instruction.

**MUSED 552 World Music Education (3)** *Campbell* Seminar on issues of multiculturalism and the world music "movement" as they affect school music curriculum and instruction. Curricular content and cultural context examined in relation to teaching K-12 students, teachers, and undergraduate students in music education programs. Offered: AWSpS.

**MUSED 560 Contemporary Issues in Music Education (1-3, max. 6)** *Campbell, Demorest, Morrison* Seminar focusing on review of literature on psychological and sociological aspects of music education, including historical and philosophical foundations of music education in the United States. Appropriate for MA students seeking guidance in preparation of topic for examinations. Prerequisite: MUSED 501.

**MUSED 561 Seminar in Theories of Music Instruction (3, max. 9)** *Campbell, Demorest, Morrison* Theories of music instruction, with special attention to curriculum, instructional procedures, and assessment of learning. Prerequisite: MUSED 501 or permission of instructor.

**MUSED 575 Seminar in Music Education Research (1-3, max. 6)** *Campbell, Demorest, Morrison* Examines research and research-based issues relevant to music instruction and learning. Doctoral students should register each quarter until successful completion of general examination. Offered: A.

**Music Ensemble**

**MUSEN 446 Advanced Studio Jazz Ensemble (1, max. 9)** *VLPA* Preparation and performance of material appropriate to large jazz ensemble concerts, clinics, and radio and television broadcasts. Recommended: three quarters of MUSEN 346.

**Courses for Graduates Only**

**MUSEN 500 University Symphony Orchestra (1, max. 9)**

**MUSEN 501 Wind Ensemble (1, max. 9)** *Salzman*

**MUSEN 502 Symphonic Band (1, max. 6)** *Salzman*

**MUSEN 503 Marching Band (2, max. 6)** *McDavid* Credit/no credit only.

**MUSEN 504 Percussion Ensemble (1, max. 9)** *Collier*

**MUSEN 505 Brass Ensemble (1, max. 9)** *Kappy*

**MUSEN 506 Woodwind Ensemble (1, max. 9)** *Skowronek*

**MUSEN 507 University Oratorio Chorus (1, max. 9)** *Kaplan* Credit/no credit only.

**MUSEN 525 Accompanying (2, max. 18)** *Bergman*

**MUSEN 540 Vocal Jazz Ensemble (1, max. 9)** Credit/no credit only.

**MUSEN 545 Jazz Workshop (1, max. 9)** *Collier, Seales*

**MUSEN 546 Studio Jazz Ensemble (1, max. 9)**

**MUSEN 547 Opera Chorus (1, max. 9)** *Kaplan*

**MUSEN 550 University Chorale (1, max. 9)** Credit/no credit only.

**MUSEN 551 Chamber Singers (1, max. 9)** *Boers*

**MUSEN 561 Piano Ensemble (1, max. 9)** Study and performance of works for four hands at one or two pianos. Designed for upper-level piano majors or students with equivalent ability.

**MUSEN 568 Harp Ensemble (1, max. 9)** *Vokolek*

**MUSEN 569 Baroque Chamber Ensemble (1)** *Terry, Tindemans*

**MUSEN 575 Opera Workshop (1, max. 9)** *Zahn* Preparation of music theatre repertoire. Intended for the mature voice student.

**MUSEN 581 Chamber Music (1, max. 9)**

**MUSEN 582 Opera Theatre (2, max. 18)** Public performance of roles in opera.

**MUSEN 583 Collegium Musicum (1, max. 9)** *Tindemans*

**MUSEN 584 Contemporary Group (1, max. 9)** *Durand* Exploration of notation and performance problems in today's music; preparation for public performance. Credit/no credit only.

**Music History**

**MUHST 400 Medieval Music: To 1400 (3)** *VLPA Taricani* Gregorian chant through Machaut and Landini. Prerequisite: one 300-level MUHST course.

**MUHST 401 Early British Music: 1300-1700 (3)** *VLPA Taricani* Examines the history of British music from its earliest polyphony through the music of Purcell. Stylistic features of English music studied, including medieval polyphony, Tudor music, Elizabethan music, and seventeenth-century music through Purcell. Prerequisite: one 300-level MUHST course.

**MUHST 402 Late Renaissance Secular Music: 1525-1630 (3)** *VLPA Taricani* The madrigal in Italy, England, and Germany. The Chanson, Jannequin through Lassus. Prerequisite: one 300-level MUHST course.

**MUHST 403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3)** *VLPA Taricani* Latin church music. Willawert through G. Gabrieli; early Reformation church music, Walther through Gibbons; instrumental music, Cabezon, the English virginal school, and Sweelinck. Prerequisite: one 300-level MUHST course.

**MUHST 404 Baroque Keyboard Music (3)** *VLPA* Forms and styles: Frescobaldi through J. S. Bach and C.P.E. Bach. Prerequisite: one 300-level MUHST course.

**MUHST 405 Orchestral Music: 1620-1760 (3)** *VLPA* Corelli through the Mannheim School. Prerequisite: one 300-level MUHST course.

**MUHST 406 Baroque Choral Music (3)** *VLPA Bozarth* Monteverdi through Handel. Prerequisite: one 300-level MUHST course.

**MUHST 407 Baroque Opera (3)** *VLPA* Opera of the Baroque period. Prerequisite: one 300-level MUHST course.

**MUHST 408 Keyboard Music: 1760-1830 (3)** *VLPA Bozarth* Haydn through Schumann. Prerequisite: one 300-level MUHST course.

**MUHST 409 Chamber Music: 1760-1830 (3)** *VLPA* Haydn through Schubert. Prerequisite: one 300-level MUHST course.

**MUHST 410 Orchestral Music: 1760-1830 (3)** *VLPA Will* Haydn through Berlioz. Prerequisite: one 300-level MUHST course.

**MUHST 411 Art Song, 1760-1830 (3)** *VLPA* The art song in European culture during the classical and early romantic periods. Prerequisite: one 300-level MUHST course.

**MUHST 412 Choral Music: 1750-1830 (3)** *VLPA Will* Large works for chorus and orchestra. Haydn through Berlioz. Prerequisite: one 300-level MUHST course.

**MUHST 413 Opera: 1750-1830 (3)** *VLPA Will* Gluck through Bellini. Prerequisite: one 300-level MUHST course.

**MUHST 414 Keyboard Music: 1830-1915 (3) VLPA**  
*Bozarth* Liszt through Debussy. Prerequisite: one 300-level MUHST course.

**MUHST 415 Chamber Music: 1830-1915 (3) VLPA**  
Schumann through Ravel. Prerequisite: one 300-level MUHST course.

**MUHST 416 Orchestral Music: 1830-1915 (3) VLPA**  
Liszt and Brahms through early Schoenberg and Stravinsky. Prerequisite: one 300-level MUHST course.

**MUHST 417 Art Song: 1830-1915 (3) VLPA** *Bozarth*  
The Lieder of Schumann, Brahms, Wolf, Strauss, Mahler, and Schoenberg. Prerequisite: one 300-level MUHST course.

**MUHST 418 Choral Music: 1830-1915 (3) VLPA**  
*Bozarth* Selected choral masterpieces. Brahms through Britten. Prerequisite: one 300-level MUHST course.

**MUHST 419 Opera: 1830-1915 (3) VLPA** *Will*  
Wagner through Puccini. Prerequisite: one 300-level MUHST course.

**MUHST 420 Authenticity and Performance (3) VLPA**  
The practical and philosophical issues raised by historically informed performance of early music on period instruments. Prerequisite: one 300-level MUHST course.

**MUHST 421 Music Criticism (3) VLPA** *Starr*  
Study of the various forms of music criticism, with an emphasis on the writing of valid examples and evaluation of one's own work along with that of others—classmates, journalists, and academic critics. Prerequisite: one 300-level MUHST course.

**MUHST 423 Twentieth-Century Music: to 1945 (3) VLPA** *Starr*  
Intensive study of selected composers and works exemplifying the new vocabularies, grammars, and styles of the early part of this century. Prerequisite: one 300-level MUHST course.

**MUHST 424 Music Since 1945 (3) VLPA** *Starr*  
Diversity of the contemporary musical scene. Vocabularies appropriate for the description and understanding of the new music, developed through study of representative composers and works, and appropriate readings. Prerequisite: one 300-level MUHST course.

**MUHST 426 American Popular Music (3) VLPA**  
*Starr* An in-depth consideration of American popular music styles and repertory from about 1920 to the present day. Analysis of representative pieces; consideration of critical and aesthetic issues relating to popular music; relationship of popular music to "art" music and to American culture and society. Prerequisite: one 300-level MUHST course.

**MUHST 429 Music, Literature, and the Arts (3) VLPA**  
Literary and visual art works that include musical subject matter and forms; musical genres that incorporate such other arts as opera and ballet. Related philosophical writings. Includes works of a particular time period or investigation of a specific problem in comparative arts. Prerequisite: one 300-level MUHST course.

**MUHST 497 Special Topics in Music History (1-3, max. 6) VLPA**  
Topics vary each quarter. Prerequisite: one 300-level MUHST course.

## Courses for Graduates Only

**MUHST 500 Seminar in Methods of Music Research (3)** *Taricani, Will*  
Explores various critical approaches to research in music at the graduate level, examining specialized bibliographical resources, controversial arguments about musical issues, and other matters of musical criticism required to begin advanced study of music. Prerequisite for all graduate music history courses except 515.

**MUHST 503 Readings in Medieval and Renaissance Music (5)** *Taricani*  
Musical styles, genres, and forms of the middle ages and Renaissance. Focuses upon musicological problems and controversy related to music composed between ca. 1000 and 1600. Prerequisite: permission of instructor.

**MUHST 504 Seminar in Medieval Music (3, max. 6)** *Taricani*  
Prerequisite: MUHST 500.

**MUHST 505 Seminar in Renaissance Music (3, max. 6)** *Taricani*  
Prerequisite: MUHST 500.

**MUHST 506 Seminar in Baroque Music (3, max. 6)**  
*Bozarth* Prerequisite: MUHST 500.

**MUHST 508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6)** *Bozarth, Will*  
Prerequisite: MUHST 500.

**MUHST 509 Seminar in Nineteenth-Century Music: 1830-1890 (3, max. 6)** *Bozarth*  
Prerequisite: MUHST 500.

**MUHST 510 Seminar in Music Since 1890 (3, max. 6)** *Starr*  
Prerequisite: MUHST 500.

**MUHST 515 Seminar in Medieval and Renaissance Notation (5)** *Taricani*  
Gregorian chant through sixteenth-century prints.

**MUHST 519 Seminar in Modern Editorial Procedures (5)** *Bozarth*  
Study of modern procedures for preparing critical editions. Related areas of study may include analysis of musical style and historical and performance problems inherent in works being edited.

**MUHST 520 Seminar in American Music (3, max. 6)** *Starr*  
Research in the life, works, and times of composers in the United States from colonial days to the present. Prerequisite: MUHST 500 and undergraduate work in the history and analysis of twentieth century music.

**MUHST 537 Seminar on Opera (3, max. 6)** *Will*  
Seminar in music history, providing a complement to history of opera series. Prerequisite: MUHST 500.

## Near Eastern Languages and Civilization

229B Denny



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/near\\_eastern.html](http://www.washington.edu/students/gencat/academic/near_eastern.html)



Department Web page:  
[depts.washington.edu/nelc/NELC/](http://depts.washington.edu/nelc/NELC/)

## Graduate Program

Graduate Program Coordinator  
M29A Denny, Box 353120  
(206) 685-3800

## Master of Arts

The Department of Near Eastern Languages and Civilization offers a graduate program of studies leading to the Master of Arts degree. The program is designed to provide students with advanced training in at least one Near Eastern language and in a specific field of specialization. Students may concentrate in Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic and may choose as their field of specialization a civilization or literature related to their language of concentration. The program is intended not only for those students who wish to continue their studies at the doctoral level but also for students who wish to pursue careers in government or business.

*Admission Requirements:* Statement of purpose; a sample of written work; three letters of recommendation, of which at least two must attest to scholarly ability. Although knowledge of a Near Eastern language is not a prerequisite for admission, applicants are generally expected to have had the equivalent of two years' study of the language in which they plan to concentrate.

*Graduation Requirements:* Departmental requirements, in addition to those required by the Graduate School for the Master of Arts degree, include a reading knowledge of French or German, or, with the prior approval of the student's M.A. committee, any other language pertinent to the research in the student's field of study; a seminar paper representing the student's best work; a written examination consisting of four parts: (1) on the general culture of the Near East, (2) on the student's field of specialization, (3) on the student's language of concentration, (4) on a second Near Eastern language related to the language concentration. Fulfillment of these requirements normally entails the completion of at least two years of study.

## Doctor of Philosophy

Some of the department faculty are part of an interdisciplinary faculty group which offers doctoral study in Near and Middle Eastern Studies. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of this catalog.

## Summer Programs

The department offers Summer Intensive Language programs in Arabic, Hebrew, and Central Asian languages (Uzbek, Kazakh, Tajik, and others).

## Research Facilities

The University of Washington Libraries holds an extensive collection of books and materials in the languages of the Near East, the Turkic regions of Central Asia, and in European languages on Near Eastern and Central Asian Turkic subjects. Candidates for the master's degree as well as doctoral students will find in the collection adequate resources for their research. The library participated in the Library of Congress Middle East Cooperative program for the acquisition of Arabic serials, and the Library of Congress Cooperative program for Pakistan for the purchase of Persian books and serials. The library staff includes Near East and Central Asia specialists responsible for acquiring and cataloging the collection. The library maintains book exchanges with the Central Asian republics, some of these beginning as early as 1961. They are handled through the Near East and Slavic Sections of the University's Suzzallo Library. Among its staff are an exchange librarian and a specialist trained in Central Asian Turkic languages. A book exchange with Xinjiang is administered through the East Asia Library.

## Financial Aid

A limited number of teaching assistantships are available for graduate students in the department who are fluent in speaking and writing a Near Eastern language. A limited number of graduate fellowships are also available.

## Exchange Agreements

The University of Washington and the Department of Near Eastern Languages and Civilization maintain exchange agreements for graduate students and faculty with the following universities and institutions: American University in Cairo, Egypt; Hebrew University of Jerusalem-Israel; Tashkent University-Uzbekistan. In addition the department has direct exchange agreements with Xinjiang University, Urumchi, People's Republic of China, and several universities in Kyrgyzstan and Kazakhstan. It also maintains exchanges and cooperation with the Oriental Institute at the Tajik Academy of Sciences, Dushanbe; and participates in an agreement of scholarly exchanges and cooperation with the Uzbek Writers' Union, the Uzbek Academy of Sciences, and the Kazakh Academy of Sciences. The department is an institutional member of the following organizations which also offer opportunities for study and research abroad: Center for Arabic Study Abroad in Cairo (CASA), American Research Center in Egypt, and the American Research Institute in Turkey.

## Faculty

### Chair

Michael A. Williams

### Professors

Bacharach, Jere L. \* 1967, (Adjunct); MA, 1962, Harvard University; PhD, 1967, University of Michigan; history of the Middle East, Islam.

Cirtautas, Ilse D. \* 1968; PhD, 1958, University of Hamburg (Germany); Turkic languages and literatures.

Heer, Nicholas L. \* 1965, (Emeritus); PhD, 1955, Princeton University; Arabic language and literature, Islamic theology and philosophy.

Jaffee, Martin S. \* 1987, (Adjunct); PhD, 1980, Brown University; rabbinic religion and literature in late antiquity.

Karimi-Hakkak, Ahmad \* 1985; PhD, 1979, Rutgers University; Persian language and literature, Iranian culture and civilization.

MacKay, Pierre A. \* 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post-classical and Byzantine Greek literature, numismatics.

Sokoloff, Naomi B. \* 1985; PhD, 1980, Princeton University; Hebrew language and literature.

Williams, Michael A. \* 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Ziadeh, Farhat J. \* 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

### Associate Professors

Deyoung, Terri L. \* 1991; PhD, 1988, University of California (Berkeley); Arabic language and literature.

### Assistant Professors

Kuru, Selim Sirri 1999, (Acting); Other, 1999, Harvard University; Turkish language and literature.

Noegel, Scott B. \* 1995; PhD, 1994, Cornell University; ancient Near Eastern languages.

Walker, Joel T. 1997, (Adjunct); PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

Wheeler, Brannon M. \* 1996; PhD, 1993, University of Chicago; Islamic studies, comparative religion, late antiquity, Jewish studies, legal studies.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Akkadian

**AKKAD 401 Elementary Akkadian (3)** Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

**AKKAD 402 Elementary Akkadian (3)** Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

**AKKAD 403 Elementary Akkadian (3)** Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

**AKKAD 421 Intermediate Akkadian (3)** Readings in Akkadian texts.

**AKKAD 422 Intermediate Akkadian (3)** Readings in Akkadian texts.

**AKKAD 423 Intermediate Akkadian (3)** Readings in Akkadian texts.

### Arabic

**ARAB 401 Intensive Elementary Arabic (15)** Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

**ARAB 411 Elementary Arabic (5)** Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.)

**ARAB 412 Elementary Arabic (5)** Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 411.

**ARAB 413 Elementary Arabic (5)** Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 412.

**ARAB 421 Intermediate Arabic (5) VLPA** Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: either ARAB 401 or ARAB 413.

**ARAB 422 Intermediate Arabic (5) VLPA** Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 421.

**ARAB 423 Intermediate Arabic (5) VLPA** Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 422.

**ARAB 431 Advanced Arabic (3) VLPA** Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 423.

**ARAB 432 Advanced Arabic (3) VLPA** Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 431.

**ARAB 433 Advanced Arabic (3) VLPA** Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 432.

**ARAB 452 Maqamat: Hamadhani, Hariri (3) VLPA** *MacKay* Reading of several maqamat (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the maqamat genre as a whole. Prerequisite: ARAB 432.

**ARAB 453 Historical Texts (3) VLPA/I&S** *B. Wheeler* Readings in Arab historians with particular reference to scholars such as Tabari, Ibn al-Jawzi, and Ibn al-Athir. Prerequisite: ARAB 432.

**ARAB 454 Quran and Its Interpretation (3) VLPA** *B. Wheeler* Reading of selected passages from the Quran in relation to their interpretation in classical commentaries (tafsir) and in legal texts (ahkam al-Quran). Focus on the various types of classical scholarship applied to the text of the Quran (ulum al-Quran). Prerequisite: ARAB 432.

**ARAB 455 Ritual and Legal Texts (3) VLPA** *B. Wheeler* Selected readings from well-known Islamic legal texts (furu al-fiqh) with attention to the sources of the law and methods of exegesis (usul al-fiqh). Prerequisite: ARAB 432.

**ARAB 456 Islamic Political Theorists (3) VLPA/I&S** Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite: ARAB 432.

**ARAB 458 Modern Poetry (3) VLPA** *DeYoung* Neoclassical poetry of the nineteenth and twentieth centuries, and the development of modern verse. Prerequisite: ARAB 432.

**ARAB 470 Stories of the Prophets (3) VLPA/I&S** *B. Wheeler* Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with HEBR 470.

**ARAB 472 Quran and Bible Masorah (3) VLPA B. Wheeler** Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 432, HEBR 427, or HEBR 432. Offered: jointly with HEBR 472.

**ARAB 490 Supervised Study (1-6 max. 18)** Special work in literary texts for graduates and undergraduates. Prerequisite: ARAB 423.

**ARAB 496 Special Studies in Arabic (3-5, max. 15) VLPA** Topics vary. Offered occasionally by visiting or resident faculty.

**ARAB 499 Undergraduate Research (1-6 max. 18)**

### Courses for Graduates Only

**ARAB 596 Special Studies in Arabic (3-5, max. 15)** Topics vary. Offered occasionally by visiting or resident faculty.

**ARAB 600 Independent Study or Research (\*)**

### Aramaic

**ARAMIC 422 Targumic Aramaic (5) VLPA Noegel** The Targum (ancient Aramaic translation) of the Hebrew Bible forms an important basis for biblical interpretation. Emphasis on comprehension and interpretive strategies. Recommended: knowledge of Hebrew and/or Aramaic. Prerequisite: HEBR 333 or HEBR 426.

### Egyptian

**EGYPT 410 Hieroglyphic Egyptian (5) VLPA Noegel** Provides an introduction to hieroglyphic Egyptian as written during the Middle Kingdom (c. 2040-1782 BCE). Focuses on reading and writing hieroglyphics, including reading a complete Egyptian text. No knowledge of Egyptian or any other Near Eastern language is required.

**EGYPT 411 Introduction to Coptic (3) Williams** Elements of grammar of the Sahidic dialect of the Coptic language.

**EGYPT 422 Readings in Coptic (3) VLPA Williams** Readings from ancient Coptic Christian literature, with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

**EGYPT 423 Readings in Coptic (3) VLPA Williams** Readings from ancient Coptic Christian literature, with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

### Hebrew

**HEBR 401 Intensive Elementary Modern Hebrew (15)** Intensive study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

**HEBR 411 Elementary Modern Hebrew (5) Sokoloff** Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.)

**HEBR 412 Elementary Modern Hebrew (5) Sokoloff** Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 411.

**HEBR 413 Elementary Modern Hebrew (5) Sokoloff** Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 412.

**HEBR 421 Intermediate Modern Hebrew (5) VLPA Sokoloff** Readings of selected texts in modern Hebrew with continuing emphasis on grammar and syntax. Prerequisite: either HEBR 401 or HEBR 413.

**HEBR 422 Intermediate Modern Hebrew (5) VLPA Sokoloff** Readings of selected texts in modern Hebrew with continuing emphasis on grammar and syntax. Prerequisite: HEBR 421.

**HEBR 423 Intermediate Modern Hebrew (5) VLPA Sokoloff** Readings of selected texts in modern Hebrew with continuing emphasis on grammar and syntax. Prerequisite: HEBR 422.

**HEBR 427 Biblical Hebrew Poetry (5) VLPA Noegel** Explores select poetic sections of the Hebrew Bible (Old Testament) in conjunction with English translations and commentaries. Emphasis on close readings, the grammatical insights of textual criticism, and the interpretive strategies and agendas of the English translations. Prerequisite: HEBR 333 or HEBR 426.

**HEBR 428 Inscriptions from Biblical Times (5) VLPA Noegel** Surveys Northwest Semitic inscriptions that bear significantly on our understanding of Biblical history and ancient Hebrew including the Moabite stone, Israelite ostraca, Siloam engraving, Gezer calendar, Deir Alla (Gilead) inscriptions, the Asherah texts, Ammonite fragments, and Phoenician monuments. Prerequisite: HEBR 333 or HEBR 426.

**HEBR 451 Introduction to Hebrew Literature (3) VLPA Sokoloff** Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

**HEBR 452 Introduction to Hebrew Literature (3) VLPA Sokoloff** Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

**HEBR 453 Introduction to Hebrew Literature (3) VLPA Sokoloff** Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

**HEBR 454 Hebrew Poetry (3) VLPA Sokoloff** Selections of poetry by prominent twentieth-century Hebrew poets whose texts comment or elaborate on biblical texts. Original source considered side-by-side with modern poetry, to examine ways recent literature models itself on, draws upon, and revises traditional sources. Prerequisite: HEBR 423.

**HEBR 470 Stories of the Prophets (3) VLPA/I&S B. Wheeler** Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with ARAB 470.

**HEBR 472 Quran and Bible Masorah (3) VLPA Wheeler** Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 437, HEBR 427, or HEBR 432. Offered: jointly with ARAB 472.

**HEBR 490 Supervised Study (1-6 max. 18)** Special work in literary texts for graduates and undergraduates. Prerequisite: HEBR 423.

**HEBR 600 Independent Study or Research (\*)**

### Persian

**PRSAN 401 Intensive Elementary Tajik (15)** Intensive study of grammar with oral and written drill and reading of selected texts in Tajik, the literary language spoken and written in the Central Asian Republic of Tajikistan. Offered: S.

**PRSAN 404 Intensive Persian for Native Speakers (15) VLPA Karimi-Hakkak** Enables students with a degree of proficiency in spoken Persian to read and write, to translate rudimentary texts, and to conceptualize the use of the formal style of composition. Reading, writing, and comprehension, particularly of handwritten manuscripts of the scribal tradition. Also covers calligraphy, translation, journalistic prose, and other facets of the language and the script. Offered: S.

**PRSAN 411 Elementary Persian (5)** Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words.

**PRSAN 412 Elementary Persian (5)** Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 411.

**PRSAN 413 Elementary Persian (5)** Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 412.

**PRSAN 421 Intermediate Persian (5) VLPA** Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 413.

**PRSAN 422 Intermediate Persian (5) VLPA** Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 421.

**PRSAN 423 Intermediate Persian (5) VLPA** Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 422.

**PRSAN 431 Advanced Persian (3) VLPA** Designed to improve reading and writing skills. Graded reading and writing and exposure to the writing system, textual history, newspaper reading, and translation. Cultural materials presented as appropriate. The art of calligraphy introduced. For students with a degree of proficiency in spoken Persian. Prerequisite: PRSAN 423.

**PRSAN 451 Introduction to Persian Literature (3) VLPA Karimi-Hakkak** Selected texts from modern and classical Persian poetry and prose. Provides insights into Iranian culture and its past and present achievements in literature. Prepares the student for a more comprehensive and critical study of Persian literature. Prerequisite: PRSAN 423.

**PRSAN 452 Modern Persian Literature: A Survey (3) VLPA Karimi-Hakkak** Development of poetry and prose after Iran felt and absorbed the impact of Western cultures. Periods and genres. Works of such authors as Jamalzadeh, Hedayat, Dehkoda, Al-e Ahmad, Nima, Sepehri, and Forugh. Prerequisite: PRSAN 423.

**PRSAN 453 Classical Persian Literature: A Survey (3) VLPA** *Karimi-Hakkak* History of Persian literature from Rudaki to Hafiz. Studies epic, lyric, and mystic traditions placed in historical settings. Covers the most important genres such as the Qasida, the Ghazal, the *Ruba'i* and the *Masnavi*. Prerequisite: PRSAN 423.

**PRSAN 454 The Epic Tradition in Iran (3) VLPA** *Karimi-Hakkak* Focuses on the Shahnameh of Firdawsi: explores the ancient legends that gave rise to it and follows the fortunes of epic poetry after Firdawsi, touching on the rise, development, and decline of romance in classical Persian literature. Prerequisite: PRSAN 433.

**PRSAN 455 The Persian Ghazal (3) VLPA** *Karimi-Hakkak* The Ghazal as the leading medium for lyrical expression in classical Persian tradition. Follows this genre from conception to culmination in the poetry of Hafiz. Conventions and devices of the *Ghazal*. Development placed in historical and social context. Prerequisite: PRSAN 433.

**PRSAN 456 Sufism: Thought and Expression (3) VLPA/I&S** *Karimi-Hakkak* Dynamics of mystical thought and expression as evolved in the writings of the great Sufi masters and reflected in the poetry of Sana'i, Attar, Rumi, and others. The fundamental unity of the mystical vision, with special attention to the peculiarities of individual style and expression. Prerequisite: PRSAN 433.

**PRSAN 490 Supervised Study (1-6, max. 18)** Special work in literary texts for graduates and undergraduates. Prerequisite: PRSAN 423.

**PRSAN 499 Undergraduate Research (1-6, max. 18)**

**PRSAN 600 Independent Study or Research (\*)**

## Turkic

**TKIC 401 Intensive Elementary Uzbek (15)** Intensive study of grammar, with oral and written drill and reading of simple texts in Uzbek. Covers first year Uzbek. Cannot be taken for credit if 411, 412, 413 taken. Offered: S.

**TKIC 403 Intensive Elementary Kirghiz (15)** Intensive study of grammar with oral and written drill of selected texts. Offered: S.

**TKIC 404 Intensive Intermediate Uzbek (15) VLPA** Allows students to complete second year Uzbek in one quarter. Reading of selected texts in Uzbek, with continuing emphasis on oral and written practice, grammar, and advanced readings. Cannot be taken for credit if 421, 422, 423 taken. Prerequisite: either TKIC 401 or TKIC 413. Offered: S.

**TKIC 405 Intensive Intermediate Kazakh (15) VLPA** Allows students to complete second year Kazakh in one quarter. Reading of selected texts in modern literary Kazakh, with emphasis on grammar, syntax, and oral practice. Prerequisite: either TKIC 402 or TKIC 416. Offered: S.

**TKIC 406 Intensive Advanced Uzbek (15) VLPA** Advanced-level instruction in speaking, writing, reading, and listening skills. Students work independently on translation projects. Emphasis on extensive writing practices in Uzbek and student participation in an Uzbek email conversation circle. Prerequisite: TKIC 423. Offered: S.

**TKIC 411 Elementary Uzbek (5) Cirtautas** Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

**TKIC 412 Elementary Uzbek (5) Cirtautas** Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

**TKIC 413 Elementary Uzbek (5) Cirtautas** Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

**TKIC 421 Intermediate Uzbek (3) VLPA Cirtautas** Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: either TKIC 401 or TKIC 413.

**TKIC 422 Intermediate Uzbek (3) VLPA Cirtautas** Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 421.

**TKIC 423 Intermediate Uzbek (3) VLPA Cirtautas** Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 422.

**TKIC 490 Supervised Study (1-6, max. 18)** Special work in literary texts for graduates and undergraduates. Prerequisite: either TKIC 404, TKIC 405, or TKIC 423.

**TKIC 499 Undergraduate Research (3-5, max. 15)** For Turkic language and literature majors.

## Courses for Graduates Only

**TKIC 546 Old Turkic (3) Cirtautas** Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of eighth-century inscriptions of historical and literary importance. Prerequisite: permission of instructor.

**TKIC 562 Middle Turkic (3) Cirtautas** Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid, Khorazmian Turkic, Kipchak, and Chagatai. Prerequisite: permission of instructor.

**TKIC 563 Seminar on Turkic Literature (5) Cirtautas** Topics in oral and written literature. Prerequisite: permission of instructor.

**TKIC 600 Independent Study or Research (\*)**

## Turkish

**TKISH 401 Intensive Elementary Modern Turkish (15)** Intensive study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if TKISH 411, 412, 413 taken.) Offered: S.

**TKISH 411 Elementary Turkish (5)** Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.)

**TKISH 412 Elementary Turkish (5)** Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.)

**TKISH 413 Elementary Turkish (5)** Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.)

**TKISH 421 Intermediate Turkish (5) VLPA** Introduction to modern Turkish literature. Prerequisite: TKISH 413.

**TKISH 422 Intermediate Turkish (5) VLPA** Introduction to modern Turkish literature. Prerequisite: TKISH 421.

**TKISH 423 Intermediate Turkish (5) VLPA** Introduction to modern Turkish literature. Prerequisite: TKISH 422.

**TKISH 454 Turkish Literary Genres: Prose (3) VLPA** Major genres, styles, and themes of Turkish art-prose from Ottoman times to present; creation of stylistic and critical norms. Prerequisite: TKISH 423.

**TKISH 490 Supervised Study (1-6, max. 18)** Special work in literary texts for graduates and undergraduates. Prerequisite: TKISH 423.

**TKISH 499 Undergraduate Research (1-6, max. 18)**

**TKISH 600 Independent Study or Research (\*)**

## Near Eastern Languages and Civilization

**NEAR E 402 Classical Arabic Literature in Translation (3) VLPA** *DeYoung* Examines development of Arabic literature from its beginnings through the fall of the Abbasid dynasty to the Mongols. Coincides with period when Arabic language and literature were dominant forces in Islamic civilization. Topics include: impact of Islam on the literature, courtly love, mystical poetry, the Thousand-and-One Nights, and Hispano-Arabic literature.

**NEAR E 403 Colonialism, Nationalism, and the Modern Arabic Novel (3) VLPA/I&S** *DeYoung* Examines how representative novels from the modern canon in Arabic have both endorsed and critiqued aspects of nationalism and colonialist ideology. Recommended: NEAR E 210.

**NEAR E 420 Islamic Theological Literature in English (3) VLPA** Readings from Mu'tazilite and Ash'arite works and from traditionalist works opposed to theology.

**NEAR E 430 Scripture in Islam (5) VLPA/I&S** *B Wheeler* Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with RELIG 430.

**NEAR E 433 Life of Prophet Muhammad (5) VLPA/I&S** *B. Wheeler* Examines historical and religious traditions associated with the life of the Prophet Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with RELIG 433.

**NEAR E 442 Turkish Literature in Translation (3) VLPA** Covers major theoretical issues concerning Ottoman court literature and Turkish epic and troubadour poetry. Major writers and works of modern Turkish literature read and analyzed in their social, political, and theoretical contexts. Previous study of Turkish literature not required.

**NEAR E 451 Pharaonic Egypt in the Context of the Ancient Near East (3) VLPA I&S** *Noegel* Surveys the history, literature, and archaeology of ancient Egypt from the first pharaohs to the conquest of Alexander the Great. Introduces the field of Egyptology, and focuses on the continuity of Egyptian history and culture in context. Slide presentations supplement the readings and in-class lectures.

**NEAR E 452 The Biblical Song of Songs (3) VLPA** *Noegel* Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 452.

**NEAR E 453 The Biblical Prophets (3) VLPA I&S** *Noegel* Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 453.

**NEAR E 454 Israel: The First Six Centuries BCE (3) VLPA I&S** *Noegel* Traces the Israelites, from the Babylonian destruction of the Jerusalem Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 454.

**NEAR E 455 The Kings of Monarchic Israel (3) VLPA I&S** *Noegel* Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 455.

**NEAR E 456 Women in Ancient Judaism (3) I&S/ VLPA** *Noegel* Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with RELIG 456.

**NEAR E 457 The History of Biblical Interpretation (3) I&S/VLPA** *Noegel* Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a "hands-on" approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with RELIG 457.

**NEAR E 490 Supervised Study (1-6, max. 18)** Special work in Near Eastern studies for graduates and undergraduates.

**NEAR E 495 Trends in the Contemporary Middle East (3) I&S** *Bacharach, De Young* Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military confrontations. Topics vary. Offered: jointly with SISME 495.

**NEAR E 496 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15) VLPA** Offered occasionally by visitors or resident faculty. Content varies.

**NEAR E 499 Undergraduate Research (1-6, max. 18)**

## Courses for Graduates Only

**NEAR E 518 Foreign Language Teaching Methodology (2) Brandl** Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/SCAND 518/SLAV 518.

**NEAR E 520 Seminar on Near Eastern Civilization and Thought (3, max. 27)** Content varies.

**NEAR E 596 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15)** Offered occasionally by visitors or resident faculty. Content varies.

**NEAR E 600 Independent Study or Research (\*)**

## Philosophy

345 Savery



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/philosophy.html](http://www.washington.edu/students/genocat/academic/philosophy.html)



Department Web page:  
[depts.washington.edu/phillweb/](http://depts.washington.edu/phillweb/)

Philosophy is the study of the most fundamental issues concerning reality, knowledge, and value, and of the basic concepts, principles, and arguments of the major intellectual disciplines. Its fields include metaphysics, epistemology, logic, ethics, history of philosophy, political philosophy, aesthetics, philosophy of science, philosophy of mind, philosophy of language, philosophy of law, and philosophy of religion.

## Graduate Program

Graduate Program Coordinator  
345 Savery, Box 353350  
(206) 543-5855  
[philinfo@u.washington.edu](mailto:philinfo@u.washington.edu)

### Master of Arts, Doctor of Philosophy

The Department of Philosophy offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees, the M.A. program serving as the initial stage of the Ph.D. program.

The Master of Arts program option is a two-year non-thesis program which may be extended to three years depending on the outcome of the spring research papers. The student must take twelve courses in philosophy, satisfy a logic requirement, and at the end of the second year, submit three research papers for evaluation by the graduate faculty of the department. The courses and the papers must satisfy a distribution requirement. The departmental evaluation of the student's papers and course work determines whether an M.A. degree is awarded and also whether admission to the Ph.D. program is granted. The M.A. portion of the program serves as the initial stage of the Ph.D. program.

The Ph.D. program, which normally requires at least two years of study beyond the M.A., has three general requirements: (1) General Examination, (2) dissertation, and (3) Final Examination.

### Special Requirements

An undergraduate major in philosophy is recommended, although not required, for admission to the M.A. program. An applicant's philosophical potential is assessed primarily on the basis of a sample of his or her written work in philosophy and secondarily on the basis of his or her undergraduate record, Graduate Record Examination scores, and letters of recommendation.

### Financial Aid

The department has some teaching assistantships available to incoming students and the Graduate School offers some non-teaching assistantships.

## Faculty

### Chair

Kenneth C. Clatterbaugh

### Professors

Benson, Keith R. \* 1981, (Adjunct); MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Boler, John F. \* 1960, (Emeritus); PhD, 1960, Harvard University; medieval philosophy.

BonJour, Laurence A. \* 1977; PhD, 1969, Princeton University; epistemology, Kant, British empiricism.

Clatterbaugh, Kenneth C. \* 1966; PhD, 1966, Indiana University; modern philosophy, social philosophy, gender studies.

Coburn, Robert C. \* 1971; PhD, 1958, Harvard University; metaphysics, social philosophy.

Cohen, S. Marc \* 1973; PhD, 1967, Cornell University; ancient philosophy, metaphysics.

Dietrichson, Paul \* 1961, (Emeritus); PhD, 1955, Yale University; philosophy of religion, Kant, existentialism.

Jecker, Nancy A. S. \* 1982, (Adjunct); MA, 1982, Stanford University; MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Keyt, David \* 1957; PhD, 1955, Cornell University; ancient philosophy, logic.

Marks, Charles \* 1966; PhD, 1972, Cornell University; philosophy of mind, modern philosophy.

Potter, Karl H. \* 1970, (Emeritus); PhD, 1955, Harvard University; Indian philosophy, philosophy of language.

Richman, Robert J. \* 1961, (Emeritus); PhD, 1953, Harvard University; ethics, epistemology.

### Associate Professors

Lange, Marc B. \* 1997; PhD, 1990, University of Pittsburgh; philosophy of science, epistemology, metaphysics.

Mish'alani, James K. \* 1963, (Emeritus); PhD, 1961, Brown University; contemporary continental philosophy.

Moore, Ronald M. \* 1979; PhD, 1971, Columbia University; philosophy of law, aesthetics.

Roberts, Jean Valerie \* 1992; PhD, 1982, University of Pittsburgh; ancient philosophy, ethics, philosophy of feminism.

Talbott, William J. \* 1989; PhD, 1976, Harvard University; epistemology, ethics, social and political philosophy, rational choice theory.

Townsend, Michael F. \* 1992, (Adjunct); MA, 1978, PhD, 1982, University of Michigan; JD, 1989, Yale University; law and science, intellectual property, use of quantitative methods.

### Assistant Professors

Smith, Angela \* 1999; PhD, 1999, Harvard University; ethics, political philosophy.

Taylor, Paul C. 1998; PhD, 1997, Rutgers University; social and political philosophy, American pragmatism, aesthetics, race theory.

Weller, Cass \* 1997; PhD, 1983, University of Pittsburgh; ancient philosophy, modern philosophy, epistemology, philosophy of the mind.

Woody, Andrea I. \* 1997; PhD, 1997, University of Pittsburgh; philosophy of science, history of science, philosophy of feminism.

**Senior Lecturer**

Baker, Ann Michelle 1994; MA, 1983, PhD, 1990, University of Washington; metaphysics, epistemology.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**PHIL 406 Philosophical Topics in Feminism (5) I&S Roberts** Detailed examination of questions raised by recent feminist scholarship in particular areas of philosophy, such as political theory, ethics, epistemology, or philosophy of science. Emphasis varies.

**PHIL 410 Social Philosophy (5) I&S Clatterbaugh, Coburn, Talbott, Taylor** An examination of topics pertaining to social structures and institutions such as liberty, distributive justice, and human rights.

**PHIL 411 Justice in Health Care (5) VLPA/I&S Jecker** Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with MHE 474.

**PHIL 412 Indian Philosophy (5) I&S Potter** Historical survey of the major systems and the traditional problems of philosophy in India. Readings in Buddhism, Nyaya, Samkhya, and Vedanta.

**PHIL 414 Philosophy of Law (3) I&S Bonjour, Moore** Nature and function of law. Relation of law to morality. Legal rights, judicial reasoning.

**PHIL 418 Indian Buddhist Philosophy (3) I&S Potter** Topics from Buddhist thought, both Sravakayanist and Mahayanist, touching on the following areas: epistemology, theory of liberation, metaphysics and the theory of the absolute, cosmology, and ethics. Readings in translation. At least one course in Indian philosophy or Hinduism or Buddhism recommended.

**PHIL 422 Studies in Continental Rationalism (3, max. 9) I&S Clatterbaugh, Coburn, Marks** Study of one or more of the major continental Rationalists: Descartes, Spinoza, Leibniz.

**PHIL 425 Studies in Nineteenth-Century Philosophy (3) I&S Baker** Study of post-Kantian metaphysical theories, with special emphasis on idealism, realism, and/or pragmatism. Typical authors include F. H. Bradley, J. McTaggart, Royce, and Green.

**PHIL 426 Twentieth-Century Philosophy (5) I&S Baker, Lange, Weller** A study of development of contemporary analytic philosophy, the revolt against idealism, and the linguistic turn in philosophy.

**PHIL 430 Hellenistic Philosophy (3) I&S Roberts** Survey of the Epicurean, Stoic, and Septic philosophy of the Hellenistic period. Emphasis may vary.

**PHIL 431 Philosophy of Plato (3, max. 6) I&S Cohen, Keyt, Roberts, Weller** Study of selected middle and late dialogues.

**PHIL 433 Philosophy of Aristotle (3, max. 6) I&S Cohen, Keyt, Roberts, Weller** Study of several major Aristotelian treatises.

**PHIL 434 Philosophy of Thomas Aquinas (3) I&S** Examination of the major philosophical positions of Thomas Aquinas in the theory of knowledge, metaphysics, and ethics.

**PHIL 436 British Empiricism (3) I&S Bonjour** Examination of the metaphysical and epistemological views of Locke and Berkeley, with perhaps some attention also to Hume. Prerequisite: either PHIL 322 or PHIL 350.

**PHIL 437 Philosophy of Hume (3) I&S Marks, Weller** Study Hume's analyses of knowledge, the passions, and morals.

**PHIL 438 Philosophy of Kant (5) I&S Bonjour, Weller** Systematic study of *The Critique of Pure Reason*.

**PHIL 440 Ethics (5) I&S Coburn, Roberts, Smith, Talbott** Critical examination of the concepts and judgments of value, including an analytical treatment of the notions of good and bad, right and wrong, and obligation. Emphasis varies from quarter to quarter.

**PHIL 445 Philosophy of Art (5) VLPA/I&S Moore** Critical examination of various accounts of the nature of art, artistic activity, the aesthetic experience. Problems in interpretation and evaluation of works of art.

**PHIL 446 Development of Aesthetic Theory (5) VLPA/I&S Moore, Taylor** Historical development of aesthetics, emphasizing such major figures as Plato, Aristotle, Hume, Kant, Hegel, and Goodman.

**PHIL 450 Epistemology (5) I&S Baker, Bonjour, Lange, Talbott** Systematic study of some of the main problems of the theory of knowledge, such as: the definition of "knowledge;" a priori knowledge; perception and knowledge of the external world; and whether knowledge has or requires a foundation. Emphasis varies from quarter to quarter.

**PHIL 453 Philosophy of Language (5) VLPA/I&S** Current theories of meaning, reference, predication, and related concepts. Offered: jointly with LING 476.

**PHIL 456 Metaphysics (5) I&S Baker, Coburn** Examination of such topics as freedom of the will, the nature of persons and personal identity, the existence of God, time, necessary truth, and universals. The emphases vary from year to year.

**PHIL 458 Phenomenology (5) I&S** The contributions of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

**PHIL 459 Philosophy of Medicine (5) I&S Jecker** Familiarizes students with central issues in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history of science, or history of medicine. Offered: jointly with MHE 440.

**PHIL 460 Philosophy of Science (5) I&S/NW Lange, Woody** Critical study of the nature of scientific knowledge. Topics include the relation of theory to observation, the use of mathematics, how theories change, the requirements for the meaningfulness of a theory, and nature of confirmation.

**PHIL 463 Philosophy of Mind (3) I&S Bonjour, Marks** Examination of current theories of the nature of the mind and mental processes.

**PHIL 464 Philosophical Issues in the Cognitive Sciences (5) I&S/NW Marks** Philosophical problems connected with research in psychology, artificial intelligence, and other cognitive sciences. Topics vary. Readings from both philosophical and scientific literature. Accessible to nonphilosophers with suitable interests and backgrounds.

**PHIL 466 Philosophy of the Social Sciences (5) I&S Talbott** Examination of fundamental issues in the foundations, methodology, and interpretation of the social sciences. Topics include value orientation and objectivity, methodological individualism, functionalism, reductionism, and the status of idealized models, including models involving idealized conceptions of individual rationality. Emphasis varies from quarter to quarter.

**PHIL 467 Philosophy of Religion (5) I&S** Study of selected topics and problems in the philosophy of religion, such as: arguments for the existence of God; the problem of evil; atheism; faith; religious experience and revelation; the attributes of God; miracles; immortality; and the relation between religion and morality. Readings from historical and contemporary authors.

**PHIL 469 Existentialist Philosophy (3) I&S** Examination of major ideas of selected existentialist philosophers.

**PHIL 470 Intermediate Logic (5) I&S/NW, QSR Keyt** An introduction to the concepts and methods of metatheory and their application to the sentential calculus.

**PHIL 471 Advanced Logic (5) I&S/NW Keyt** Study of the first-order predicate calculus with identity and function symbols. Consistency, soundness, completeness, compactness. Skolem-Löwenheim theorem. Formalized theories.

**PHIL 472 Axiomatic Set Theory (5) I&S/NW Keyt** Development of axiomatic set theory up to and including the consistency of the Axiom of Choice and Continuum Hypothesis with the Zermelo-Fraenkel Axioms.

**PHIL 473 Philosophy of Mathematics (5) I&S/NW** Study of the traditional accounts of the nature of mathematical entities and mathematical truth given by logicism, intuitionism, and formalism, and the impact of Gödel's incompleteness theorems on these accounts.

**PHIL 474 Modal Logic (5) I&S/NW** Notions of necessity and possibility, using the classical systems T, S4, and S5, and the syntax and the semantics (Kripke models) of these systems.

**PHIL 479 Semantics II (3) VLPA/I&S/NW Ogihara** Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal semantics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with LING 479.

**PHIL 481 Philosophy of Biology (5) I&S/NW Lange** Study of several current topics in philosophy of biology, which may include the logical structure of evolutionary theory, fitness, taxonomy, the concept of a living thing, reductionism, the concept of a biological species, evolutionary explanations, and philosophical consequences of sociology.

**PHIL 482 Philosophy of Physical Science (5, max. 10) I&S/NW Lange, Woody** Study of philosophical issues raised by theories in physics or chemistry, such as whether space (time) is a substance, how causation and locality are treated in quantum mechanics, temporal anisotropy and time travel, the nature of a field of force, the reduction of chemistry to physics. Prerequisite: one PHIL course.

**PHIL 484 Reading in Philosophy (1-5, max. 15)** Individual study of selected philosophical works.

**PHIL 490 Advanced Topics in Epistemology (5, max. 15) I&S Bonjour, Talbott** Intensive study of a particular topic or area in epistemology. Prerequisite: either PHIL 350 or PHIL 450.

## Courses for Graduates Only

**PHIL 500 Proseminar in Philosophy (5)** Introduces incoming graduate students to topics representative of the field and the faculty's interest. Each class session is devoted to a separate topic taught by a different member of the faculty. In addition to reading and short written assignments. Students prepare a term paper on a topic presented. Offered: A.

**PHIL 505 Seminar in Teaching Philosophy (1, max. 2)** *Baker* First quarter: seminar on topics of importance to a graduate student teaching two quiz sections of a large lecture course. Second quarter: focus on helping student prepare to teach own course. Prerequisite: graduate standing in philosophy. Offered: AW.

**PHIL 514 Seminar in Legal Philosophy (5, max. 20)** *Moore*

**PHIL 520 Seminar in Ancient Philosophy (5, max. 20)** *Cohen, Keyt, Roberts, Weller*

**PHIL 522 Seminar in Modern Philosophy (5, max. 20)** *Clatterbaugh*

**PHIL 525 Seminar in Nineteenth-Century Philosophy (5, max. 20)** *Baker*

**PHIL 526 Seminar in Recent Philosophy (5, max. 20)** *Keyt, Lange*

**PHIL 540 Seminar in Ethics (5, max. 20)** *Coburn, Roberts, Smith, Talbott*

**PHIL 545 Seminar in the Philosophy of Art (5, max. 20)** *Moore, Taylor*

**PHIL 550 Seminar in Epistemology (5, max. 20)** *BonJour, Talbott*

**PHIL 553 Seminar in Philosophy of Language (5, max. 20)**

**PHIL 556 Seminar in Metaphysics (5, max. 20)** *Baker, BonJour, Coburn*

**PHIL 560 Seminar in the Philosophy of Science (5, max. 20)** *Lange, Woody*

**PHIL 563 Seminar in the Philosophy of Mind (5, max. 20)** *BonJour, Marks*

**PHIL 566 Seminar in Philosophy of the Social Sciences (5, max. 20)**

**PHIL 567 Seminar in the Philosophy of Religion (5, max. 20)** *Coburn*

**PHIL 570 Seminar in Logic (5, max. 20)** *Keyt*

**PHIL 584 Reading in Philosophy (1-5, max. 12)** Intensive reading in philosophical literature. Prerequisite: permission of graduate program coordinator.

**PHIL 587 Contemporary Analytic Philosophy (5, max. 20)** *Baker*

**PHIL 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program coordinator.

**PHIL 700 Master's Thesis (\*)**

**PHIL 800 Doctoral Dissertation (\*)**

## Physics

C121 Physics-Astronomy



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/physics.html](http://www.washington.edu/students/genocat/academic/physics.html)



Department Web page:  
[www.phys.washington.edu](http://www.phys.washington.edu)

Physics is the study of the fundamental structure of matter and the interaction of its constituents, with the goal of providing a quantitative description of nature based on a limited number of physical principles.

## Graduate Program

Graduate Program Coordinator  
C139 B Physics-Astronomy, Box 351560  
(206) 543-2488

The Department of Physics offers studies leading to the degrees of Master of Science and Doctor of Philosophy. The department has a permanent faculty of 50 members, about 20 research faculty, and about forty adjunct, affiliate, and emeritus faculty. An average of twenty Ph.D. and twenty-five M.S. degrees in physics have been awarded annually in recent years.

## Research Facilities

The department is well equipped, both in staff and facilities, for instruction and research in a discipline that emphasizes fundamental problems in the understanding of the physical universe. Areas of research available to the Ph.D. student within the department include atomic physics, astrophysics, condensed-matter physics, elementary-particle physics, nuclear physics, and physics education. In addition, students may do research in physics with adjunct faculty members whose primary appointment is in another department such as Aeronautics and Astronautics, Bioengineering, Chemistry, or Geophysics. Experimental work in atomic physics is concentrated on the measurement of fundamental physical properties through laser, ion trap, and radiofrequency techniques. The emphasis on fundamental measurements is continued in experiments on the gravitational force, carried out by faculty and students in atomic physics, nuclear physics, and astrophysics. Condensed-matter experiment includes research on surfaces, interfaces, lower-dimensional and bulk matter, with materials as diverse as high-temperature superconductors and low-temperature hydrogen monolayers. Facilities used range from synchrotron radiation and neutron sources in the U.S. and abroad to on-campus laboratories with low-temperature, high-pressure, scanning-probe microscopy, x-ray and light scattering, and surface-physics equipment. Members of the high-energy experimental groups are heavily engaged in experiments at the European Center for Nuclear Research in Geneva, Kamiokande in Japan, and the Stanford Linear Accelerator Center. Faculty and students of the nuclear physics group are involved in a broad spectrum of research including studies of neutrino properties, relativistic heavy ions, fundamental symmetries and nuclear astrophysics. Researchers use the on-campus accelerators of the Nuclear Physics Laboratory (NPL), as well as major facilities in the U.S., Canada, and Europe. Theorists in the department are concerned with problems in: the theories of elementary particles and quantum fields, nuclear and high-energy reactions from the very lowest to the very highest energies phase transitions and statistical mechanics, condensed-matter physics from localization in disordered systems to electron transport in mesoscopic systems, atomic physics, general relativity, and astrophysics. The Institute for Nuclear Theory, a national

facility closely associated with the department, offers a unique opportunity for students to pursue research with distinguished permanent and visiting staff. Students in physics have the opportunity to obtain a physics degree in a number of interdisciplinary and applied physics areas through research with faculty members in other departments.

Department facilities are housed in the Physics-Astronomy Building and the Nuclear Physics Laboratory.

## Master of Science (Applications of Physics)

**Admission Requirements:** This option is designed for students who are currently employed and whose background is in physical science, engineering, mathematics, or computer science. Admission is based on course grades in physics and related fields, adequacy of preparation in physics, and interest in areas of instruction offered in the physics department. Entering students are expected to have an undergraduate background equivalent to a B.S. degree in physical science, engineering, mathematics, or computer science.

**Graduation Requirements:** As part of the standard Graduate School requirements, students are expected to complete the sequence of core courses PHYS 441, 541, and 543, and to select appropriate elective courses. In addition, students must complete an independent-study project in consultation with a faculty member. This project may be carried out at the University or at the student's place of employment. A written report as well as an oral presentation of the project are required. Students must take at least 3 credits of PHYS 600 while completing the project. No thesis is required.

## Master of Science, Doctor of Philosophy

**Admission Requirements:** Undergraduate preparation should include upper-division courses in mechanics; electricity and magnetism; statistical physics and thermodynamics; modern physics, including an introduction to quantum mechanics; and advanced laboratory work. Preparation in mathematics should include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary-value problems, and special functions. Admission is determined by: the applicant's undergraduate program, undergraduate grades, Graduate Record Examination aptitude and advanced physics scores, letters of recommendation, and a statement of educational and professional objectives.

## Master of Science

**Graduation Requirements:** Department requirements include standard Graduate School requirements. In addition, 3 credits must be in PHYS 600 and at least 12 other credits in physics graduate courses. A final examination is required. No thesis is required.

## Doctor of Philosophy

**Graduation Requirements:** The student is expected to obtain here, or elsewhere with a master's degree, a background in physics equivalent to that contained in the following sequences of basic graduate courses: PHYS 505, 506, 511, 513, 514, 515, 517, 518, 519, 520, 521, and 524; and in specialized courses appropriate to each student's interests. The student is required to pass, successively, a written qualifying examination (in the autumn of the second year), an oral General Examination for admission to candidacy, and an oral Final Examination. In order to take the General Examination, the student must have been accepted by a graduate faculty member as a research student and have completed the graduate studies outlined above. This examination concentrates on the area in which the dissertation research is planned. Teaching experience is required of all candidates. Courses in teaching techniques in physics, PHYS 501-503, are required of students holding teaching assistantships.

## Financial Aid

Most graduate students are supported by fellowships and assistantships. Applications for the Ph.D. program are automatically considered for these fellowships and assistantships.

## Faculty

### Chair

David G. Boulware

### Professors

Adelberger, Eric G. \* 1972; PhD, 1967, California Institute of Technology; experimental nuclear physics.

Alberg, Mary Ann 1983, (Affiliate); PhD, 1974, University of Washington; theoretical nuclear physics.

Arons, Arnold B. 1968, (Emeritus); MS, 1940, Stevens Institute of Technology; PhD, 1943, Harvard University; physical oceanography, physics education.

Baker, Marcia \* 1980, (Adjunct); MS, 1960, Stanford University; PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Baker, Marshall \* 1962; PhD, 1958, Harvard University; field theory, theoretical elementary-particle physics.

Bardeen, James M. \* 1976; PhD, 1965, California Institute of Technology; general relativity, theoretical astrophysics.

Bertsch, George F. \* 1992; PhD, 1965, Princeton University; theoretical physics, nuclear and atomic cluster physics.

Bichsel, Hans 1992, (Affiliate); PhD, 1951, University of Basel (Switzerland); experimental nuclear physics.

Bodansky, David \* 1954, (Emeritus); PhD, 1950, Harvard University; experimental nuclear physics.

Boulware, David G. \* 1965; PhD, 1962, Harvard University; field theory, theoretical elementary-particle physics, general relativity.

Bowles, Thomas J. 1995, (Affiliate); PhD, 1978, Princeton University; experimental nuclear physics.

Boynton, Paul E. \* 1970; PhD, 1967, Princeton University; high-energy astrophysics, astronomy.

Brown, Frederick C. \* 1987; PhD, 1950, Harvard University; use of synchrotron radiation in experimental solid state physics.

Brown, Lowell S. \* 1968; PhD, 1961, Harvard University; field theory, theoretical elementary-particle physics.

Buck, Warren W. 1999, (Adjunct); MS, 1970, PhD, 1976, The College of William and Mary; physics and nuclear energy.

Burnett, Thompson H. \* 1979; PhD, 1968, University of California (San Diego); experimental elementary-particle physics.

Cahn, John Werner 1984, (Affiliate); PhD, 1953, University of California (Berkeley); theoretical condensed-matter physics.

Campbell, Charles T. \* 1989, (Adjunct); PhD, 1979, University of Texas (Austin); physical chemistry, analytical chemistry, surfaces, chemisorption, catalysis, biosensors.

Chaloupka, Vladimir \* 1981; PhD, 1975, University of Geneva (Switzerland); experimental elementary-particle physics.

Chayes, Jennifer T. 1997, (Affiliate); PhD, 1983, Princeton University; theoretical condensed-matter physics.

Clark, Kenneth C. \* 1948, (Emeritus); PhD, 1947, Harvard University; optical spectroscopy, upper atmosphere.

Cook, Victor \* 1963; PhD, 1962, University of California (Berkeley); experimental high-energy physics.

Cramer, John G. \* 1964; PhD, 1961, Rice University; experimental nuclear physics.

Dash, J. Gregory \* 1961, (Emeritus); PhD, 1951, Columbia University; low-temperature condensed-matter physics.

Dehmelt, Hans G. \* 1955; PhD, 1950, University of Gottingen (Germany); experimental atomic physics.

den Nijs, Marcel P. \* 1981; PhD, 1979, Katholieke University (Netherlands); theoretical condensed-matter physics.

Doe, Peter J. \* 1994, (Research); MSc, 1975, PhD, 1977, University of Durham (UK); experimental nuclear physics.

Drobny, Gary P. \* 1981, (Adjunct); PhD, 1981, University of California (Berkeley); solid state nuclear magnetic resonance, biophysics, biomaterials.

Efimov, Vitaly 1990, (Affiliate); PhD, 1966, Physico-Technical Institute (Russia); theoretical nuclear physics.

Ellis, Stephen D. \* 1975; PhD, 1971, California Institute of Technology; theoretical elementary-particle physics.

Engel, Thomas \* 1980, (Adjunct); PhD, 1969, University of Chicago; surface chemistry and catalysis.

Fain, Samuel C. \* 1970; PhD, 1969, University of Illinois; experimental condensed-matter physics, surface physics.

Farwell, George W. \* 1948, (Emeritus); PhD, 1948, University of Chicago; experimental nuclear physics.

Fortson, E. Norval \* 1963; PhD, 1964, Harvard University; experimental atomic physics.

Gerhart, James B. \* 1956, (Emeritus); PhD, 1954, Princeton University; physics education.

Halpern, Isaac \* 1953, (Emeritus); PhD, 1948, Massachusetts Institute of Technology; experimental nuclear physics.

Haxton, Wick C. \* 1984; PhD, 1976, Stanford University; theoretical physics, nuclear physics.

Heckel, Blayne \* 1983; PhD, 1981, Harvard University; experimental neutron and atomic physics.

Henley, Ernest M. \* 1954, (Emeritus); PhD, 1952, University of California (Berkeley); theoretical nuclear physics, theoretical elementary-particle physics.

Hogan, Craig J. \* 1990; PhD, 1980, Cambridge University (UK); astrophysical cosmology, especially the origin of astronomical structures in the expanding universe.

Holzworth, Robert \* 1982, (Adjunct); PhD, 1977, University of California (Berkeley); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms.

Ingalls, Robert L. \* 1966; PhD, 1962, Carnegie Mellon University; experimental condensed-matter physics.

Jarboe, Thomas R. \* 1989, (Adjunct); PhD, 1974, University of California (Berkeley); plasma physics and controlled fusion, magnetic reconnection and relaxation.

Kaplan, David B. \* 1994; PhD, 1985, Harvard University; theoretical nuclear and elementary-particle physics.

Lake, George Russell \* 1985, (Adjunct); PhD, 1980, Princeton University; stellar dynamics, galaxy structure and formation, cosmology, computational astrophysics.

Lord, Jere J. \* 1952, (Emeritus); PhD, 1950, University of Chicago; cosmic rays, experimental elementary-particle physics.

Lubatti, Henry J. \* 1969; PhD, 1966, University of California (Berkeley); experimental elementary-particle physics.

Margon, Bruce H. \* 1980, (Adjunct); PhD, 1973, University of California (Berkeley); galactic and extragalactic x-ray astronomy, optical counterparts of x-ray sources.

McDermott, Lillian C. \* 1971; PhD, 1959, Columbia University; physics education.

McDermott, Mark N. \* 1962; PhD, 1959, Columbia University; experimental atomic physics.

Miller, Gerald A. \* 1975; PhD, 1972, Massachusetts Institute of Technology; theoretical nuclear physics.

Mockett, Paul M. \* 1972, (Research); PhD, 1965, Massachusetts Institute of Technology; experimental elementary-particle physics.

Nagourney, Warren \* 1977, (Research); PhD, 1972, Columbia University; experimental atomic physics, high resolution laser spectroscopy of atoms.

Nelson, Ann E. \* 1994; MA, 1981, PhD, 1984, Harvard University; theoretical elementary-particle physics.

Olmstead, Marjorie A. \* 1991; PhD, 1985, University of California (Berkeley); experimental condensed-matter physics, surface and interface physics.

Parks, George K. \* 1971, (Adjunct); PhD, 1966, University of California (Berkeley); particles and waves in auroral, magnetospheric, and interplanetary space plasma phenomena.

Pearsall, Thomas P. \* 1989, (Adjunct); PhD, 1973, Cornell University; physics of semiconductors and the technology of semiconductor devices.

Puff, Robert D. \* 1962; PhD, 1960, Harvard University; many-body theory, statistical physics.

Rehr, John J. \* 1974; PhD, 1972, Cornell University; theoretical condensed-matter physics.

Reinhardt, William P. \* 1991, (Adjunct); PhD, 1968, Harvard University; theoretical and computational chemistry with applications in chemistry and biophysics.

Riedel, Eberhard K. \* 1975, (Affiliate); PhD, 1966, Technical University of Munich (Germany); theoretical condensed-matter physics.

Robertson, R. G. Hamish \* 1994; MA, 1965, Oxford University (UK); PhD, 1971, McMaster University (Canada); experimental nuclear physics.

Rothberg, Joseph E. \* 1969; PhD, 1963, Columbia University; experimental high-energy physics.

Schick, Michael \* 1969; PhD, 1967, Stanford University; theoretical condensed-matter physics.

Sharpe, Stephen R. \* 1986; PhD, 1983, University of California (Berkeley); theoretical particle physics: lattice gauge theory and strong interaction phenomenology.

Snover, Kurt Albert \* 1972, (Research); PhD, 1969, Stanford University; experimental nuclear physics.

Sorensen, Larry B. \* 1983; PhD, 1980, University of Illinois; experimental condensed-matter physics.

Spivak, Boris \* 1991; PhD, 1970, Leningrad Polytechnic Institute (Russia); theoretical condensed-matter physics.

Stern, Edward A. \* 1965; PhD, 1955, California Institute of Technology; experimental condensed-matter physics.

Storm, Derek \* 1979, (Research); PhD, 1970, University of Washington; nuclear physics, especially medium energy, accelerator physics.

Streib, John F. \* 1947, (Emeritus); PhD, 1941, California Institute of Technology; experimental nuclear physics.

Stubbs, Christopher \* 1994; MSc, 1983, PhD, 1988, University of Washington; observational cosmology and gravitation.

Thouless, David \* 1980; PhD, 1958, Cornell University; theoretical condensed-matter physics.

Trainor, Thomas A. \* 1973, (Research); PhD, 1973, University of North Carolina; experimental nuclear physics.

Van Dyck, Robert S. Jr. \* 1971; PhD, 1971, University of California (Berkeley); experimental atomic physics.

Vilches, Oscar E. \* 1968; PhD, 1966, National University of Cuyo (Argentina); low-temperature condensed-matter physics.

Weitkamp, William G. \* 1968, (Research Emeritus); MS, 1961, PhD, 1965, University of Wisconsin (Madison); experimental nuclear physics.

Wilets, Lawrence \* 1958, (Emeritus); PhD, 1952, Princeton University; theoretical nuclear and atomic physics.

Wilkerson, John F. \* 1994; MS, 1979, PhD, 1982, University of North Carolina; experimental nuclear physics.

Wilkes, Richard Jeffrey \* 1974, (Research); PhD, 1974, University of Wisconsin; experimental cosmic ray and elementary particle physics.

Williams, Robert W. \* 1959, (Emeritus); PhD, 1948, Massachusetts Institute of Technology; experimental high-energy physics, cosmic rays.

Yaffe, Laurence G. \* 1988; PhD, 1980, Princeton University; quantum field theory, elementary particle theory.

### Associate Professors

Bulgac, Aurel \* 1993; PhD, 1977, Leningrad Nuclear Physics Institute (Russia); many body theory, molecular dynamics, classical and quantum chaos.

Gundlach, Jens 1984, (Research); PhD, 1990, University of Washington; experimental nuclear physics.

Jonsson, Hannes \* 1988, (Adjunct); PhD, 1985, University of California (San Diego); theory and simulations of atomic scale structure and dynamics in liquids, glasses, and crystals.

Savage, Martin J. \* 1996; MSc, 1985, University of Auckland (New Zealand); PhD, 1990, California Institute of Technology; nuclear and particle physics.

Schwinger, Paul B. 1972, (Research); MS, 1975, PhD, 1979, University of Washington; experimental atomic physics.

Unsworth, Martyn J. \* 1993, (Adjunct Research); PhD, 1991, Cambridge University (UK); geomagnetic induction, magnetotellurics, electromagnetic geophysics.

Vogel, Viola \* 1990, (Adjunct); DPhil, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, nonlinear optics, microscopy.

Wettlaufer, John S. 1987, (Affiliate); PhD, 1991, University of Washington; fundamental and applied physics of ice and crystal growth.

Winglee, Robert M. \* 1991, (Adjunct); PhD, 1984, University of Sydney (Australia); energetic phenomena in sun/earth plasmas, excitation of waves, high energy particle acceleration.

Zhao, Tianchi \* 1986, (Research); PhD, 1987, Columbia University; experimental high-energy physics instrumentation and detectors.

### Assistant Professors

Bedaque, Paulo S. F. 1996, (Research); MS, 1989, Sao Paulo State University (Brazil); PhD, 1994, University of Rochester; theoretical nuclear physics.

Elliott, Steven R. \* 1995, (Research); PhD, 1987, University of California (Irvine); experimental nuclear physics.

Heron, Paula \* 1995; MS, 1992, University of Ottawa (Canada); PhD, 1995, Western Ontario University (Canada); physics education.

Kaplan, Lev 1999, (Research); MS, 1993, PhD, 1996, Harvard University; theoretical nuclear physics.

Mittleman, Richard K. 1987, (Research); PhD, 1987, University of Chicago; experimental atomic physics.

Phillips, Daniel R. \* 1998, (Research); PhD, 1995, University of South Australia; theoretical nuclear physics.

Rieke, Frederick Martin \* 1997, (Adjunct); PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Romalis, Michael V. \* 1997; PhD, 1997, Princeton University; atomic physics, low energy tests of fundamental particle physics.

Seidler, Gerald T. \* 1996; MA, 1991, PhD, 1993, University of Chicago; condensed matter experiments: microstructural kinetics and nonequilibrium statistical mechanics.

Shaffer, Peter S. \* 1985, (Research); PhD, 1993, University of Washington; physics education.

Steiger, Thomas D. 1994, (Research); MS, 1989, PhD, 1994, University of Michigan; experimental nuclear physics.

Vokos, Stamatis P. \* 1992; MA, 1985, PhD, 1990, University of California (Berkeley); physics education.

Wasserbaech, Steven R. \* 1993, (Research); PhD, 1989, Stanford University; experimental high-energy physics.

Watts, Gordon T. \* 1999; PhD, 1995, University of Rochester; accelerator-based elementary particle physics.

### Senior Lecturer

Robertson, Charles E. 1990; MS, 1981, University of Washington; physics education.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**PHYS 401 Special Problems (\* max. 30)** Supervised individual study. Offered: AWSpS.

**PHYS 402 Special Problems (\* max. 30)** Supervised individual study. Offered: AWSpS.

**PHYS 403 Special Problems (\* max. 30)** Supervised individual study. Offered: AWSpS.

**PHYS 405- Physical Science by Inquiry II (5-) NW** Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: A.

**PHYS -406 Physical Science by Inquiry II (-5) NW** Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: W.

**PHYS 407 Physics by Inquiry II (5) NW** Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 123. Offered: A.

**PHYS 408 Physics by Inquiry II (5) NW** Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 407. Offered: W.

**PHYS 409 Physics by Inquiry II (5) NW** Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 408. Offered: Sp.

**PHYS 410 Physics by Inquiry for In-Service Teachers (1-2, max. 10) NW** A "hands-on" inquiry-oriented approach designed to train in-service teachers in the use of the physical science content for any of several science programs selected by a school or school district. Credit/no credit only.

**PHYS 411 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW** Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: A.

**PHYS 412 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW** Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: W.

**PHYS 413 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW** Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: Sp.

**PHYS 421 Atomic and Molecular Physics (3) NW** Survey of the principal phenomena of atomic and molecular physics. Prerequisite: PHYS 323; PHYS 325.

**PHYS 422 Nuclear and Elementary-Particle Physics (3) NW** Survey of the principal phenomena of nuclear and elementary-particle physics. Prerequisite: PHYS 323; PHYS 325. Offered: Sp.

**PHYS 423 Solid-State Physics (3) NW** Survey of the principal phenomena of solid-state physics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

**PHYS 424 Mathematical Physics (3) NW** Advanced classical mechanics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

**PHYS 425 Mathematical Physics (3) NW** Mathematical techniques of particular use in physics, including partial differential equations. Prerequisite: PHYS 323; PHYS 325. Offered: W.

**PHYS 426 Mathematical Physics (3) NW** Mathematical techniques of particular use in physics, including partial differential equations. Prerequisite: PHYS 425. Offered: Sp.

**PHYS 427 Applications of Physics (1-3, max. 12) NW** Current applications of physics to problems in the sciences and technology.

**PHYS 428 Selected Topics in Physics (1-5, max. 12) NW**

**PHYS 431 Modern Physics Laboratory (3) NW** Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: A.

**PHYS 432 Modern Physics Laboratory (3) NW** Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: W.

**PHYS 433 Modern Physics Laboratory (3) NW** Techniques in nuclear and elementary-particle research. Prerequisite: either PHYS 327 or PHYS 422. Offered: Sp.

**PHYS 434 Application of Computers to Physical Measurement (3) NW** Laboratory giving specific instruction and experience in interfacing laboratory equipment to computers. Prerequisite: PHYS 335. Offered: A.

**PHYS 436 Nonlinear Dynamics and Chaos (4) NW** Variational Principle, Lagrangian and Hamiltonian Mechanics, phase space, nonlinear dynamics, approach to chaos, Lyapunov exponents, applications to physical systems. Numerical exercises to illustrate phenomena. Prerequisite: MATH 309.

**PHYS 441 Quantum Physics (4) NW** Introduction to concepts and methods of quantum physics: wave mechanics (de Broglie wavelength, uncertainty principle, Schrodinger equation), one-dimensional examples (tunneling, harmonic oscillator), formalism of quantum physics, angular momentum and the hydrogen atom. Recommended: 30 credits in physical science or engineering. Offered: W.

**PHYS 451 Issues for Ethnic Minorities and Women in Science and Engineering (5) I&S** Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with WOMEN 485.

**PHYS 460 Water in the Environment (3) NW** *Baker, Raymond, Waddington, Warren* Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136 and PHYS 123; PHYS 133. Offered: jointly with ATM S/GPHYS 460. Offered: A.

**PHYS 485 Senior Honors Seminar (1, max. 3) NW** Offered: A.

**PHYS 486 Senior Honors Seminar (1, max. 3) NW** Offered: W.

**PHYS 487 Senior Honors Seminar (1, max. 3) NW** Offered: Sp.

**PHYS 491 Independent Research (1-3, max. 3)** Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: A.

**PHYS 492 Independent Research (1-3, max. 3)** Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: W.

**PHYS 493 Independent Research (1-3, max. 3)** Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: Sp.

**PHYS 494 Seminar on Current Problems in Physics (1-3, max. 3) NW** Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: A.

**PHYS 495 Seminar on Current Problems in Physics (1-3, max. 3) NW** Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: W.

**PHYS 496 Seminar on Current Problems in Physics (1-3, max. 3) NW** Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: Sp.

### Courses for Graduates Only

**PHYS 501 Tutorials in Teaching Physics (1, max. 2)** Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: A.

**PHYS 502 Tutorials in Teaching Physics (1, max. 2)** Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: W.

**PHYS 503 Tutorials in Teaching Physics (1, max. 2)** Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: Sp.

**PHYS 505 Mechanics (3)** Lagrangian and Hamiltonian dynamics, with applications to various topics such as coupled oscillators, parametric resonance, anharmonic oscillations, chaos. Offered: A.

**PHYS 506 Numerical Methods (3)** Integration, solution of differential equations, Monte Carlo methods, function minimization, data analysis, modern computing techniques, computation in experimental physics. Offered: Sp.

**PHYS 507 Physical Applications of Group Theory (3)** Applications of finite and continuous groups, representation theory, symmetry, and conservation laws to physical systems. Offered: Sp.

**PHYS 511 Topics in Contemporary Physics (3, max. 9)** Topics of current experimental, theoretical, or technological interest in modern physics. Offered: Sp.

**PHYS 513 Electromagnetism and Relativity (4)** First of a three-part sequence. Principles of electrostatics, complex variable techniques, boundary value problems and their associated mathematical techniques, Green's functions. Offered: A.

**PHYS 514 Electromagnetism and Relativity (3)** Continuation of PHYS 513. Electric and magnetic fields in free space and material media, wave guides and cavity resonators. Offered: W.

**PHYS 515 Electromagnetism and Relativity (4)** Continuation of PHYS 514. Special relativity, electromagnetic radiation from accelerated charges, synchrotron radiation, Cerenkov radiation, radiation reaction. Offered: Sp.

**PHYS 517 Quantum Mechanics (4)** First of a three-part sequence. Modern non-relativistic quantum mechanics developed, beginning with its basic principles. Dirac and abstract operator notation introduced, starting with simple examples. Offered: A.

**PHYS 518 Quantum Mechanics (4)** Continuation of PHYS 517. Modern non-relativistic quantum mechanics. The character of the theory illustrated both with physical examples and with conceptual problems. Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: W.

**PHYS 519 Quantum Mechanics (4)** Continuation of PHYS 518. Modern non-relativistic quantum mechanics. Physical examples and conceptual problems. Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: Sp.

**PHYS 520 Advanced Quantum Mechanics—Introduction to Quantum Field Theory (3)** Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: A.

**PHYS 521 Advanced Quantum Mechanics—Introduction to Quantum Field Theory (3)** Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: W.

**PHYS 522 Advanced Quantum Mechanics: Introduction to Modern Quantum Field Theory (3)** Functional integrals, symmetry breaking, critical phenomena and continuum limits, and non-perturbative methods. Credit/no credit only. Offered: Sp.

**PHYS 524 Thermodynamics and Statistical Mechanics (4)** Statistical mechanical basis of the fundamental thermodynamical laws and concepts; classical and quantum statistical distribution functions; applications to selected thermodynamic processes and examples of Bose and Fermi statistics. Offered: W.

**PHYS 525 Statistical Mechanics (3)** Introduction to equilibrium and non-equilibrium aspects of many-body systems; scale invariance and universality at phase transitions and critical phenomena; exactly soluble models; Markov processes, master equations and Langevin equation in non-equilibrium stochastic processes. Prerequisite: PHYS 524. Offered: A.

**PHYS 527 Current Problems in Physics (1)** Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: A.

**PHYS 528 Current Problems in Physics (1)** Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: W.

**PHYS 530 Laser Physics (4)** Physics underlying laser design and operation in the context of common laboratory systems. Topics may include continuous and pulsed lasers; solid, liquid, and gas gain media; Q-switching, mode-locking, resonator theory, nonlinear optics, and others. Prerequisite: basic quantum mechanics, electromagnetism, and optics; recommended: PHYS 541.

**PHYS 541 Applications of Quantum Physics (4)** Techniques of quantum mechanics applied to lasers, quantum electronics, solids, and surfaces. Emphasis on approximation methods and interaction of electromagnetic radiation with matter. Prerequisite: PHYS 421 or PHYS 441 or equivalent. Offered: Sp.

**PHYS 542 Numerical Methods in Physics (4)** Numerical methods for analysis and computation in physics. Topics may include integration, differential equations, partial differential equations, optimization, data handling, and Monte Carlo techniques. Emphasis is applications in physics. Prerequisite: 30 credits in physical sciences, computer science, or engineering.

**PHYS 543 Electromagnetic Theory (4)** Principal concepts of electromagnetism. Static electric and magnetic fields. Boundary-value problems. Electric and magnetic properties of materials. Electromagnetic waves and radiation. Prerequisite: 30 credits in physical sciences, computer science, or engineering. Offered: A.

**PHYS 544 Applications of Electromagnetic Theory (4)** Emphasis may vary from year to year. Topics may include electromagnetic waves, radiation, scattering, wave guides, plasma physics, quantum electronics, and accelerator physics. Prerequisite: PHYS 543 or equivalent.

**PHYS 545 Contemporary Optics (4)** Coordinated lecture and laboratory treatment of topics in contemporary optics. Subjects include Fourier optics, lens systems, interferometry, laser optics, holography, polarization, crystal optics, birefringence, laser and conventional light sources, optical detectors. Prerequisite: PHYS 543 or equivalent.

**PHYS 546 Condensed-Matter Physics (4)** Introduction to the theory of solids: crystal structure in real space and reciprocal space, phonons, free electrons, band theory, semiconductor devices. Prerequisite: PHYS 441 or equivalent.

**PHYS 547 Electronics for Physics Research (4)** Electronic techniques as applied in physics research. Topics include noise, control-system analysis, operational amplifiers, lock-in amplifiers, precision power supplies and metering, data transmission, microprocessors. Several integrated measurement systems are examined in the context of specific research problems. Prerequisite: elementary electronics.

**PHYS 550 Atomic Physics (3)** Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

**PHYS 551 Atomic Physics (3)** Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

**PHYS 554 Nuclear Astrophysics (3)** Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with ASTR 510; A.

**PHYS 555 Cosmology and Particle Astrophysics (3)** Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with ASTR 513; W.

**PHYS 557 High Energy Physics (3)** First quarter of a three-quarter series. Emphasis on the experimental foundations of particle physics. Prerequisite: PHYS 519; recommended: PHYS 520 and PHYS 521, which may be taken concurrently. Offered: A.

**PHYS 558 High Energy Physics (3)** Second quarter of a three-quarter series. Phenomenology of the standard model of strong and electro-weak interactions, including an introduction to Feynman diagrams. Prerequisite: PHYS 519; recommended: PHYS 520 and PHYS 521, which may be taken concurrently. Offered: W.

**PHYS 559 High Energy Physics (3)** Third quarter of a three-quarter series. Topics of current interest in high-energy particle physics. Prerequisite: PHYS 519; recommended: PHYS 520 and 521, which may be taken concurrently. Offered: Sp.

**PHYS 560 Theoretical Nuclear Physics (3)** First of a two-part sequence. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: A.

**PHYS 561 Theoretical Nuclear Physics (3)** Continuation of PHYS 560. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: W.

**PHYS 564 General Relativity (3)** First of a two-part sequence. General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: PHYS 515.

**PHYS 565 General Relativity (3)** Continuation of PHYS 564. General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: PHYS 515.

**PHYS 567 Theory of Solids (3)** First quarter of a course on modern solid state and condensed matter physics, aimed at bringing student's knowledge up to the level of current literature. Topics include structural, electronic, and vibrational properties; optical response functions and dynamics; transport theory; and cooperative phenomena. Prerequisite: PHYS 519, PHYS 524. Offered: AW.

**PHYS 568 Theory of Solids (3)** Second quarter of a course on modern solid state and condensed matter physics, aimed at bringing the student's knowledge up to the level of current literature. Additional topics (see PHYS 567) include magnetism, quantum Hall effect, superconductivity. Offered: WSp.

**PHYS 570 Quantum Field Theory (3)** Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

**PHYS 571 Quantum Field Theory (3)** Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

**PHYS 572 Modern Quantum Field Theory (3)** Advanced topics in quantum field theory. Credit/no credit only. Prerequisite: PHYS 570, PHYS 571.

**PHYS 575 Selected Topics in Applications of Physics (\* max. 30)**

**PHYS 576 Selected Topics in Experimental Physics (\* max. 30)**

**PHYS 578 Selected Topics in Theoretical Physics (\* max. 30)** Credit/no credit only.

**PHYS 580 Physics Colloquium (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 581 Seminar in High-Energy Physics (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 582 Seminar in Particle Theory (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 583 Seminar in Relativistic Astrophysics (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 584 Seminar in Atomic Physics and Coherent Spectroscopy (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 585 Seminar in Experimental Nuclear Physics (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 586 Seminar in Condensed Matter Physics (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 587 Seminar in Nuclear Theory (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 588 Particle Astrophysics Seminar (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 589 Seminar in Problems of Physics Education (\* max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 590 Seminar in Statistical Physics (1, max. 30)** Credit/no credit only. Offered: AWSp.

**PHYS 600 Independent Study or Research (\*)** Study or research under the supervision of individual faculty members. Credit/no credit only. Prerequisite: permission of supervisor. Offered: AWSpS.

**PHYS 800 Doctoral Dissertation (\*)** Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson. Offered: AWSpS.

## Political Science

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General Catalog Web page:  
[www.washington.edu/students/genocat/academic/political\\_sci.html](http://www.washington.edu/students/genocat/academic/political_sci.html)



Department Web page:  
[depts.washington.edu/polisci/](http://depts.washington.edu/polisci/)

Students of political science examine the theory and practice of government and politics. They acquire knowledge of political institutions and processes and learn to think critically about public policies and their consequences. They learn how to evaluate individual, group, and mass behavior in political settings. Because of their understanding and interest in political systems, students who major in political science enter such career fields as government service, law, business, journalism, politics, public-policy analysis, and education.

The department is organized into four major fields of study: political theory, American government and politics, international relations, and comparative politics. Several subfields—public law, law and public policy, political communication, and political economy—cut across these main areas and provide focused specialization for both undergraduate and graduate students. The department has long been renowned in comparative and international politics, especially in the study of Asian political phenomena, in public law, and in American government and politics. The department has also augmented its faculty strength in international relations, public policy, political and feminist theory, political communication, and political economy.

## Graduate Program

Graduate Program Coordinator  
215 Smith, Box 353530  
(206) 543-1898  
polsgrad@u.washington.edu

Graduate study in political science integrates traditional education in political science's primary fields with other fields in the social sciences allowing an eclectic, interdisciplinary approach.

The department has long been outstanding in comparative and international politics, especially in the study of Asian political phenomena. The department has augmented its faculty strength in American politics, Western European politics, political theory, international relations, political economy, public policy, public law, political communication, and methodology. Graduate students can pursue studies in other campus units, such as the School of Marine Affairs, the Graduate School of Public Affairs, the Henry M. Jackson School of International Studies, the School of Communications, and the School of Law.

### Master of Arts, Doctor of Philosophy

Graduate work in political science is organized primarily as preparation for the Doctor of Philosophy degree. Because the department does not offer a terminal Master of Arts degree, the Master of Arts program serves as the initial stage of the Ph.D. program.

The department admits for autumn quarter only, with an application deadline of January 15. Admission and financial-aid decisions are based on the applicant's academic transcript, Graduate Record Examination general-test scores (no subject test is required), three letters of reference, a statement of purpose, and a writing sample. Foreign students are required to submit TOEFL scores.

### Master of Arts

A bachelor's degree is required for admission to the graduate program. To earn the M.A. degree, students must complete four courses in quantitative and qualitative political analysis, complete course requirements in two fields, and submit and orally defend an essay of distinction. One of the fields must be chosen from four general fields: political theory, international relations, comparative politics, and American politics. The second field may be a second general field or one of the following specialized fields: area study, public law, political communication, public policy process, or political economy. Completion of the M.A. degree requires two years of full-time study.

### Doctor of Philosophy

Most students are expected to have completed an M.A. degree in political science in this department for the Ph.D. program. The doctoral student must prepare a total of three fields, including at least one general field (see general and specialized fields above) and no more than one constructed field. Students must also complete a four-course methodology sequence (usually completed as part of the M.A.). Competence in a foreign language is required only if deemed appropriate by the student's supervisory committee. To be advanced as a doctoral candidate, students must complete all of the above, a research seminar, a written examination in each of the three fields, and a defense of their dissertation prospectus. Once advanced to candidacy, students must write, and orally defend, their dissertation thesis. The Ph.D. program requires a minimum of three years of full-time course work followed by the completion of the dissertation project.

### Research Facilities

The University library system, the largest research library in the Pacific Northwest, has a collection of five million volumes, with specialized collections for the Pacific Northwest, Near East, South Asia, and Slavic and East European areas. A political science reference librarian is available in the Suzzallo and Allen Libraries to assist graduate students and the specialized needs of the department. Specialized access to computing facilities and extensive data holdings is available through the Center for Social Science Computation and Research, and the Political Science Computer Classroom. The University is a member of the Inter-University Consortium for Political and Social Research.

### Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of study.

## Faculty

### Chair

Michael W. McCann

### Professors

Bennett, W. Lance \* 1974; MPhil, 1973, PhD, 1974, Yale University; American politics, comparative politics, political communication, mass media, political culture.

Brass, Paul R. \* 1965, (Emeritus); PhD, 1964, University of Chicago; comparative politics (South Asia).

Burstein, Paul \* 1985, (Adjunct); PhD, 1974, Harvard University; political sociology, social stratification, public policy, law.

Caporaso, James A. \* 1988; PhD, 1968, University of Pennsylvania; international political economy, comparative politics, European Community, research methodology.

Cassinelli, Charles W. \* 1960, (Emeritus); PhD, 1953, Harvard University; comparative government (Latin America).

Gerberding, William P. \* 1979, (Emeritus); PhD, 1959, University of Chicago; American government and politics, public policy.

Gore, William J. \* 1966, (Emeritus); PhD, 1952, University of Southern California; public policy, public administration.

Hartsock, Nancy C. M. \* 1984; PhD, 1972, University of Chicago; feminist theory, Marxism, contemporary political theory.

Hellmann, Donald C. \* 1967; PhD, 1964, University of California (Berkeley); Japanese politics and international relations.

Jones, Bryan D. \* 1996; PhD, 1970, University of Texas (Austin); decision-making and public policy processes in American government.

Keeler, John T. \* 1980; PhD, 1978, Harvard University; comparative politics (Western Europe), international relations.

Lang, Gladys Engel \* 1984, (Emeritus); PhD, 1954, University of Chicago; political effects of mass media, sociology of art, political movements and crowd behavior.

Lev, Daniel S. \* 1970, (Emeritus); PhD, 1964, Cornell University; comparative politics (Southeast Asia).

Levi, Margaret \* 1974; PhD, 1974, Harvard University; comparative politics, political economy, labor politics.

Majeski, Stephen J. \* 1984; PhD, 1981, Indiana University; international relations, foreign policy, peace and conflict resolution.

Matthews, Donald Rowe \* 1976, (Emeritus); PhD, 1953, Princeton University; American government and politics, comparative politics (Norway, U.K.).

May, Peter J. \* 1979; PhD, 1979, University of California (Berkeley); policy analysis, quantitative methods, federal disaster policy.

McCann, Michael W. \* 1982; MA, 1976, PhD, 1983, University of California (Berkeley); American government and politics, public law, political theory.

McCrone, Donald J. \* 1979; PhD, 1966, University of North Carolina; American politics, political economy, methodology.

Migdal, Joel S. \* 1980, (Adjunct); MA, 1968, PhD, 1972, Harvard University; state-society relations, rules of public space, Israel-Palestine.

Modelski, George \* 1967, (Emeritus); PhD, 1954, University of London (UK); international relations, international political economy.

Olson, David J. \* 1974; PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Pempel, T. J. \* 1995, (Adjunct); PhD, 1972, Columbia University; comparative politics in Japan.

Reshetar, John S. Jr. \* 1957, (Emeritus); PhD, 1950, Harvard University; comparative government (Soviet Union), international relations.

Scheingold, Stuart A. \* 1969; PhD, 1963, University of California (Berkeley); American politics (public law).

Taylor, Michael John \* 1985; PhD, 1976, University of Essex (UK); political theory, political economy.

Townsend, James R. \* 1968, (Emeritus); PhD, 1965, University of California (Berkeley); comparative government (China), politics of development.

Ward, Michael D. \* 1997; PhD, 1977, Northwestern University; international relations, political economy, political geography, statistical models.

### Associate Professors

Bachman, David M. \* 1991, (Adjunct); PhD, 1984, Stanford University; Chinese politics and foreign policy and China's political economy (1949-present); US-China relations.

Di Stefano, Christine \* 1985; PhD, 1984, University of Massachusetts; political theory (modern and contemporary), feminist theory, political culture.

Gill, Anthony J. \* 1994; MA, 1989, PhD, 1994, University of California (Los Angeles); comparative politics, Latin America, political economy, methodology.

Goldberg, Ellis \* 1985; PhD, 1983, University of California (Berkeley); political economy of the Middle East, comparative politics.

Gottfried, Alex 1951, (Emeritus); MA, 1948, PhD, 1952, University of Chicago; American government and politics.

Hanson, Stephen E. \* 1990; MA, 1986, PhD, 1991, University of California (Berkeley); Soviet, post-Soviet and comparative politics.

Ingebritsen, Christine \* 1992, (Adjunct); PhD, 1993, Cornell University; politics, international political economy, European integration, environmental policy.

Kier, Elizabeth L. \* 1998; PhD, 1992, Cornell University; international relations.

Kiser, Edgar Vance \* 1988, (Adjunct); PhD, 1987, University of Arizona; political sociology, theory, historical sociology.

Litfin, Karen T. \* 1991; PhD, 1992, University of California (Los Angeles); international environmental politics, globalization processes, technology and politics.

Mayerfeld, Jason \* 1991; MA, 1988, PhD, 1992, Princeton University; political theory, ethics.

Mercer, Jonathan L. \* 1996; PhD, 1993, Columbia University; international relations theory, security, political psychology, rationality and emotion.

Riley, Walter 1946, (Emeritus); MA, 1935, PhD, 1957, Stanford University; political science.

Rivenburgh, Nancy \* 1989, (Adjunct); MS, 1982, Boston University; PhD, 1991, University of Washington; international communications, the media, intercultural relations and identity, international news.

Rohn, Peter H. \* 1962, (Emeritus); PhD, 1958, University of Washington; international relations, international law.

Wilkinson, John D. \* 1990; MA, 1989, PhD, 1991, University of Rochester; American government and politics, quantitative methodology.

### Assistant Professors

Givens, Terri E. 1999; MA, 1996, PhD, 1999, University of California (Los Angeles); comparative politics, Western Europe, political parties, political economy.

La Vaque-Manty, Mika T. 1998; PhD, 1998, University of Michigan; political theory.

Simon, Adam F. \* 1997; MA, 1993, PhD, 1997, University of California (Los Angeles); American government, methodology, political communication, voting behavior, media.

Simpson, Andrea Y. \* 1993; PhD, 1993, Emory University; ethnic identity and its effects on political attitudes and behavior.

Smith, Mark A. \* 1997; PhD, 1997, University of Minnesota; American politics, interest groups, political economy, Congress, public policy.

Whiting, Susan H. \* 1994; PhD, 1995, University of Michigan; political economy of development in post-1949 China.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Political Science

**POL S 401 Advanced Special Topics in Political Theory (5, max. 10) I&S** Topics can include, but are not limited to, analytical theory pertaining to justice, exploitation, and freedom; revolution and social changes; collective choice and action; sexuality and politics; critical theory; Marxist theory; post-structuralism. Content varies. Recommended: POL S 201.

**POL S 403 Advanced Special Topics in International Relations (5, max. 10) I&S** Examination of contemporary developments in the field of international relations. Content varies according to the nature of developments and research interests of the instructor.

**POL S 404 Topics in Public Policy (3-5) I&S** Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with PB AF 499.

**POL S 405 American Politics Seminar (5, max. 10) I&S** Intensive reading and research in selected problems or fields of political analysis.

**POL S 407 International Conflict (5) I&S** Many forms of international conflict, including global wars, local wars, antiregime wars, military interventions, and international crises. Several political, social, and anthropological explanations for conflicts and examination of alternative world futures.

**POL S 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S** Seminar in political economy with focus on Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with ECON 409.

**POL S 410 Technology, Politics, and the State (5) I&S** Relationships between politics, technological change, and development of multinational corporations. Considers whether the relations between political and economic systems of industrial societies have been fundamentally altered by the increased importance and interdependence of government, experts, and new technological possibilities for intervention in social life.

**POL S 411 Theories of the State (5) I&S** Topics may include origins and development of the state; arguments about the necessity, desirability, and proper role of the state; the nature and operation of modern states and the international state system; the legitimacy of modern state power.

**POL S 412 Democratic Theory (5) I&S** Explores the concept of democracy and theoretical models purporting to describe its central features: majority rule, participation, and deliberation. Themes also include: representative vs. direct democracy; the rights of minorities; the relationship between democracy and other political theories such as liberalism, socialism, and conservatism. Prerequisite: POL S 201; either POL S 308, POL S 309, POL S 310, or POL S 318.

**POL S 413 Contemporary Political Theory (5) I&S** Analysis of political theorists, exploring contemporary theories of humanity and society that form the basis for differing political ideas.

**POL S 414 Politics and Culture (5) I&S** How people interpret and shape the political world around them through the use of such cultural resources as language, symbolism, myth, and ritual. The various uses of these cultural elements establish the place of the individual in society, influence the perception of political events, and create opportunities for individual and mass political responses.

**POL S 422 International Environmental Politics Seminar (5) I&S** Study of the practical and theoretical challenges associated with global ecological interdependence. Examination of international treaties and institutions, state, and nonstate actors with an emphasis on the emerging concept of sustainability.

**POL S 423 International Law (5) I&S** Origin and present status of efforts to make rules of conduct for sovereign states; simulation of a treaty-drafting conference, with students playing roles of legal advisers to foreign governments.

**POL S 426 World Politics (5) I&S** The nation-state system and its alternatives, world distributions of preferences and power, structure of international authority, historical world societies and their politics. Offered: jointly with SIS 426.

**POL S 427 International Political Economy (5) I&S** Examines major theoretical problems, substantive issues, and school of thought in international political economy (IPE), including issues of trade, production, and finance. Preparation for critical analysis of dilemmas entailed in establishing and maintaining an instrumentally effective and ethically acceptable IPE system.

**POL S 428 Military Intervention (5) I&S** Historical and theoretical analysis of military intervention in the post-World War II era. Considers how and why interventions occur and evaluates intervention as a foreign-policy response.

**POL S 429 National and International Security (5) I&S** Examines what constitutes U.S. national interests; causes of war and means of deterring war; discusses role nuclear weapons play in international security; how to deter use of chemical and biological weapons; desirability of non-lethal weapons; and role for economic sanctions, intelligence, and ethics.

**POL S 431 International Relations in the Middle East (5) I&S** Study of domestic sources of foreign policy in the Middle East; politics of oil; the East-West rivalry in the arena; and conflict and collaboration among the local powers.

**POL S 432 Political Islam and Islamic Fundamentalism (5) I&S** Study of resurgence, since mid-1970s of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with SIS 406.

**POL S 434 International Relations of South Asia (5) I&S** Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with SISSA 434.

**POL S 435 Japanese Government and Politics (5) I&S** Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with SISEA 435.

**POL S 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) I&S** Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Offered: jointly with SIS 436.

**POL S 437 Politics in Scandinavia (5) I&S** Twentieth-century politics in Scandinavia. How Scandinavian countries have been governed. Costs and consequences of their governmental style and its uncertain future. Optimal size of polities, problems of mature welfare states, process of leadership and representation in multiparty systems, decline of political parties. Offered: jointly with SCAND 437.

**POL S 438 Politics in France (5) I&S** Study of contemporary France. Structures of government in the Fifth Republic; nature of French voting behavior and evolution of the bipolarized political party system; behavior of political interest groups; training of France's administrative elite and functioning of the state bureaucracy; dynamics of policy-making.

**POL S 441 Government and Politics of the Soviet Union and Russia (5) I&S** Ideological and historical bases of Soviet politics; Leninism; Stalinism; Gorbachev's perestroika and the collapse of the USSR; the role of Yeltsin; problems of Russian state-building, market reform, and democratic transition; political parties and civil society; the relationship between the center and the regions; the problem of Russian national identity.

**POL S 442 Government and Politics of China (5) I&S** Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with SISEA 449.

**POL S 443 Comparative Political Societies (5) I&S** Analyses of modern and premodern types of stable political society; special attention to contemporary representative democracy.

**POL S 445 Politics and Society in Eastern Europe (5) I&S** Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with SISRE 445.

**POL S 446 Peasants in Politics (5) I&S** Interdisciplinary study of peasants, with special attention to questions of rural transformation. Peasant involvement in an increasingly interdependent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with SIS 444.

**POL S 447 Comparative Politics Seminar (5, max. 10) I&S** Selected comparative political problems, political institutions, processes, and issues in comparative perspective. Strongly recommended: POL S 204.

**POL S 448 Politics of the European Community (5) I&S** Examines the origins, structures, and political dynamics of the European Community. Attention given to theories of integration, to relations between the European Community and member states, and to the role of the European Community in world politics.

**POL S 449 Politics of Developing Areas (5) I&S** Comparative study of problems of national integration and political development in the new states of Asia and Africa.

**POL S 450 State-Society Relations in Third World Countries (5) I&S** Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of economic and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with SIS 456.

**POL S 452 Political Processes and Public Opinion in the United States (5) I&S** The foundations and environment of opinion; organization and implementation of opinion in controlling government and public opinion as a force in the development of public policy; public relations activities of government agencies.

**POL S 461 Mass Media Law (5) I&S** Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to press coverage of the judicial system. Offered: jointly with CMU 440.

**POL S 464 The Politics of American Criminal Justice (5) I&S** Political forces and value choices associated with the enforcement of criminal law. Distribution of resources among participants in the criminal justice system (e.g., police, attorneys, defendants, and judges). Understanding and evaluation of the interaction of criminal justice processes with the political system.

**POL S 467 Comparative Law in Society (5) I&S** Legal systems around the world as they actually work in their respective political, social, and economic contexts. Emergence and development of European legal systems, legal customs at variance with those of Europe, problems of legal processes in the modern state.

**POL S 468 Comparative Media Systems (5) I&S** Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with CMU 420/SIS 419.

**POL S 470 Public Bureaucracies in the American Political Order (5) I&S** Growth, power, and roles of governmental bureaucracies in America: conflict and conformity with American political thought, other political institutions, and the public.

**POL S 472 Topics in Public Leadership (3-5) I&S** Examines the nature and variety of public leadership in modern political life. Discussion of the political, managerial, and ethical challenges facing today's public leaders as well as strategies of leadership in a wide variety of settings. Offered: jointly with PB AF 498.

**POL S 473 Decision-Making in Politics (5) I&S** Process of decision-making in politics at elite and mass levels, comparison of approaches based on the comprehensive rationality of decision makers with approaches based on limitations on the cognitive capacities of decision makers. Applications to real decision-making situations.

**POL S 474 Government and the Economy (5) I&S** Interaction between politics and the economy. Impact of policy makers on economic performance. Models of partisan and political business cycles. Concepts of economic voting. Marxist theories of modern capitalist economics. Recommended: ECON 201; MATH 124 or MATH 134.

**POL S 475 Public Choice (5) I&S** Problems and prospects for collective action in a political democracy. Designing rules and institutions for effective central authority and effective constraints on governmental power. Social choice theory and game theory. Recommended: POL S 270 or POL S 474.

**POL S 476 Strategy in Politics (5) I&S** Explores the problem of finding fair methods for making social decisions, and examines alternative methods of social choice. Emphasis on the importance of agenda control for outcomes, and the implications of theories of social choice for common interpretations of concepts such as democracy and the general will. Recommended: POL S 101 or POL S 202; POL S 481.

**POL S 481 Big City Politics (5) I&S** Contemporary big city politics, focusing on Seattle and the largest twenty-five cities. Social, economic, and political trends that have shaped characteristics of large American cities. Distribution and use of economic and political power among parties and groups. Future of large cities and politics of change.

**POL S 488- Honors Senior Thesis (5-) I&S** Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

**POL S -489 Honors Senior Thesis (-5) I&S** Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

**POL S 490 Foundations of Political Analysis (5) I&S** Fundamental issues pertaining to research in political science: "logics of inquiry," problems of concept formation, and development of research methods. Positivist, postempiricist, and other arguments about the nature of scientific knowledge.

**POL S 491 Political Research Design and Analysis (5) I&S** Major quantitative methods of empirical research in political science. Primary emphasis on research design, data collection, data analysis, and use of computers.

**POL S 492 Advanced Political Research Design and Analysis (5) I&S** Third methods course in political research. Testing theories with empirical evidence. Examines current topics in research methods and statistical analysis in political science. Content varies according to recent developments in the field and with interests of instructor.

**POL S 493 Qualitative Research Methods (5) I&S** Introduction to qualitative methods in political science, emphasizing practical experience with techniques. Readings and exercises cover research design, multiple methods, varieties of qualitative data, measurement and validation, participant observation, interviewing, and content analysis. Research decision-making issues include analytical strategies, presentation of data, ethics, epistemology, and theory-building.

**POL S 496 Undergraduate Internship (5, max. 15)** Students serving in approved internships.

**POL S 497 Political Internship in State Government (5, max. 20)** Students serving in approved internship program with state government agencies.

**POL S 498 The Washington Center Internship (15)** Full-time academic internship with the Washington Center in Washington, DC Includes internship activities, academic seminar, assemblies, and related activities. Credit/no credit only. Recommended: POL S 202; 45 UW credits.

**POL S 499 Individual Conference and Research (2-5, max. 20)** Intensive study with faculty supervision. No more than one registration in 499 under same instructor.

### Courses for Graduates Only

**POL S 505 Comparative Politics (5)** Core course. Modern theories, approaches, and methods in the study of comparative politics.

**POL S 509 Political Theory—Core (5, max. 10)** Introduction to central themes in political theory and the works of major political theorists, past and present.

**POL S 511 Seminar in Ethical and Political Theory (5)** Ethical writings of major political philosophers. Coherent themes arising from these works and assessment of their impact on concepts of politics.

**POL S 512 Seminar in Nationalism and Political Theory (3)** Nationalism, republics, impact of mass democracy. Growth of internationalism. Role of political philosophy in probing institutions, moral perspectives, and assessing significance of nation-state, international order.

**POL S 514 Selected Topics in Political Theory (5, max. 15)** Selected topics, historical and conceptual, national, regional, and universal. Prerequisite: permission of instructor.

**POL S 515 Political Theory Research Seminar (5)** Survey of paradigmatic research approaches in political theory through the exploration of a theme (canonical text, theoretical concept, and specific topic). Methods covered may include rational choice, psychoanalytic, Straussian, Marxian, and feminist approaches. Students carry out substantive theoretical research. Recommended: second or third year graduate standing.

**POL S 516 Special Topics in American Political Thought (3/5)** Special topics or themes in the development of American political culture.

**POL S 517 Marxism and Critical Theory (5)** Works of Marx and Engels as well as selected works of twentieth-century Marxist and critical theorists. Themes such as Marx's method, twentieth-century interpretations of Marx, and relationship of twentieth-century theorists to their eighteenth- and nineteenth-century forebears.

**POL S 518 Liberalism and Its Critics (5)** Examination of liberal theory and the critiques it has inspired. Focuses on central themes, such as toleration, rights, justice, and democracy, or on specific thinkers, historical or contemporary.

**POL S 519 Modern Scandinavian Politics (5)** Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with SCAND 519.

**POL S 521 International Relations I: Theory and Method (5)** Part one of the core course in the field of international relations. Reviews contemporary theory, research, and methodology in the study of world politics.

**POL S 522 International Political Economy (5)** Theories of international political economy. Focuses on the emergence and development of the modern world system, the transition from feudalism to capitalism, and the institution of the nation-state system. Examines the political economy of trade, investment, and the international division of labor from a variety of theoretical perspectives. Prerequisite: POL S 521.

**POL S 525 International Law—Policy (5)** Inputs of international law into the decisional process in foreign policy. Effect of policy on law. Relevant roles of individuals and institutions in routine and crisis situations. Prerequisite: POL S 423 or permission of instructor.

**POL S 527 Special Topics in International Relations Research (5, max. 15)** Examination of current topics in the theory and practice of world politics. Content varies according to recent developments in the field and research interests of the instructor.

**POL S 528 Advanced International Relations Theory (5)** Covers advanced works in international relations theory. e.g., realism, neorealism, game theory, and theories of cooperation and conflict. Includes some classic works (Thucydides, Hobbes, E. H. Carr) to show continuity of debates in the present. Modern theories of war, conflict, cooperation, and international institutions also explored. Prerequisite: POL S 521.

**POL S 530 Transatlantic Relations: The United States and Europe in World Politics (5)** Fulfills required component of "American Module" of Transatlantic Studies program. Addresses political dynamics of relations between United States and Europe from American republic's founding to post-Cold War era. Limited to students in Transatlantic Studies program.

**POL S 532 The Chinese Political System (5)** Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with SISEA 532.

**POL S 533 Seminar on Contemporary Chinese Politics (5)** Research on selected problems in contemporary Chinese politics. Prerequisite: POL S 532 or permission of instructor. Offered: jointly with SISEA 533.

**POL S 534 International Affairs (3)** Provides a broad understanding of international issues and United States policy. Students explore US foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 534/SIS 534.

**POL S 535 International Relations of Modern China (5)** Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with SISEA 535.

**POL S 536 Ethnic Politics and Nationality Formation (3)** Seminar on analysis and theoretical understanding of two interrelated processes: ethnic group persistence and change over time; and the transformation of ethnic groups into politically self-conscious and influential nationalities. The readings and discussions deal with these two processes in the contexts of both developing societies and advanced industrial societies.

**POL S 537 Approaches to East European Politics (3-5)** Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and southeastern Europe. Prerequisite: permission of instructor. Offered: jointly with SISRE 504; alternate years.

**POL S 538 Government and Politics in the Middle East and North Africa (5)** Political change in the area within the context of comparative politics; breakdown of traditional political systems; new range of choice expressed in competing ideologies; governmental and nongovernmental instrumentation of change; and problems of international relations and regional conflict and integration.

**POL S 539 International Relations of Northeast Asia (5)** Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with SISEA 551.

**POL S 542 Seminar: State and Society (5)** Examines the mutually conditioning relationship between states and the societies they seek to govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with SIS 542.

**POL S 544 Problems in Comparative Government (5, max. 15)** Selected problems in the comparative analysis of political institutions, organizations, and systems.

**POL S 547 Politics of Reform (5)** Examines cases of reform in democratic political systems, e.g., Roosevelt's New Deal, Allende's Chilean "revolution," Mitterrand's socialist experiment in France, and the Thatcher government in Britain.

**POL S 548 Comparative Political Parties (3)** Role of political parties in the modern state. Similarities and differences in origins and development of political parties and functions they perform, both in established democracies and in developing countries.

**POL S 550 American Politics—Core (5)** Core course in American government and politics. Systematic survey of the literature; focuses on national politics. Prerequisite: undergraduate courses in American government and politics.

**POL S 551 Political Communication (5)** Survey of contemporary and some historical political communications research, emphasizing quantitative aspects. Includes discussions and demonstrations of experimental, survey, aggregate, and content analysis methods. Designed to foster substantive comprehension of political communication literature, familiarity with research techniques and creation of empirical projects.

**POL S 554 Legislative Politics (5)** Selected problems in legislative processes and leadership, state and national.

**POL S 561 Law and Politics (5)** Points and levels at which law and politics intersect. What is distinctive about legal forms; how these legal forms influence, and are influenced by, politics. Conceptions of law, courts and public policy, law and bureaucracy, civil and criminal justice, and the legal profession.

**POL S 562 Law, Politics, and Social Control (5)** Explores works of social scientists and lawyers regarding these competing conceptions of social control: as the seamy side of law—reinforcing equitable patterns of domination and disciplining deviants; as law embodying society's basic values, articulating minimum rules for harmonious social interaction.

**POL S 563 Supreme Court in American Politics (5)** Explores the tendency in the United States to turn to the Supreme Court to provide constitutional solutions for some of our biggest social, economic, and political problems. Focuses on the controversies concerning the legitimacy and capacity of the Supreme Court to intervene in American politics and public policy.

**POL S 564 Law and the Politics of Social Change (5)** Explores the many ways that law figures into the politics of social struggle and reform activity. Analyzes law in terms of particular state institutions (courts, agencies), professional elites (lawyers, judges), and especially cultural norms ("rights" discourses) that are routinely mobilized by reform-movement activists.

**POL S 566 Problems in Comparative Legal Institutions (3)** Social science inquiry in comparative legal institutions. Worldwide scope, with attention to both theory of law in society and development and practice of legal institutions.

**POL S 571 American National Institutions (5)** Answers the question, "Do institutions matter?" Surveys American national institutions from theoretical perspectives, focusing on how they affect the manner in which decisions are made. Employs cross-institutional perspective of American institutions.

**POL S 572 Administrative and Executive Leadership (3)** Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered: jointly with PB AF 503.

**POL S 573 Topics in Public Policy (5, max. 10)** Specialized research topics with a policy process or related theoretical content.

**POL S 574 Environmental Regulation Policy (5)** Scholarly and practical aspects of environmental regulation. Examines literature concerning regulatory policy design, policy instruments, federalism, compliance and enforcement. Studies selected federal, state, and other nations' environmental policies. Participants are expected to have a good understanding of American policy processes.

**POL S 575 Public Policy Processes (5)** Political science frameworks, approaches, and theories concerning development and implementation of public policies within American political systems. Governmental behaviors and processes, including rational, political, and bureaucratic models of governmental decision making; agenda-building processes; and normative perspectives concerning role of governmental entities. Offered: jointly with PB AF 575.

**POL S 582 The Political Economy of Social Change (5)** Social change and property rights theory. Exploration of long-term secular change through works whose approaches derive from neo-classical economics and analytical Marxism. Evolution and transformation of property rights over land, labor, and capital and the consequences of the property rights structure for political and economic institutions.

**POL S 583 Economic Theories of Politics (5)** Problems of public goods provision and collective action. Collective action theories and applications as well as critical review of the concept of rationality.

**POL S 587 Politics of Urban Reform (5)** Interpretations of urban reformers at turn of this century and during 1960s and 1970s. Historical and political science literature on the subject. Prerequisite: graduate student standing and permission of instructor.

**POL S 589 Special Topics in Political Economy (3, max. 9)** Evaluating research in political economy as well as developing research problems. Topics vary with instructor and with current problems in the literature. Prerequisite: POL S 406, POL S 416, ECON 400, and permission of instructor.

**POL S 590 Seminar in Political Behavior (5, max. 10)** Analysis of behavioral research in selected fields of political science.

**POL S 593 Theories of Decision Making (5)** Explanation of political decisions using models of such theoretical processes as preference formation, learning, heuristics, noncooperative games, collective action, agenda manipulation, and coalition formation. Examination of competing notions of political rationality and irrationality and criteria for their evaluation. Strategies for design of decision research. Prerequisite: POL S 491 or permission of instructor.

**POL S 595 College Teaching of Political Science (1)**

**POL S 597 Directed Readings (1-10, max. 10)** Intensive reading in the literatures of political science, directed by the chair of the doctoral supervisory committee. Credit/no credit only.

**POL S 598 Independent Writing I (1-5, max. 5)** Supervised research and writing for graduate students completing the MA essay of distinction.

**POL S 599 Independent Writing II (3-5)** Supervised research and writing for graduate students completing the Ph.C. essay of distinction.

**POL S 600 Independent Study or Research (\*)**

**POL S 800 Doctoral Dissertation (\*)**

## Society and Justice

**SO JU 400 Seminar in Society and Justice (3, max. 6) I&S** Aspects of the administration of justice.

**SO JU 401 Field Experience in Society and Justice (5)** Participant observation in some public or private agency relevant to the system of justice.

**SO JU 405 Introduction to Organized and White Collar Crime (3) I&S** Overview of organized and white collar crime. Exposure to definitional problems, distinctive characteristics, potential areas of overlap, and barriers to more effective social control. Addresses impediments resulting from inadequate conceptualizations, legal and operational difficulties in pursuing offenders, and effects of corruption and discretion in the justice system.

**SO JU 425 Introduction to the American Court System (3) I&S** Philosophical and structural bases of the American court system; roles of attorneys, judges and the public in that system. Some focus also on current challenges to the courts posed by court congestion and alternative dispute resolution, and on future prospects for the courts.

**SO JU 430 The Police (5) I&S** Conceptual and empirical issues concerning multifaceted and changing roles of the American police.

**SO JU 440 Criminal Law and Procedure (4) I&S** Substantive and procedural criminal law for lay persons; analysis of the philosophy behind the law, with an emphasis on due process in adult and juvenile courts; case-analysis teaching technique.

**SO JU 450 Special Topics in Society and Justice (1-5, max. 15) I&S** Examination of various current topics or issues concerning the criminal justice system in our society.

**SO JU 473 Corrections (5) I&S** Analyzes research on diversionary methods, treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution, probation, parole, halfway houses, other alternatives to incarceration; correctional institutions. Organization of state, federal systems. Problems of administration. Subsidies, governmental control. Planning, public participation. Recommended: SOC 371 and SOC 372. Offered: jointly with SOC 473.

**SO JU 499 Readings in Society and Justice (1-5, max. 10)** Individual readings in society and justice.

## Psychology

119 Guthrie



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/psychology.html](http://www.washington.edu/students/gencat/academic/psychology.html)



Department Web page:  
[depts.washington.edu/psych/](http://depts.washington.edu/psych/)

Psychology involves the scientific study of behavior and its causes and the understanding of human behavior in a variety of settings. Psychology is studied either as a natural science, which stresses physical and biological causes of behavior, or as a social science, which stresses the effects of the social setting on human behavior. Major areas of emphasis are human cognition, animal behavior, physiological and sensory bases of behavior, personality and clinical psychology, developmental psychology, social psychology, and quantitative techniques. The department does not have formal programs in educational, school, or counseling psychology (see the College of Education section of this catalog); engineering psychology; or industrial psychology.

## Graduate Program

Graduate Program Coordinator  
219 Guthrie, Box 351525  
(206) 543-4612  
[psygrad@u.washington.edu](mailto:psygrad@u.washington.edu)

Graduate work in psychology is organized primarily as preparation for the Doctor of Philosophy degree. The optional Master of Science degree is taken by some doctoral students in the course of their work toward the doctorate.

For graduate instruction, the department is organized into six major areas of study: animal behavior, adult and child clinical, cognition and perception, developmental, physiological, and social psychology and personality. Specialization also exists in the subareas of community, law, sport, and quantitative psychology.

The program in clinical psychology is accredited by the American Psychological Association and provides scientific and professional training.

## Admissions Qualifications

An undergraduate degree in psychology is desirable, but not required. Some preparation in biological, social, or quantitative sciences is strongly advised. Applicants are judged on a number of criteria, including academic and research backgrounds, Graduate Record Examination scores, and written evaluations submitted by former professors or supervisors. Students with little training in psychology may be required to complete preliminary work in undergraduate courses. Admission of new students occurs in autumn quarter. The deadline for receipt of admissions material is December 31.

## Master of Science (Optional)

A master's-degree-only program is not available. Doctoral students have the option of obtaining a master's degree while working toward the Ph.D.

*Graduation Requirements:* Completion of first-year graduate program (see Doctor of Philosophy degree requirements below) and an appropriate research program, including a research thesis.

## Doctor of Philosophy

*Graduation Requirements:* Completion of course work in major and out-of-area requirements, completion of required course work in statistics and general methodology, independent research, General Examination, dissertation, and Final Examination. Minimum 3.00 GPA overall must be maintained; a minimum grade of 3.0 is required for all courses used to satisfy breadth and minor requirements. *First-year requirements:* Demonstrate competence in statistics and experimental design; complete at least 3 credits of independent predoctoral research and report that research at the department's annual Research Festival.

## Special Research Facilities

Facilities for research and graduate instruction include teaching laboratories; machine, electronic, and carpentry shops; microprocessor room; animal vivarium; darkroom; remote-access console to computer center; and approximately 60 small, specialized laboratory research rooms.

## Assistantships, Fellowships, or Traineeship Opportunities

Research and teaching assistantships are available to qualified graduate students. Additional traineeships and fellowships are also available.

## Faculty

### Chair

Michael D. Beecher

### Professors

Barash, David P. \* 1975; MA, 1968, PhD, 1970, University of Wisconsin; sociobiology, psychological aspects of nuclear war, peace studies, animal behavior and evolution.

Barnard, Kathryn E. \* 1972, (Adjunct); MSN, 1962, Boston University; PhD, 1972, University of Washington; ecological factors of child development.

Becker, Joseph \* 1965, (Emeritus); PhD, 1958, Duke University; psychosocial aspects of depression.

Beecher, Michael D. \* 1978; MA, 1965, PhD, 1970, Boston University; animal communication, animal behavior, sensory processes.

Bernstein, Ilene L. \* 1974; MA, 1967, Columbia University; PhD, 1972, University of California (Los Angeles); behavioral neuroscience, mechanisms affecting appetite and taste preference.

Booth, Cathryn L. \* 1980, (Adjunct Research); PhD, 1974, Ohio State University; mother-infant interaction, observational methodology, child birth experiences and attachment.

Brenowitz, Eliot A. \* 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Carr, John E. \* 1963; PhD, 1963, Syracuse University; clinical health psychology, behavioral medicine.

Casseday, John H. \* 1996, (Research); MA, 1963, PhD, 1970, Indiana University; neuroethology of sensory systems, echolocation and function of auditory mid-brain.

- Cauce, Ana Mari \* 1986; PhD, 1984, Yale University; community/developmental psychology, socialization of children/adolescents of color, ethnic identity.
- Chapman, C. Richard \* 1971, (Adjunct); PhD, 1969, University of Denver; human pain measurement, psychophysiology, sensation and perception, chronic pain.
- Curry, Susan J. \* 1981, (Adjunct); MA, 1979, PhD, 1981, University of New Hampshire; health behavior change.
- Dale, Philip S. \* 1968, (Affiliate); PhD, 1968, University of Michigan; psycholinguistics, language and cognitive development in normal and exceptional children.
- Dawson, Geraldine \* 1985; PhD, 1979, University of Washington; developmental disabilities, autism, and neuropsychology.
- Diaz, Jaime \* 1978; PhD, 1975, University of California (Los Angeles); brain development, developmental psychopharmacology, neurophysiology.
- Doerr, Hans O. \* 1967, (Emeritus); PhD, 1965, Florida State University; psychophysiology of central and autonomic nervous systems, neuropsychology.
- Donovan, Dennis 1981, (Adjunct); MA, 1972, Western Washington University; PhD, 1980, University of Washington; cognitive-behavioral factors in substance abuse and addictive behaviors.
- Fiedler, Fred E. \* 1969, (Emeritus); PhD, 1949, University of Chicago; leadership and group effectiveness, social, industrial, and organizational psychology.
- Fuchs, Albert F. \* 1969, (Adjunct); PhD, 1966, Johns Hopkins University; oculomotor physiology.
- Gottman, John M. \* 1986; PhD, 1971, University of Wisconsin; development of children's friendships, marriage and family, observational research techniques.
- Greenberg, Mark T. \* 1977, (Affiliate); PhD, 1978, University of Virginia; developmental psychopathology, prevention of mental disorders in childhood.
- Greenwald, Anthony G. \* 1986; PhD, 1963, Harvard University; social cognition, attitudes, self and self-esteem, methodology, unconscious cognition.
- Guralnick, Michael J. 1986; MS, 1964, PhD, 1967, Lehigh University; developmental disabilities, peer relations, social and language development, evaluation systems.
- Heiman, Julia R. \* 1980, (Adjunct); PhD, 1975, State University of New York (Stony Brook); sexuality and sexual relationships, prevention and treatment of family abuse.
- Hunt, Earl B. \* 1966; PhD, 1960, Yale University; individual differences in cognition, cognition in education and the workplace.
- Keating, John P. \* 1972, (Affiliate); PhD, 1972, Ohio State University; social psychology, media effect on attitude, psychology and religion, emergency behavior psychology.
- Kiyak, H. Asuman \* 1972, (Adjunct); MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.
- Kuhl, Patricia K. \* 1976, (Adjunct); MA, 1971, PhD, 1973, University of Minnesota; speech perception.
- Linehan, Marsha M. \* 1977; PhD, 1971, Loyola University (Chicago); personality disorders, including borderline; suicidal behaviors, cognitive and behavior therapies.
- Lockard, Joan S. \* 1962; PhD, 1963, University of Wisconsin; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior.
- Loftus, Elizabeth F. \* 1973; PhD, 1970, Stanford University; cognition, long-term memory, eye-witness testimony, psychology and law.
- Loftus, Geoffrey R. \* 1972; PhD, 1971, Stanford University; perception, cognitive processes and information processing, computer control of experimentation.
- Lunneborg, Clifford E. \* 1962, (Emeritus); PhD, 1959, University of Washington; psychometrics, multivariate models, individual differences in cognition.
- Marlatt, G. Alan \* 1972; PhD, 1968, Indiana University; health psychology and addictive behaviors (relapse prevention and harm reduction).
- McCauley, Elizabeth 1979, (Adjunct); PhD, 1973, State University of New York (Buffalo); clinical and developmental psychology.
- McMahon, Robert J. \* 1987; PhD, 1979, University of Georgia; developmental psychopathology, prevention, family interaction, tobacco use in youth.
- Meltzoff, Andrew N. \* 1977; PhD, 1976, Oxford University (UK); cognitive and social development of human infants.
- Mitchell, Terence R. \* 1969; PhD, 1969, University of Illinois; organizational behavior.
- Morrison, Diane M. \* 1980, (Adjunct Research); PhD, 1982, University of Washington; sexual decision-making, attitudes and behavior, teen pregnancy.
- Patterson, David R. \* 1984, (Adjunct); PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.
- Robinson, Nancy M. \* 1969, (Adjunct); PhD, 1958, Stanford University; developmental psychology, giftedness.
- Rubel, Edwin W. \* 1986, (Adjunct); PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.
- Sackett, Gene P. \* 1970; PhD, 1963, Claremont Graduate School; primate behavior, early experience and development.
- Sarason, Irwin G. \* 1956; PhD, 1955, Indiana University; personality, social support, stress and anxiety.
- Sax, Gilbert \* 1965, (Emeritus); PhD, 1958, University of Southern California; measurement, statistics and research design.
- Smith, Ronald E. \* 1973; PhD, 1968, Southern Illinois University; clinical psychology, personality, stress and coping, human performance enhancement.
- Smoll, Frank L. \* 1976; PhD, 1970, University of Wisconsin; sport psychology, leadership behavior in youth sports, psychological correlates of motor development.
- Speltz, Matthew L. 1981, (Adjunct); MA, 1975, Western Washington University; PhD, 1980, University of Missouri; developmental psychotherapy, family therapy, pediatric behavioral medicine.
- Spieker, Susan J. \* 1983, (Adjunct Research); PhD, 1982, Cornell University; developmental psychology, infant security, mother-infant interaction.
- Streissguth, Ann P. 1972, (Adjunct); MA, 1959, University of California (Berkeley); PhD, 1964, University of Washington; psychology and behavioral teratology.
- Teller, Davida Y. \* 1965; PhD, 1965, University of California (Berkeley); vision, color vision, development of vision in infants.
- Teri, Linda \* 1984, (Adjunct); PhD, 1980, University of Vermont; dementia, healthy aging and intervention research, depression and anxiety.
- Townes, Brenda D. \* 1961, (Adjunct); PhD, 1970, University of Washington; psychology.
- Vitaliano, Peter P. \* 1978, (Adjunct); PhD, 1975, Syracuse University; stress and coping.
- Vitiello, Michael V. \* 1982, (Adjunct); PhD, 1980, University of Washington; sleep, sleep disorders and circadian rhythms in aging, age-related neuroendocrine/cognitive change.
- Weinstein, Philip \* 1972, (Adjunct); PhD, 1971, University of Kentucky; dental behavioral science; dental fear and pain in children, adults, and early childhood cases.
- Westrum, Lesnick E. \* 1966, (Adjunct); MD, 1963, University of Washington; PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

### Associate Professors

- Baer, John S. \* 1985, (Research); PhD, 1986, University of Oregon; clinical psychology, addictive behaviors, early intervention.
- Bassok, Miriam \* 1997; MA, 1978, PhD, 1984, Hebrew University (Israel); cognitive psychology, focus on learning, problem solving, and analogical reasoning.
- Bowen, Deborah J. \* 1986, (Adjunct); PhD, 1986, Uniformed Service University of the Health Sciences; health psychology.
- Brown, Jonathon D. \* 1989; PhD, 1986, University of California (Los Angeles); self-concept and social behavior; stress and physical health.
- Buck, Steven L. \* 1979; PhD, 1976, University of California (San Diego); human visual psychophysics, perception, human and animal learning.
- Burns, Edward M. \* 1984, (Adjunct); PhD, 1977, University of Minnesota; psychoacoustics.
- Corina, David P. \* 1993; PhD, 1991, University of California (San Diego); functional neuroimaging, cognitive neuropsychology, psycholinguistics, sign-language processing.
- Covey, Ellen \* 1996; MS, 1976, University of Houston; PhD, 1980, Duke University; structure and function of the central auditory system, echo location.
- Craft, Suzanne \* 1994, (Adjunct); PhD, 1985, University of Texas (Austin); neuropsychology of attention and memory in aging and Alzheimer's disease.
- Culbert, Sidney S. \* 1955, (Emeritus); PhD, 1950, University of Washington; perception, psycholinguistics, intercultural communication.
- Douglas, Robert J. \* 1968; PhD, 1964, University of Michigan; neuropsychology of learning and memory, aging and inhibition.
- Fitts, Douglas A. \* 1981, (Research); PhD, 1978, Washington State University; neurobiology, salt/water regulation, thirst.
- Frey, Karin S. \* 1983, (Adjunct Research); PhD, 1978, University of Washington; educational psychology, relationships between social cognitions and behaviors.
- George, William H. \* 1990; PhD, 1982, University of Washington; alcohol effects on social/sexual behavior, treatment and cultural issues in addiction.
- Gillmore, Gerald M. \* 1973, (Affiliate); PhD, 1970, Michigan State University; measurement theory, assessment of student performance, program evaluation.
- Ginorio, Angela B. \* 1981, (Adjunct); PhD, 1979, Fordham University; women and/in science, violence and women, socially defined identities, psychology issues for Latinas.
- Gonzalez, Richard D. \* 1990, (Affiliate); PhD, 1990, Stanford University; judgment and decision making, measurement statistics, group dynamics, psychology and law.
- Ha, James C. \* 1993, (Research); PhD, 1989, Colorado State University; animal behavior, behavioral ecology, infant primate development.

Kahn, Peter H., Jr. 2000, (Research); PhD, 1988, University of California (Berkeley); social cognition and development; multicultural psychology, environmental psychology.

Katz, Lynn Fainsilber 1991, (Research); PhD, 1988, University of California (Berkeley); antisocial children, social psychophysiology, family interaction, parent-child interaction.

Kenney, Nancy J. \* 1976; PhD, 1974, University of Virginia; neural and endocrine controls of food and fluid intake, physiological basis of motivation.

Kerr, F. Beth \* 1974; PhD, 1974, University of Oregon; cognition, human motor control and learning, attention, human factors.

Kivlahan, Daniel R. \* 1983, (Adjunct); PhD, 1983, University of Missouri; evaluating assessment, prevention, and treatment approaches for addictive behaviors.

Kohlenberg, Robert J. \* 1968; PhD, 1968, University of California (Los Angeles); behavior modification, learning, clinical behavior analysis, psychotherapy process.

Miyamoto, John M. \* 1984; PhD, 1985, University of Michigan; mathematical models of mental processes, inductive reasoning and decision making.

Mizumori, Sheri J. 2000; PhD, 1985, University of California (Berkeley); neurobiology of learning and memory.

Olavarria, Jaime F. \* 1990; MD, 1974, State University of Chile; PhD, 1984, University of California (Berkeley); visual system: anatomy and physiology, comparative and developmental studies.

Osterhout, Lee E. \* 1991; PhD, 1990, Tufts University; psycholinguistics, cognitive psychophysiology.

Ramsay, Douglas S. \* 1983, (Adjunct); DMD, 1983, University of Pennsylvania; PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Rose, Richard M. \* 1966, (Emeritus); PhD, 1964, University of Pennsylvania; stochastic models, psychophysics, sleep.

Shoda, Yuichi \* 1996; PhD, 1990, Columbia University; social and personality psychology, social cognition, health and coping.

Unis, Alan S. \* 1987, (Adjunct); MD, 1976, University of Pittsburgh; early-onset psychopathology resulting from disrupted brain development.

### Assistant Professors

Brown, Joseph L. 1999, (Acting); PhD, 1999, Stanford University; sociocultural influences on intellectual performance and identity, stereotyping and decision making.

Canfield, James G. 2000, (Research); PhD, 1995, University of Utah; neuroethical approach to the study of brain-behavior relationships.

Carlson, Stephanie M. \* 1998; PhD, 1997, University of Oregon; cognitive and social development in preschool children.

Jones, Theresa A. \* 1996; PhD, 1992, University of Texas (Austin); behavioral and neural plasticity after brain damage.

Kyes, Randall C. \* 1993, (Research); PhD, 1989, University of Georgia; animal behavior, primate behavior and cognition, conservation biology.

Larimer, Mary E. \* 1987, (Research); PhD, 1992, University of Washington; prevention of alcohol problems among college students.

Lengua, Lilianna J. \* 1993; PhD, 1994, Arizona State University; child-clinical, community psychology; contextual/family/individual predictors of child adjustment.

O'Donnell, Sean \* 1996; PhD, 1993, University of Wisconsin; genetic and hormonal effects on behavior in social insects.

Richards, Jane M. 2000; PhD, 2000, Stanford University; how emotion regulation affects cognitive performance, social relationships, and personality processes.

Rudd, Michael \* 1998; PhD, 1987, University of California (Irvine); quantitative psychology, statistics and mathematical modeling.

von der Emde, Gerhard 2000; PhD, 1987, Eberhard-Karls-Universität Tübingen (Germany); neuroethology, neural basis of animal behavior and animal sensory capabilities.

### Senior Lecturers

Barrett, Kimberly \* 1990; EdD, 1989, University of San Francisco; adolescent substance abuse, child development, parent education, ethnic identity development.

Fagan, Corey N. \* 1989; PhD, 1988, University of Massachusetts; psychotherapy effectiveness, program evaluation, psychotherapy for adults and adolescents.

McDermott, Lois J. 1984; PhD, 1979, University of Chicago; human sexuality and reproductive physiology.

Passer, Michael W. \* 1977; MA, 1972, PhD, 1977, University of California (Los Angeles); social psychology, organizational psychology, teaching of psychology.

### Lecturers

Joslyn, Susan L. 1988; PhD, 1995, University of Washington; cognition, autobiographical memory, multitasking, applied issues.

Little, Laura M. 1997; PhD, 1998, University of New Mexico; quantitative methodology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**PSYCH 400 Learning (5) I&S/NW** Experimental research and basic theories primarily in animal learning. Prerequisite: either PSYCH 101 or PSYCH 102.

**PSYCH 401 Observing Interaction (4) I&S** *Gottman* Surveys the methods of systematic observational research for the study of interaction. Emphasis on summarizing quantitative data for analysis of pattern and sequence, and for theory development. Prerequisite: PSYCH 101; PSYCH 209.

**PSYCH 402 Infant Behavior and Development (3/5) I&S** *Meltzoff* Psychological development in the first two years of life. Basic and advanced techniques for assessing psychological development in infancy. Classic theories of human infancy and examination of a wide range of new experiments about infant behavior and development. Prerequisite: either PSYCH 306 or PSYCH 414. Offered: A.

**PSYCH 403 Motivation (5) I&S/NW** Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: either PSYCH 101 or PSYCH 102.

**PSYCH 405 Advanced Personality: Theory and Research (5) I&S** Intensive survey of theoretical concepts and detailed review of experimental methods and experiments in the field of personality. Prerequisite: PSYCH 205.

**PSYCH 407 History of Psychology (5) I&S** Historical and theoretical background of the basic assumptions of modern psychology, including such doctrines as behaviorism, determinism, and associationism and the scientists who developed them. Prerequisite: either PSYCH 101 or PSYCH 102.

### PSYCH 408 Mechanisms of Animal Behavior (4)

**NW** *Beecher, Brenowitz* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either PSYCH 200, BIOL 102, or BIOL 203. Offered: jointly with ZOO 408; W.

### PSYCH 409 Sociobiology (5) NW

*Beecher, Rohwer* Biological bases of social behavior, emphasizing evolution as a paradigm. Topics are: individual versus group selection, kin selection, altruism, group versus individual living, mating systems, parental care of offspring, and competitive strategies. Prerequisite: either PSYCH 200 or both BIOL 202 and BIOL 203. Offered: jointly with ZOO 409.

### PSYCH 410 Child and Adolescent Behavior Disorders (5) I&S

*McMahon* Introduction to psychopathology in children and adolescents, and an overview of principal modes of intervention. Particularly for students interested in advanced work in clinical psychology, social work, or special education. Prerequisite: PSYCH 305; PSYCH 306. Offered: WS.

### PSYCH 412 Behavioral Genetics (4) NW

*O'Donnell* Role of genetics in determining variation in human and animal behavior and in regulating behavioral development. Techniques for quantifying genetic variation, behavioral effects, and gene expression. Prerequisite: either PSYCH 200 or both BIOL 202 and BIOL 203. Offered: W.

### PSYCH 414 Cognitive Development (5) I&S

*Batterson* Key theoretical and research approaches to cognitive development from infancy through adolescence. Sensorimotor development, language development, imitation, number concepts, logical reasoning, memory, cognition in adolescents, intelligence, and the role of biology, environment, and experience. Prerequisite: PSYCH 209; PSYCH 306.

### PSYCH 415 Personality Development of the Child (5) I&S

*Carlson* Socialization theory and research, infant attachment and social relationships, development of aggressive and altruistic behaviors, sex-role development, moral development, parent and adult influences. Applied issues in social development and policy. Prerequisite: PSYCH 306.

### PSYCH 416 Animal Communication (5) NW

*Beecher, Brenowitz* Evolution and mechanisms of animal communication and related processes of perception, thinking, and social behavior. Prerequisite: either PSYCH 200, BIOL 102, or BIOL 203.

### PSYCH 417 Human Behavior as a Natural Science (5) I&S/NW

*Lockard* Evolution of human social behavior and the adaptive significance of communication systems from a sociobiological and anthropological perspective. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: WS.

### PSYCH 418 Primate Social Behavior (5) NW

*Lockard* Social behavior, ecology, and group structure of monkeys and apes from an evolutionary, sociobiological, and anthropological perspective. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: Sp.

### PSYCH 419 Behavioral Studies of Zoo Animals (5, max. 10) NW

*Lockard* Observational studies of behavior of zoo animals to expand basic knowledge of animal behavior, conservation of endangered species, and research methodology with discussions and tours focusing on zoo philosophy and operations. Offered in cooperation with Woodland Park Zoo. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: AS.

**PSYCH 420 Drugs and Behavior (3) NW** *Diaz* Animal and clinical research on the behavioral consequences of drug intake. Prerequisite: PSYCH 322.

**PSYCH 421 Neural Basis of Behavior (5) NW** *Diaz* Anatomical and physiological principles and resultant behavior involved in the integrative action of the nervous system. 431 recommended but not required to follow 421. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: AS.

**PSYCH 422 Physiological Psychology (5) NW** *Douglas* Physiological mechanisms in behavior, including those basic to emotion, fatigue and sleep, learning, and memory. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: Sp.

**PSYCH 423 Sensory Basis of Behavior (5) NW** *Olavarria* Study of sensory mechanisms as a way to understand behavior. Basic properties of neurons, anatomy, and physiology of sensory systems, with some emphasis on the visual system. Prerequisite: either PSYCH 222 or PSYCH 333. Offered: W.

**PSYCH 424 Vision and Its Physiological Basis (5) NW** *Teller* Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: either PSYCH 101, PSYCH 102, BIOL 202, or ZOOL 301. Offered: jointly with P BIO 424; W.

**PSYCH 425 Surgical and Histological Techniques (5) NW** Practicum in basic and advanced surgical and histological techniques used in psychophysiological experimentation. Prerequisite: PSYCH 421.

**PSYCH 426 Neurobiology of Learning and Memory (4) NW** *T. Jones* Theory and research on how animals learn and remember, including basic concepts of brain plasticity, how brain areas and neurons adapt to changes in experiences throughout the lifespan, and cellular and structural substrates of a "memory." Prerequisite: either PSYCH 222, PSYCH 322, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423.

**PSYCH 427 Behavioral Endocrinology (5) NW** *Lattermann* The endocrine system and how its secretions influence and are influenced by behavior; relationships between the nervous and endocrine systems. Prerequisite: PSYCH 421.

**PSYCH 428 Human Motor Control and Learning (5) I&S/NW** *Kerr* Current theory and research in human motor performance and skill acquisition. Prerequisite: PSYCH 101 or PSYCH 102; recommended: PSYCH 209. Offered: W.

**PSYCH 429 Brain Anatomy for the Behavioral Scientist (1) NW** *Diaz* Detailed review of the neuroanatomical features of the sheep brain with laboratory demonstrations. Prerequisite: PSYCH 421 which may be taken concurrently. Offered: A.

**PSYCH 430 Development of Brain Connections (4) NW** *Olavarria* Analysis of innate and environmental factors that play a role in the development of brain connections. Critical review of current literature on the various strategies used by neurons to find their appropriate targets. Prerequisite: either PSYCH 222, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423. Offered: Sp.

**PSYCH 433 Regulatory Behavior (4) NW** *Kenney* Neural and endocrine mechanisms in the control of food and water intake and the regulation of body weight and fluid balance. Prerequisite: either PSYCH 421 or PSYCH 427.

**PSYCH 436 Developmental Aspects of Sport Competition (4) I&S** *Smoll* Biophysical and psychosocial influences of sport participation on growth and development of children and youth. Competition readiness, injuries, stress, aggression, roles and responsibilities of parents and coaches. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: AS.

**PSYCH 437 Motor Development (4) NW** *Smoll* Analysis of motor development from prenatal origins through adolescence with emphasis on relations between biophysical and psychosocial development of children and youth. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: Sp.

**PSYCH 441 Perceptual Processes (5) I&S/NW** Theory and findings in perception with a focus on visual perception in humans. Discrimination and constancy for simple judgments, segregation and identification of visual objects, and specific areas of investigation such as reading and computer vision. Prerequisite: PSYCH 333.

**PSYCH 445 Theories of Social Psychology (5) I&S** *JD Brown* Evaluation of the major theories of human social behavior supported by the empirical literature; theories of social cognition and thought; major theories of social interaction, group processes, and social learning. Prerequisite: PSYCH 345.

**PSYCH 446 Personality Assessment (3) I&S** *R Smith* Measurement of personality variables in personal research, social psychology, and clinical psychology. Theoretical conceptions underlying various clinical and experimental scales and an assessment of their construct validity and behavioral correlates. Prerequisite: PSYCH 205; either PSYCH 213 or PSYCH 217; PSYCH 305.

**PSYCH 447 Psychology of Language II (4) VLPA/I&S** *Corina, Osterhout* Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: jointly with LING 447.

**PSYCH 448 Seminar in Psychology (1-15, max. 15)** Selected research topics of contemporary interest. Quarterly listings of specific offerings are available at departmental advisory office. Offered: AWSpS.

**PSYCH 449 Organizational and Industrial Psychology (3) I&S** *Passer* Examines research on human behavior in industrial and organizational environments. Topics include research methods, job analysis, the prediction of workplace performance, personnel selection and training, performance appraisal, group influences, job satisfaction, job motivation, leadership, and human factors. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: S.

**PSYCH 450- Honors Research Seminar in Psychology (2-, max. 4)** *Teller* Senior thesis research; preparation of senior thesis; oral presentation of research. Four credits of 450 required for all senior honors and distinction candidates in conjunction with 498 and 499. Offered: AWSpS.

**PSYCH 451 Health Psychology (5) I&S/NW** Overview of the psychological and behavioral factors in health and disease. Includes research on both psychological causes and treatments. Topics include stress, risky behaviors, patient-provider interactions, pain, behavioral/medical treatments, and lifestyle interventions. Prerequisite: either PSYCH 101 or PSYCH 102; PSYCH 209; either PSYCH 205, PSYCH 222, PSYCH 305, or PSYCH 345.

**PSYCH 452 Psychology of the Self-Concept (4) I&S** *JD Brown* Examines psychological theory and research on the role of the self-concept in regulating behavior. Topics include the development of the self-concept; self-awareness; and self-esteem maintenance. Prerequisite: PSYCH 345. Offered: W.

**PSYCH 454 Personality and Social Influence (4) I&S** *Shoda* Survey of various theories and research for analyzing person-situation interactions—how the qualities of persons and situations combine to generate thoughts, feelings, and behaviors of a person in a given social situation. Prerequisite: PSYCH 209; either PSYCH 205 or PSYCH 345. Offered: A.

**PSYCH 457 Language Development (5) VLPA/I&S** First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: either PSYCH 306, LING 200, or LING 400. Offered: jointly with LING 457.

**PSYCH 460 Cognitive Neuropsychology (4) NW** *Corina, Osterhout* Discussion of neural systems underlying cognitive behavior with particular focus on breakdown of cognition following brain damage. Topics include object and space perception, language, voluntary movement, attention, and memory. Examination of contributions from related areas of neuroimaging, visual perception, linguistics, physiology, and neuroscience. Prerequisite: either PSYCH 222, PSYCH 333, PSYCH 355, or PSYCH 421.

**PSYCH 462 Human Memory (5) I&S** *Joslyn* Research and theory in key areas of memory. Issues covered include information processing theory, the link between memory processes and their biological underpinnings, autobiographical memory, implicit memory, and the effect of emotion on memory. Prerequisite: PSYCH 209; recommended: PSYCH 355. Offered: A.

**PSYCH 465 Intelligence (5) I&S** *Hunt* Analysis of individual differences in cognition. Includes description/use of psychometric ("intelligence test") models, test scores' relationship to academic and non-academic performance, information processing and biological models of intelligence (including genetic models). Discussion of male-female and demographic group differences in cognition. Prerequisite: either PSYCH 213 or PSYCH 217; PSYCH 355.

**PSYCH 466 Psychology of Judgment and Decision Making (5) I&S** *Miyamoto* Human information processing in judgment and decision making, especially the interface between cognitive theories and normative and prescriptive theories of decision making. Prerequisite: either PSYCH 213 or PSYCH 217; either PSYCH 231, PSYCH 355, or PSYCH 361.

**PSYCH 467 Eyewitness Testimony (3) I&S** *E Loftus* Perception, memory, and retrieval of real world events. The eyewitness in the legal system. Psychologists as expert witnesses regarding eyewitness accounts. Prerequisite: either PSYCH 101 or PSYCH 102; PSYCH 355. Offered: W.

**PSYCH 469 Psychology of Reasoning (4) I&S** *Bassok* Cognitive processes in human learning, problem solving, deductive and inductive reasoning. Prerequisite: either PSYCH 231 or PSYCH 355.

**PSYCH 470 Psychology and Music (5) VLPA/I&S** Introduction to the scientific study of musical behavior. An overview of current topics in the psychology of music from the areas of musical perception and cognition, musical development, music therapy, musical performance, and composition. Includes psychoacoustical and neuropsychological foundations, research methods, and some basic material in music theory. Prerequisite: either PSYCH 101 or PSYCH 102.

**PSYCH 471 Applied Issues in Cognition (4-5, max. 10) I&S** *Joslyn* Examines cognitive issues in applied settings, such as the workplace and education. Topics include such issues as attention, expertise, problem solving, decision-making, human error, automation, navigation, and individual differences. Prerequisite: either PSYCH 355 or PSYCH 462 or PSYCH 469.

**PSYCH 480 Ideas of Human Nature (5) I&S** *Barash* Reviews various approaches to the nature of human nature, including ideas from ancient philosophy, theories of the soul, empiricism, idealism, conditioning, social constructions, concepts of Freud, Marx, the existentialists, and neo-Darwinism. Prerequisite: either PSYCH 101 or PSYCH 102.

**PSYCH 488 Stress and Coping (4) I&S/NW** *Sarason* Reviews theories and research concerning stress and its roles in behavior, personality, development, health, and interpersonal relationships. Coping analyzed as a factor in the way people respond to stressful circumstances. Prerequisite: either PSYCH 205 or PSYCH 305. Offered: Sp.

**PSYCH 489 Clinical Psychology (3) I&S** *George* Basic issues, methods, and research concerning professional issues, psychological assessment, and approaches to psychotherapy and behavioral change. Prerequisite: either PSYCH 205 or PSYCH 305.

**PSYCH 490 Stress Management (3) I&S/NW** Nature of stress. Physiological responses to stress and relaxation. Techniques of stress management with training in relaxation, biofeedback, meditation, cognitive restructuring, exercise, nutrition, interpersonal communication skills, and time management. Credit/no credit only. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: S.

**PSYCH 494 Field Study in Animal Behavior (2-3, max. 9)** *Kyes* Field experience in areas relating to animal behavior through participation in seminar discussion and field exercises and training at foreign and domestic field study sites. Prerequisite: PSYCH 200.

**PSYCH 496 Undergraduate Teaching Experience in Psychology (2-3, max. 6)** Students are trained as assistants in quiz sections or as supplemental tutors for undergraduate psychology courses. Designed especially for those students planning graduate work or education certification. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

**PSYCH 497 Undergraduate Fieldwork (2-5, max. 10)** Individual consultation with faculty member and supervised practicum experience in a broad range of community settings and agencies dealing with psychological problems. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

**PSYCH 498 Directed Reading in Psychology (1-3, max. 18)** Readings in special interest areas under supervision of departmental faculty. Discussion of reading in conference with the instructor. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

**PSYCH 499 Undergraduate Research (1-3, max. 18)** Design and completion of individual research projects. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

### Courses for Graduates Only

**PSYCH 500 Laboratory in Statistical Computation I (2)** *Miyamoto* Techniques of computation using statistical software on personal computers. Organization of data files, transformations of variables, graphical representations of data, descriptive statistics, elementary inferential statistical analyses. Prerequisite: concurrent enrollment in PSYCH 513 or permission of instructor. Offered: A.

**PSYCH 501 Laboratory in Statistical Computation II (2)** Techniques of statistical computation using statistical software on personal computers and mainframe computers. Multiple regression, analysis of

variance and covariance. Planned and post hoc comparisons and confidence intervals. Data analytic diagnostics for violations of regression assumptions. Prerequisite: PSYCH 500 and PSYCH 513, concurrent enrollment in PSYCH 514, or permission of instructor. Offered: W.

**PSYCH 504 Biological Basis of Development (4)** *Bernstein* Embryological, genetic, physiological, and evolutionary perspectives of human development; biological development in infancy; sensory development and its influence on the development of perception; primate models for human development. First quarter of a three-quarter proseminar required for graduate majors in developmental psychology. Offered: A.

**PSYCH 505 Early Cognitive and Linguistic Development (4)** *Meltzoff* Focus on the origins and early development of thought and language. Piagetian theory and modern-day revisions of it emphasized. In depth examination of historical and philosophical bases for current empirical research. Second quarter of a three-quarter proseminar, required for graduate majors in developmental psychology. Offered: W.

**PSYCH 506 Personality and Social Development (4)** *Carlson* Theories and empirical literature in personality and social development throughout infancy, childhood, and adulthood. Third quarter of a three-quarter proseminar required for graduate majors in developmental psychology.

**PSYCH 508 Research Methods in Social Psychology (4, max. 8)** *Greenwald* Examination of methodological, practical, and communication problems associated with research on human behavior. Topics include: selecting research problems, use of theory, types of validity, common sense about statistics, when to replicate, dealing with unpredicted results, strategies for presentation and publication. Offered: Sp.

**PSYCH 510 Advanced Attitude Theory (5)** *Greenwald* Theoretical, methodological, and empirical work on the concept of attitude and its practical applications. Topics include: definition of attitude, measurement of attitudes, information processing theories, functional theories, cognitive structure theories, the self as attitude object, unconscious attitudinal processes. Prerequisite: PSYCH 445 or PSYCH 503; PSYCH 514 or equivalent; or permission of instructor.

**PSYCH 511 Personality (3)** *Shoda, R Smith* Review of personality research. Roles of cognitive, affective, motivational, and psychodynamic processes. Critical evaluation of current personality research as it relates to concepts of personality, its antecedents, and influences over behavior. Attention to role of personality variables in social relationships.

**PSYCH 513 Introduction to Statistics and Data Analysis (4)** *Miyamoto* Basic concepts of statistical theory and methods of data analysis. Emphasis on the integration of statistical theory, statistical computation, and psychological research methods. Required of all first-year graduate students in psychology. Prerequisite: concurrent enrollment in PSYCH 500 or permission of instructor. Offered: A.

**PSYCH 514 Linear Models and Data Analysis (4)** Analysis of data in the behavioral sciences. Required of all first-year graduate majors. Prerequisite: PSYCH 500, PSYCH 513; concurrent registration in PSYCH 501, or permission of instructor. Offered: W.

**PSYCH 515 Modeling Experimental and Observational Data (4)** *Rudd* An introduction to statistical modeling; interactive data analyses; use of regression, ANOVA, logistic regression, and log-linear models in explanatory studies. Prerequisite: PSYCH 514.

**PSYCH 518 Single Subject Design and Research (3)** *Kohlenberg* Single subject designs (reversal, multiple baseline, changing criterion) and their application to clinical cases. Prerequisite: graduate major standing in clinical psychology or permission of instructor. Offered: W.

**PSYCH 519 Statistical Methods in Longitudinal Research (3)** *Sackett* Those aspects of statistics and experimental design unique to, or heavily used in, developmental research; behavioral observation methods, analysis of variance and nonparametric techniques, time series and survival, analysis and repeated measure techniques for studying change over time. Prerequisite: PSYCH 514 or equivalent.

**PSYCH 522 Cognitive Perception (3)** *G Loftus* Current topics in perception, psychophysics, sensory memory, pattern recognition, letter and word perception, and visual masking. Prerequisite: PSYCH 441 and PSYCH 517, or permission of instructor. Offered: Sp.

**PSYCH 523 Cognition (5)** *Hunt* Survey of the major influences on human cognition. Discussion of biological, information processing, and content-based theories of thought. Applications described in memory, language, decision-making, and problem solving. Prerequisite: completion of departmental mathematical and statistical requirement through PSYCH 514.

**PSYCH 524 Cognitive Approaches to Human Memory (3)** *E Loftus* Examination of current topics in human memory from the perspective of cognitive psychology. Prerequisite: PSYCH 355 or permission of instructor. Offered: Sp.

**PSYCH 525 Assessment of Intelligence (5)** *Lengua* Current theory and research on intelligence and intelligence testing; training in administration, scoring, and interpretation of major intelligence tests; ethical issues in assessment. Prerequisite: graduate major standing in child clinical or clinical psychology, or graduate minor standing in child clinical psychology. Offered: Sp.

**PSYCH 526 Psychological Assessment of Children (5)** *Dawson* Assessment techniques appropriate to children, including those for infants, special problems of preschool and school-age children; projective tests, family interviews, and target observational assessment; training in administration of selected techniques. Prerequisite: PSYCH 525 and permission of instructor.

**PSYCH 527 Psychological Assessment of Adults (3)** Training in adult assessment and development of skills in administration, scoring, and interpretation of the Rorschach with some attention to other projective techniques. Prerequisite: PSYCH 525 and permission of instructor.

**PSYCH 533 Teaching of Psychology (3)** *Passer* Examines issues concerning the teaching of psychology, including educational goals, course development, instructional methods, T.A.-student and T.A.-faculty relations, grading, student diversity, and problem situations. Assignments are designed to enhance students' organizational, presentational, and problem-solving skills. Credit/no credit only. Prerequisite: graduate standing in the Department of Psychology.

**PSYCH 535 Approaches to Psychological Assessment (4)** Problem-solving approach to psychological assessment; review of psychological tests and procedures and presentation of approaches to their clinical interpretation and use. Required for all graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical psychology. Offered: Sp.

**PSYCH 536 Behavioral Assessment (4)** *Linehan* Research, theory, and technique in behavioral assessment. Emphasis on assessing for change and relationship between assessment and therapy. Interviewing, observational techniques, self-monitoring, simulated environments, and physiological, self-report, and imaginal procedures. Prerequisite: clinical psychology graduate standing and permission of instructor.

**PSYCH 538 Systems of Psychotherapy (3)** *George, Marlatt* Theory and research of major systems of psychotherapy, including the psychodynamic, behavioral, cognitive, and family systems approaches as an introduction to subsequent practica in clinical psychology. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate major standing in clinical psychology and permission of instructor. Offered: A.

*The content of each graduate seminar (numbered 540 through 560) offered by the department changes from quarter to quarter. A list of offerings is published each quarter and can be obtained from the Department of Psychology.*

**PSYCH 540 Seminar in Clinical Psychology (2)** *Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, McMahon, Sarason, Smith* Prerequisite: permission of instructor.

**PSYCH 541 Seminar in Cognitive Processes (2)** *Hunt, E Loftus, G Loftus* Prerequisite: permission of instructor.

**PSYCH 542 Seminar in Animal Behavior (2)** *Barash, Beecher, Brenowitz, Lockard* Prerequisite: permission of instructor.

**PSYCH 543 Seminar in Developmental Psychology (2)** *Carlson, Gottman, Meltzoff, Sackett* Prerequisite: permission of instructor.

**PSYCH 549 Seminar in Physiological Psychology (2)** *Bernstein, Diaz, Douglas, Kenney, Teller* Prerequisite: permission of instructor.

**PSYCH 550 Seminar in Psycholinguistics (2)** *Osterhout* Prerequisite: PSYCH 447 or PSYCH 457.

**PSYCH 551 Seminar in Psychophysics (2)** *Buck, Teller* Prerequisite: permission of instructor.

**PSYCH 552 Seminar in Quantitative Techniques (2)** *Hunt, Lunneborg* An introduction to the use of mathematical modeling in psychology and the behavioral sciences. Topics vary.

**PSYCH 553 Seminar in Social Psychology (2)** *JD Brown, JL Brown, Greenwald, Shoda* Prerequisite: permission of instructor.

**PSYCH 554 Seminar in Decision Processes (2)** *Miyamoto* Prerequisite: permission of instructor.

**PSYCH 559 Seminar in Current Research in Vision (1)** *Buck, Olavarria, Teller* Prerequisite: permission of instructor.

**PSYCH 560 Seminar (\* max. 30)** Prerequisite: permission of instructor. Offered: AWSpS.

**PSYCH 565 Quantifying Brain Structure (3)** *Jones* Covers concepts and applications of statistically unbiased methods for quantifying brain structure. Hands-on learning and application of concepts, sampling strategies and calculations for unbiased stereological measure of the size and number of various brain components.

**PSYCH 570 Child Clinical Psychology (4)** Issues and content of child clinical psychology, promotion of student's beginning work in research. Prerequisite: graduate major or minor standing in child-clinical psychology.

**PSYCH 571 Child Psychopathology (5)** *McMahon* Broad survey of major categories of child and adolescent disorders. Emphasis on scientific, empirical approach to description, classification, and research literature on these disorders. Required for all graduate students majoring in child clinical psychology. Prerequisite: graduate standing in psychology or permission of instructor.

**PSYCH 572 Approaches to Child Treatment (4)** *Barrett, Dawson* Major approaches to child psychotherapy, including specific applications, issues in treatment, and research. Prerequisite: graduate major standing in child-clinical psychology or permission of instructor. Offered: Sp.

**PSYCH 574 Community Psychology (4)** Overview of key issues and concepts in the field of community psychology. History of field and overview of different models used to conceptualize system-level mental health issues and delivery systems. Emphasizes theory and research rather than intervention. Prerequisite: psychology graduate student or permission of instructor.

**PSYCH 575 Minority Mental Health (3)** *Barrett, George* Surveys topics on mental health and treatment of racial and ethnic minorities. Theory emphases include: models addressing ethnic identity, cross-cultural differences, models of culturally sensitive intervention. Practice emphases include unique psychotherapy strategies for: African-, Asian-, and Latino-Americans, and American Indians. Prerequisite: graduate clinical major standing in psychology or permission of instructor.

**PSYCH 583 Research Methods in Clinical and Community Psychology (4)** *Lengua* Addresses issues concerning the design and implementation of research in clinical and community psychology. Topics include validity; reliability; experimental, quasi-, and non-experimental designs; causal inference; interpretation of data; and research ethics. Provides students with tools to evaluate research, develop hypotheses, and design rigorous empirical studies. Offered: A.

**PSYCH 584 Behavioral Methods: Clinical Interventions (3)** *Linehan* Provides students with basic skills required for competent practice of cognitive and behavioral therapies. Topics include behavioral skills training, cognitive restructuring, contingency management, and exposure-based procedures. Prerequisite: second year of graduate clinical psychology, social work, psychosocial nursing, or psychiatric residency.

**PSYCH 586 Clinical Personality Assessment (3)** *R Smith* Use of objective personality inventories in the description of normal and abnormal personality and use of such information in case conceptualization and treatment planning. Minnesota Multiphasic Personality Inventory, Millon Clinical Multiaxial Inventory. Credit/no credit only. Prerequisite: clinical psychology graduate standing.

**PSYCH 587 Clinical Methods: Interviewing (2)** *Fagan* Provides the foundation for developing good clinical skills. Enables students to conduct an initial clinical interview and generate a diagnostic formulation, problem list, and treatment plan after taking a complete history. Limited to and required of all second year clinical psychology graduate students. Credit/no credit only. Offered: A.

**PSYCH 588 Clinical Methods: Ethics (2)** *Fagan* Enables students to acquire a thorough working knowledge of the American Psychological Association's Ethical Standards for Psychologists; an awareness of Washington state law as it affects psychologists and a knowledge of how to identify and solve ethical dilemmas. Limited to and required of all second year clinical psychology graduate students. Credit/no credit only. Offered: W.

**PSYCH 589 Advanced Clinical Practicum (4)** *Cauce, Dawson, George, Kohlenberg, Marlatt, McMahon, Smith* Supervised psychotherapy involving several individual clients. Separate consultations with instructor for intensive supervision of each case. Occasional meetings in small groups of instructors and students to discuss case material. Assigned readings appropriate to each case with opportunities to discuss these with instructor. Credit/no credit only. Prerequisite: clinical psychology graduate standing and permission of instructor. Offered: AWSpS.

**PSYCH 590 Practicum in Psychological Assessment (2)** Demonstration and practice of selected psychological test procedures and interviewing skills. Concurrent registration in 535 required. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical or child-clinical psychology and permission of instructor.

**PSYCH 591 Issues in Clinical Psychology (1, max. 3)** Personal and professional issues in clinical psychology. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Credit/no credit only. Prerequisite: graduate major standing in clinical psychology. Offered: AW.

**PSYCH 593 Clinical Colloquium and Clinic Practicum (1-6, max. 24)** *Fagan* Required of all clinical psychology graduate students seeing clients in the clinic. Clinical colloquium required of all second-year students, optional for others. Credit/no credit only. Offered: AWS.

**PSYCH 594 Advanced Personality Theory (5)** *Linehan* Conceptual models of behavioral functioning, cognition, emotion, and environment as organizers of behavior and other critical issues in personality theory. Opportunity to integrate previous courses, research, and practice, and arrive at coherent theoretical framework. Required for graduate majors in clinical psychology.

**PSYCH 595 Behavior Disorders (5)** *Sarason* Major types of behavior disorders, with emphasis on clinical manifestations, relevant research, and theoretical perspectives. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate major standing in clinical psychology or permission of instructor. Offered: W.

**PSYCH 596 Psychology of Behavior Change (5)** *Kohlenberg* Behavioral theory and behavioral approaches to treatment. Prerequisite: PSYCH 595 and permission of instructor. Offered: Sp.

**PSYCH 597 Fieldwork in Clinical Psychology (1-5, max. 36)** *Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, McMahon, N Robinson, R Smith* Prerequisite: second-year graduate major standing and permission of departmental faculty.

**PSYCH 598 Directed Reading in Psychology (\* max. 30)** Selected topics. Prerequisite: permission of a supervising psychology faculty member.

**PSYCH 599 Directed Research in Psychology (1-3, max. 24)** Supervised participation in research. Prerequisite: permission of a supervising psychology faculty member.

**PSYCH 600 Independent Study or Research (\*)** Offered: AWSpS.

**PSYCH 700 Master's Thesis (\*)** Offered: AWSpS.

**PSYCH 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Romance Languages and Literature

C104 Padelford

 *General Catalog Web page:*  
[www.washington.edu/students/gencat/academic/romance.html](http://www.washington.edu/students/gencat/academic/romance.html)

The department consists of two divisions: French and Italian Studies and Spanish and Portuguese Studies. The divisions offer programs designed to develop competence in the reading, speaking, and writing of the languages and in the study of the literatures and cultures.

## French and Italian Studies

C254 Padelford

 *Division Web page:*  
[depts.washington.edu/frenital/](http://depts.washington.edu/frenital/)

## Graduate Program

Graduate Program Coordinator  
C259 Padelford, Box 354360  
(206) 616-5366

The Division of French and Italian Studies offers programs of graduate study leading to the degrees of Master of Arts in French or Italian and Doctor of Philosophy in French. Students who wish to complete their doctoral studies in Italian may do so through the Department of Comparative Literature.

The Master of Arts degree consists of 45 credits of courses taken at the 400 and 500 levels (plus 10 credits for exam preparation). The M.A. Final Examinations are written and oral and are administered in the last quarter of study.

Students enrolled in the doctoral program of French language and literature should devote at least two-thirds of their course work to the fields of specialization. Some training in the history of language is required. The Ph.D. program requires a total of 77 credits beyond the 55 for the M.A. (including 27 dissertation credits). The General Examination is divided into three broad areas: century or literary movement, critical problem, and outside area or constructed area. A dissertation is also required.

Information on specific requirements for the various degree programs is available upon request from the office of the graduate advising assistant or on the division's Web page ([depts.washington.edu/frenital/](http://depts.washington.edu/frenital/)).

## Financial Aid

The department awards annually a number of teaching assistantships. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the 10 weeks of the quarter.

## Faculty

### Chair

John T. Keeler

### Professors

Borch-Jacobsen, Mikkel \* 1986; Doct, 1981, University of Strasbourg (France); French twentieth-century literature, theory and criticism, psychoanalysis.

Christofides, Constantine \* 1966, (Emeritus); PhD, 1956, University of Michigan; medieval, seventeenth-century, Romanesque art and literature.

Clausen, Meredith L. \* 1979, (Adjunct); PhD, 1975, University of California (Berkeley); twentieth-century and American architecture.

Creore, A. Emerson 1940, (Emeritus); MA, 1936, University of Rochester; PhD, 1939, Johns Hopkins University.

Friedman, Lionel J. 1961, (Emeritus); PhD, 1950, Harvard University.

Handwerk, Gary J. \* 1984, (Adjunct); PhD, 1984, Brown University; literary theory, English and Irish nineteenth- and twentieth-century narrative.

Jonas, Raymond A. \* 1985, (Adjunct); PhD, 1985, University of California (Berkeley); modern France.

Keeler, John T. \* 1980; PhD, 1978, Harvard University; comparative politics (Western Europe), international relations.

Leiner, Jacqueline \* 1963, (Emeritus); DresLe, 1969, University of Strasbourg (France); modern French literature.

Nostrand, Howard L. 1982, (Emeritus); MA, 1933, Harvard University; Doct, 1934, Université De Paris VI (France); French culture and civilization.

Pace, Antonio 1980, (Emeritus); MA, 1937, Syracuse University; PhD, 1943, Princeton University; Italian language and literature.

Vance, Eugene \* 1990; PhD, 1964, Cornell University; French, English, and Italian medieval literature; history of rhetoric; sacred art; age of Augustine.

### Associate Professors

Collins, Douglas P. \* 1980; PhD, 1978, University of Missouri; twentieth-century French literature.

Dale, Robert C. \* 1963, (Emeritus); PhD, 1963, University of Wisconsin; nineteenth-century French literature, cinema.

Delcourt, Denyse \* 1990; PhD, 1987, University of Montreal (Canada); French Middle Ages, French Renaissance, French women writers and Quebecois literature.

Ellrich, Robert J. \* 1964, (Emeritus); PhD, 1960, Harvard University; eighteenth-century French literature.

Friedrich, Pia \* 1965, (Emeritus); PhD, 1946, University of Turin (Italy); pedagogy and twentieth-century Italian literature.

O'Neil, Mary R. \* 1983, (Adjunct); PhD, 1982, Stanford University; Renaissance/Reformation, early modern Europe.

Sbragia, Albert J. \* 1989; PhD, 1988, University of California (Berkeley); modern and contemporary Italian literature and cinema, Italian fascism, Rome.

Wortley, W. Victor \* 1965, (Emeritus); PhD, 1964, University of Oregon; seventeenth-century French theatre and prose (nonfiction).

### Assistant Professors

Collins, Jeffrey L. \* 1994, (Adjunct); MA, 1989, Yale University; MA, 1992, Cambridge University (UK); PhD, 1994, Yale University; European Baroque art and architecture with an emphasis on Italy; American material culture.

Jackson, Dianah Leigh \* 1998; PhD, 1999, University of Minnesota; body of Enlightenment culture and the epistolary novel, medical history of the 18th century.

Rubino, Nancy I. \* 1997; PhD, 1996, Columbia University; 19th-century French literature, modernism, history of medicine, French cinema.

Van Elslande, Jean-Pierre \* 1996; PhD, 1996, University of Geneva (Switzerland); seventeenth-century French literature and cultural history.

### Senior Lecturer

Yowell, Donna Lynne \* 1988; PhD, 1987, University of California (Berkeley); medieval Italian literature, Dante, Occitan lyric.

### Lecturers

Collins, H  l  ne V. 1984; PhD, 1995, University of Washington; French pedagogy and curriculum development, French cinema studies.

Leporace, Giuseppe 1987; MA, 1989, University of Washington; Italian pedagogy and translation.

Meyer, Hedwige M. 1988; MA, 1992, University of Washington; French pedagogy.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### French

**FRENCH 406 Advanced French Composition (5) VLPA** Extensive guidance in advanced French composition, emphasizing stylistics and grammar. Prerequisite: FRENCH 303.

**FRENCH 411 Topics in the Middle Ages (5) VLPA** Sixteenth-century literature with emphasis on poetry and the general artistic ambiance. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 412 Topics in Sixteenth Century French Literature (5) VLPA** An introduction to major French literary texts of the Sixteenth Century. Prerequisite: FRENCH 303; FRENCH 304.

**FRENCH 413 Topics in Seventeenth Century (5) VLPA** Seventeenth-century literature, with emphasis on the development of classicism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 414 French Literature of the Eighteenth Century: Enlightenment (5) VLPA** Eighteenth-century literature, with emphasis on the development of the Enlightenment ideology. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 415 French Literature of the Eighteenth Century: Post-Enlightenment (5) VLPA** Eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 416 French Literature of the Nineteenth Century: Romanticism (5) VLPA** Nineteenth-century literature, with emphasis on romanticism and the early manifestations of realism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 418 French Literature of the Early Twentieth Century (5) VLPA** Twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 420 Interdisciplinary Approaches to Literature (5) VLPA** Interdisciplinary studies in French literature and culture, focusing on the complex interactions of literature and other disciplines, i.e. philosophy, psychoanalysis, anthropology, architecture. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 306.

**FRENCH 432 Critical Approaches to French Fiction (5) VLPA** Addresses theory and practice of fiction within the context of a given century or movement. Content varies. Prerequisite: FRENCH 303.

**FRENCH 435 Topics in Non-Fiction (5) VLPA** Content varies. Prerequisite: FRENCH 303.

**FRENCH 441 Québécois Literature (5) VLPA** Readings of novels, plays, and occasionally, poetry. Special attention paid to how Québécois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with SCSA 441.

**FRENCH 445 Women Writers and Feminist Theory (5) VLPA** Focus on French women writers from different periods and places. Gender issues addressed in critical fashion, considering the different historical and ideological contexts in which each of the works were produced. Prerequisite: FRENCH 303.

**FRENCH 450 Themes in French Literature and Culture (5) VLPA** Interdisciplinary studies in French literature and culture, focusing on the construction and representation of gender roles in the French novel from the early eighteenth century. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 455 One Author in French Literature/Culture (5, max. 15) VLPA** In depth focus on the works of one author in French Literature or Culture. Prerequisite: FRENCH 303.

**FRENCH 458 French Art and Literature: Period Studies (5) VLPA** Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Recommended: background in French literature.

**FRENCH 470 Cinema (5) VLPA** Major films and figures of French cinema from the beginnings to the present. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

**FRENCH 481 Twentieth-Century French Novel in English (5) VLPA**

**FRENCH 486 Literature of the Enlightenment in English (5) VLPA**

**FRENCH 487 Nineteenth-Century Fiction in English (5) VLPA**

**FRENCH 488 Women in French Literature in English (5) VLPA** Masterpieces of French literature are read in an attempt to understand French attitudes toward women. From the sixteenth century, with a concentration on the twentieth century.

**FRENCH 490 Honors Seminar (2-5, max. 10) VLPA** Special studies in French literature. Required of candidates for honors and distinction in French.

**FRENCH 499 Special Topics (1-5, max. 10)** Topics to meet special needs. Prerequisite: FRENCH 303.

### Courses for Graduates Only

**FRENCH 510 Methodology of French Language Teaching (3)** Theoretical and practical foundation of teaching French. Major topics include modern theories of language and language acquisition which underlie modern methods of foreign language teaching, teaching techniques, testing, and classroom relations with emphasis on the multiple-approach direct method. Required for beginning French Teaching Assistants. Credit/no credit only.

**FRENCH 515 French Literature of the High Middle Ages (5, max. 10)** Old French literature, from the beginning to 1315. Prerequisite: permission of instructor.

**FRENCH 516 Middle French Literature (5, max. 10)** French literature from 1315 to 1500. Prerequisite: permission of instructor.

**FRENCH 520 Renaissance Prose: Rabelais (5)**

**FRENCH 523 Studies in Fiction: 1660-1800 (5, max. 10)**

**FRENCH 525 Studies in Fiction: 1850-1900 (5, max. 10)**

**FRENCH 526 Studies in Fiction: 1900-1950 (5, max. 10)**

**FRENCH 555 French Nonfiction (5, max. 10)**

**FRENCH 561 Studies in Seventeenth-Century Drama (5, max. 10)**

**FRENCH 565 Studies in French Drama (5, max. 10)** Studies in French drama, sixteenth to twentieth centuries.

**FRENCH 575 Literary Criticism (5)**

**FRENCH 576 Critical Methodology (5)** Basic scholarly tools of bibliography; historical review of literary doctrine; an introduction to critical methodology.

**FRENCH 577 Modern Critical Methods (5)** Modern critical methodology and theory.

**FRENCH 590 Special Seminar and Conference (1-10, max. 30)** Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

**FRENCH 591 Literary Problems: Middle Ages (5, max. 10)**

**FRENCH 592 Literary Problems: Renaissance (5, max. 10)**

**FRENCH 593 Literary Problems: Seventeenth Century (5, max. 10)**

**FRENCH 594 Literary Problems: Eighteenth Century (5, max. 10)**

**FRENCH 595 Literary Problems: Nineteenth Century (5, max. 10)**

**FRENCH 596 Literary Problems: Twentieth Century (5, max. 10)**

**FRENCH 600 Independent Study or Research (\*)**

**FRENCH 700 Master's Thesis (\*)** Credit/no credit only.

**FRENCH 800 Doctoral Dissertation (\*)** Credit/no credit only.

### Italian

**ITAL 401 Medieval Italian Readings (5) VLPA** Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions.

**ITAL 402 Early Modern Italian Readings I (5) VLPA** Readings in Italian Quattro/Cinquecento, covering the period of the Renaissance.

**ITAL 403 Early Modern Italian Readings II (5) VLPA** Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature.

**ITAL 404 Modern Italian Readings I(5) VLPA** Readings in Italian Ottocento, covering the period of Romanticism. Prerequisite: ITAL 203.

**ITAL 405 Modern Italian Readings II (5) VLPA** Readings in Italian Novecento, covering the work of major Italian twentieth-century authors. Prerequisite: ITAL 203.

**ITAL 466 Italian Society in Cinema and Literature in Italian (5) VLPA/I&S** *Sbragia* Studies the evolution of Italian postwar society through the analysis of film and literature as well as critical, historical, and sociological readings. Offered in Italian.

**ITAL 475 Italian Fascism: Architecture and Power (5) VLPA/I&S** Fascism in Italy as studied within the broader European context of nationalism, imperialism, and modernization, with particular emphasis on the arts—literature, film, architecture, and urbanism. Offered: jointly with ART H 495; A.

**ITAL 480 Dante's Comedy in English (5) VLPA** Introduction to Dante's Comedy. Considers formal, structural, linguistic, literary, historical, cultural, philosophical, and theological issues raised by the text. Discusses the main currents of twentieth-century Dante criticism.

**ITAL 481 Dante's Comedy in English (5) VLPA** Second half of a two-quarter series. Close study of Dante's Purgatory and Paradiso and retrospective reading of Inferno. Explores Dante's concept of art, both human and divine, as it is developed in and defines the poem. Prerequisite: ITAL 480.

**ITAL 482 The Decameron in English (5) VLPA** An integral reading of the Decameron, with some consideration of its place in world literature and as an expression of the culture of its time.

**ITAL 490 Proseminar in Italian Literature (3-5) VLPA** Intended to help the student achieve a mature critical mastery of Italian literature.

**ITAL 499 Special Topics (1-5, max. 10)** Topics to meet special needs.

### Courses for Graduates Only

**ITAL 501 Medieval Italian Readings (5)** *Yowell* Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions.

**ITAL 502 Early Modern Italian Readings I (5)** Readings in Italian Quattro/Cinquecento over the period of the Renaissance. Covers major intellectual, literary, and cultural movements and figures of the period, including humanistic rediscovery of Graeco-Roman models, chivalric poems, comic theater.

**ITAL 503 Early Modern Italian Readings II (5)** *Scalabrini* Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature.

**ITAL 504 Modern Italian Readings I (5)** *Sbragia, Scalabrini* Readings in Italian Ottocento, covering the period of Romanticism.

**ITAL 505 Modern Italian Readings 2 (5)** *Sbragia, Scalabrini* Readings in Italian Novecento, covering the work of the major Italian twentieth-century authors.

**ITAL 514 Dante (5, max. 10)**

**ITAL 590 Special Seminar and Conference (1-10, max. 30)** Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of instructor.

**ITAL 596 Literary Problems: Twentieth Century (5, max. 10)**

**ITAL 600 Independent Study or Research (\*)**

## Spanish and Portuguese Studies

C104 Padelford

 Division Web page:  
[depts.washington.edu/spanport/](http://depts.washington.edu/spanport/)

### Graduate Program

Graduate Program Coordinator  
C104 Padelford, Box 354360  
(206) 543-2075

The Division of Spanish and Portuguese Studies offers programs of graduate study leading to the degrees of Master of Arts and Doctor of Philosophy.

The Master of Arts degree normally requires two years of course work and successful completion of a comprehensive examination.

The doctorate normally requires one to two years of course work beyond the M.A., successful completion of a series of comprehensive examinations, and a dissertation.

Information on specific requirements for the various degree programs is available upon request from the office of the division's academic counselor.

### Financial Aid

The department awards annually a number of teaching assistantships. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the ten weeks of the quarter.

### Faculty

#### Chair

Cynthia Steele

#### Professors

Anderson, Farris Furman \* 1967; MA, 1962, Duke University; PhD, 1968, University of Wisconsin; nineteenth- and twentieth-century Spanish literature and civilization, advanced Spanish grammar.

Hunn, Eugene S. \* 1972, (Adjunct); PhD, 1973, University of California (Berkeley); cognitive anthropology, ethnobiology, cultural ecology and evolution, Mexico, North American Indians.

Lawson, Victoria A. \* 1986, (Adjunct); PhD, 1986, Ohio State University; Latin America, critical development studies, feminist geography.

Steele, Cynthia \* 1986; PhD, 1980, University of California (San Diego); Latin American literature and cultural studies; Mexican literature, film, and photography.

#### Associate Professors

Deyoung, Terri L. \* 1991, (Adjunct); PhD, 1988, University of California (Berkeley); Arabic language and literature.

Flores, Lauro H. \* 1980; PhD, 1980, University of California (San Diego); Chicano literature, contemporary Latin American literature (narrative).

Geist, Anthony L. \* 1987; PhD, 1978, University of California (Berkeley); twentieth-century Spanish literature: ideology and literary form, cultural studies, film.

O'Hara, Edgar \* 1989; PhD, 1989, University of Texas (Austin); Spanish, Latin American poetry, writing poetry and essays.

Petersen, Suzanne Helen \* 1973; PhD, 1976, University of Wisconsin; medieval Spanish literature, oral poetry, pan-Hispanic ballad, medieval Spanish literature.

Shipley, George A. \* 1967; PhD, 1968, Harvard University; Spanish Golden Age.

Strozer, Judith R. \* 1987, (Adjunct); PhD, 1976, University of California (Los Angeles); comparative Romance syntax, second language acquisition, foreign language teaching.

Zagona, Karen T. \* 1987, (Adjunct); PhD, 1982, University of Washington; syntactic theory and Spanish syntax, tense, and aspect.

#### Assistant Professors

Fuchs, Barbara \* 1997, (Adjunct); PhD, 1997, Stanford University; early modern English and Spanish literature, literature and imperialism.

Santianez, Nil 1999; PhD, 1991, University of Illinois; naturalism and realism, modernism, 19th-century science fiction, theory of the novel.

#### Lecturers

Basdeo, Ganeshdath D. 1985; MA, 1976, University of Washington; second-year Spanish, Spanish linguistics.

Bensadon, Leon M. 1989; MA, 1991, University of Washington; French and Spanish pedagogy and curriculum development.

Borreguero, Paloma A. 1990; MA, 1992, University of Washington; Spanish language and culture, pedagogy and teaching methodology.

Fox, Joan H. 1984; MA, 1973, University of British Columbia (Canada); language pedagogy and translation.

Gillman, Maria 1990; MA, 1986, Oregon State University; third-year Spanish curriculum and pedagogy.

Marulanda, Sandra 1987; MA, 1989, University of Washington; language pedagogy, children's literature, translation.

Raneda-Cuartero, Immacula 1997; MA, 1994, University of Wisconsin; second- and third-year Spanish curriculum and pedagogy.

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

## Romance Languages and Literature

### Courses for Graduates Only

**ROMAN 596 Problems in Comparative Contemporary Literary Studies (5)** Seminar exploring contemporary literary thought through theoretical and/or creative literature. A selection of texts from at least two Romance languages and literary traditions. Prerequisite: competence in at least two Romance languages; completion of several upper division literature courses; some familiarity with critical methodologies.

**ROMAN 600 Independent Study or Research (\*)** Credit/no credit only.

**ROMAN 700 Master's Thesis (\*)** Credit/no credit only.

**ROMAN 800 Doctoral Dissertation (\*)** Credit/no credit only.

### Romanian

**RMN 401 Elementary Romanian (5)** Comprehensive introduction to spoken and literary Romanian. Offered: jointly with ROMN 401; A.

**RMN 402 Elementary Romanian (5)** Comprehensive introduction to spoken and literary Romanian. Prerequisite: RMN/ROMN 401. Offered: jointly with ROMN 402; W.

**RMN 403 Elementary Romanian (5)** Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: RMN/ROMN 402. Offered: jointly with ROMN 403; Sp.

**RMN 404 Advanced Romanian (5) VLPA** Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 403. Offered: jointly with ROMN 404; A.

**RMN 405 Advanced Romanian (5) VLPA** Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 404. Offered: jointly with ROMN 405; W.

**RMN 406 Advanced Romanian (5) VLPA** Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 405. Offered: jointly with ROMN 406; Sp.

### Spanish

**SPAN 400 The Syntactic Structure of Spanish (5) VLPA** *Strozer, Zagona* Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 400.

**SPAN 401 The Morphological Structure of Spanish (5) VLPA** *Strozer, Zagona* Principles of word formation, including derivational and inflectional morphology. Relationship between inflectional morphology and other components of grammar. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 401.

**SPAN 402 The Phonological Structure of Spanish (5) VLPA** *Strozer, Zagona* Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 402.

**SPAN 403 The Evolution of the Spanish Language (5) VLPA** *Zagona* Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 403.

**SPAN 406 Advanced Spanish Grammar (5) VLPA** Problems of Spanish grammar. Differences from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: SPAN 303; SPAN 323. Offered: jointly with SPLING 406.

**SPAN 408 Spanish Translation Workshop (5) VLPA** Intensive practice in translation to and from Spanish. Texts include literary prose, poetry, expository writing, newspaper and magazine articles. Problems of standard versus colloquial language, transposition of cultural references, concept of fidelity in translation. Prerequisite: SPAN 303; SPAN 323; recommended: SPAN 406.

**SPAN 409 Spanish Phonetics (5) VLPA** Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 409.

**SPAN 414 Spanish Literature: Eighteenth Century (5) VLPA** Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 415 Spanish Literature: Nineteenth Century (5) VLPA** Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 416 Spanish Literature: 1900-1936 (5) VLPA** Spanish literature of the twentieth century prior to the Civil War (1900-1936). Concentration on Generations of 1898 and 1927. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 417 Spanish Literature From 1940 to the Present (5) VLPA** Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 420 Spanish Poetry: Origins Through the Fifteenth Century (5) VLPA** Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 424 Hispanic Poetry (5) VLPA** Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Becquer to Hernandez. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 426 Hispanic Poetry (5) VLPA** Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Becquer to Hernandez. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 433 Golden Age Prose (5) VLPA** Representative, and outstanding, prose works of sixteenth- and seventeenth-century Spain. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 436 Spanish Novel of the Nineteenth Century (5) VLPA** Representative works of Galdos, Clarn, Pereda, Valera, and Blasco Ibanez. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 438 Spanish Novel: 1939 to the Present (5) VLPA** Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 439 Women Writers (5) VLPA/I&S** Feminist analysis of selected texts by Chicana/Latina writers in the United States as well as by Spanish-American, Luso-Brazilian and/or Spanish women writers in their specific socio-historical contexts. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 453 Cervantes and His Times (5) VLPA** Study of Cervantes and his moment in Spanish history, with special attention to his cultural and artistic environment. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 461 Cultural Background of Latin American Literature (5) VLPA** Survey of ideas and art forms and their relationship to literature in four periods: pre-Columbian, colonial, early independence, and twentieth century. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

**SPAN 462 Early Spanish Civilization (5) I&S/VLPA** Development of Spanish society and art forms from early times to 1700. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

**SPAN 463 Spanish Civilization Since 1700 (5) I&S/VLPA** Spanish civilization and its major artistic products since 1700. Major moments in the development of Spanish society and intellectual life as reflected in music, painting, and especially literature. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

**SPAN 465 Contemporary Chicano Literature (5) VLPA** Examination of one or more problems, themes, and/or figures in the developing body of Chicano literature. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 466 Chicano Literature: Fiction (5) VLPA** Nineteenth- and early twentieth-century fiction, as well as contemporary works, are examined in attempts to trace the development of Chicano fiction in the proper historical trajectory. Prerequisite: either SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 467 Spanish Women (5) VLPA/I&S** Women's culture in Spain, focusing on women's experience during Civil War; persecution and censorship of women activists, artists, intellectuals during Franco years; changes in women's culture brought about by reintroduction of democracy; major issues addressed by contemporary Spanish feminists. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

**SPAN 468 Latin American Women (5) VLPA/I&S** The elaboration of discourses of identity in relation to gender, ethnicity, social class, and nationality, by women writers from South America, Mexico, Central America, and the Caribbean. Testimonial literature, literature and resistance, women's experimental fiction. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303. Offered: jointly with WOMEN 468.

**SPAN 474 Latin American Fiction: Twentieth Century (5) VLPA** Study of prose fiction in Latin America in the twentieth century. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 475 Latin American Poetry: Colonial Through Nineteenth Century (5) VLPA** Poetic movements of the seventeenth, eighteenth, and nineteenth centuries in Spanish American, Renaissance, baroque, neoclassicism, romanticism, and modernism. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 476 Contemporary Latin American Poetry (5) VLPA** Evolution of Latin American poetry, from postmodernism and vanguardism to the most recent poetic expression. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 477 Latin American Essay (5) VLPA** Literary expression of ideas in Latin American countries, nineteenth and twentieth centuries. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 478 Modern Latin American Theater (5) VLPA** Study of the origin, development, and achievements of Latin American theater with an overview of its history prior to the twentieth century. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 480 Spanish Medieval Literature (5) VLPA** Principal literary works of the Spanish Middle Ages in the context of evolving intellectual, spiritual, and artistic climates of the period. Covers the evolution of narrative and lyric prose and verse in both their traditional and learned manifestations. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 481 Sixteenth- and Seventeenth-Century Spanish Literature (5) VLPA** Spanish literature of the sixteenth and seventeenth centuries. Close study of key texts from all genres as well as their socio-historical contexts. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 482 Eighteenth- through Twentieth-Century Spanish Literature (5) VLPA** Survey of Spanish literature since 1700, and its historical context. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 483 Latin American Literature: Origins to Independence (5) VLPA** The elaboration of discourses of legitimization by the Spanish conquistadores, and of resistance and accommodation by native and mestizo peoples; the development of a New World Baroque aesthetic; literatures of independence from Spain and of nation-building. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 484 Latin American Literature: Modernismo to the Present (5) VLPA** Principal literary movements of Latin America, late nineteenth century to the present, with particular emphasis on poetry and narrative: modernismo, postmodernismo, the vanguard, nueva and novísima narrativa. Includes essays and autobiographical writings to help place the literary works in socio-historical perspective. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 485 Cultural Studies of Latin America (5) VLPA/I&S** Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 485.

**SPAN 486 Photography and Cultural Studies in Latin America (5) VLPA/I&S** Interdisciplinary exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Offered jointly with SISLA 486.

**SPAN 487 Mexican Cinema (5) VLPA, I&S Steele** Analysis of representative films about post-revolutionary Mexico by directors from both the Golden Age of Mexican Cinema (1940-1960) and the Mexican New Film movement (1975-the present). Revolutionary nationalism, modernization and its discontents; construction of gender, class and ethnicity; migration and globalization. Prerequisite: SPAN 303; SPAN 322 and one additional 300-level course beyond 303.

**SPAN 490 Honors Seminar (2-5, max. 10) VLPA** Special studies in Spanish literature. Required of candidates for Honors and Distinction in Spanish.

**SPAN 491 Individual Authors and Special Topics in Spanish Literature (5, max. 10) VLPA** Focus on an individual Spanish author or a special problem in Spanish literature. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

**SPAN 493 Foreign Study (2-10, max. 20) VLPA** Advanced study in Spanish speaking country outside the standard Spanish curriculum of the University of Washington. Prerequisite: SPAN 303; one additional 300-level course above SPAN 303.

**SPAN 495 Study in Spain (12) VLPA** Study in Spain. Course content varies from year to year. Consult the Division of Spanish and Portuguese for availability and further requirements.

**SPAN 499 Special Topics (1-5, max. 10)** Topics to meet special needs.

### Courses for Graduates Only

**SPAN 510 Methodology of Spanish Language Teaching (3) *Borneguero*** Theoretical and practical foundation for teaching Spanish. Major topics include modern theories of language and language acquisition which underlie modern methods of foreign language teaching, teaching techniques, testing, classroom relations. Emphasis on the multiple-approach direct method. Required for beginning Spanish Teaching Assistants. Credit/no credit only.

**SPAN 561 Spanish-American Novel From 1940 to the Present (5)**

**SPAN 571 The Modern Essay in Spanish America (5)**

**SPAN 572 Twentieth-Century Spanish Poetry (5, max. 10)**

**SPAN 573 Twentieth-Century Spanish-American Poetry (5, max. 10)**

**SPAN 577 Contemporary Literary Theory (5)** Introduction to various structuralist and poststructuralist theories of literary analysis, including those developed by Hispanic theorists, and their application to the study of texts from the Spanish and Latin American traditions.

**SPAN 590 Special Seminar and Conference (1-10, max. 30)** Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

**SPAN 591 Literary Problems: Middle Ages (5, max. 10)**

**SPAN 592 Literary Problems: Renaissance (5, max. 10)**

**SPAN 593 Literary Problems: Golden Age (5, max. 10)**

**SPAN 594 Literary Problems: Eighteenth Century (5, max. 10)**

**SPAN 595 Literary Problems: Nineteenth Century (5, max. 10)**

**SPAN 596 Literary Problems: Twentieth Century (5, max. 10)**

**SPAN 597 Literary Problems: Spanish-American Colonial Literature (5, max. 10)**

**SPAN 598 Literary Problems: Latin America (5, max. 10)**

**SPAN 600 Independent Study or Research (\*)**

**SPAN 700 Master's Thesis (\*)** Credit/no credit only.

**SPAN 800 Doctoral Dissertation (\*)** Credit/no credit only.

## Russian, East European, and Central Asian Studies

See International Studies.

## Scandinavian Studies

318 Raitt



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/scandinavian.html](http://www.washington.edu/students/genocat/academic/scandinavian.html)



Department Web page:  
[depts.washington.edu/scand/](http://depts.washington.edu/scand/)

The Department of Scandinavian Studies is concerned with the study of languages, literature, history, politics, and cultures of Denmark, Finland, Iceland, Norway, Sweden, and the Baltic States of Estonia, Latvia, and Lithuania. Emphasis is placed both on contemporary literature and culture and on historical development. Although most courses designed for majors are taught in the original languages, a broad spectrum of courses designed primarily for nonmajors is offered in English. Graduate seminars require considerable reading in the Scandinavian languages.

## Graduate Program

Graduate Program Coordinator  
318 Raitt, Box 353420  
(206) 543-0645  
[uwscand@u.washington.edu](mailto:uwscand@u.washington.edu)

The Department of Scandinavian Studies offers graduate programs of study leading to the Master of Arts and Doctor of Philosophy degrees. For the M.A. degree, the emphasis may be placed on Old Icelandic (Old Norse), Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies. Ph.D. degree aspirants must complete one year's study of Old Icelandic and concentrate their studies primarily within one of four areas: Danish language and literature, Finnish language and literature, Norwegian language and literature, Swedish language and literature, or Scandinavian philology and linguistics.

For the graduate student, the programs in Scandinavian languages and literature open several areas of study: medieval, with extensive study of Old Scandinavian languages and literature, particularly Old Icelandic; modern, including the eighteenth century, romanticism, the modern breakthrough, and the twentieth century. Attention is paid to the history of the Scandinavian languages, prose fiction, drama, and poetry. Opportunities for supervised study and specialization also exist in such areas as Scandinavian history, politics, mythology, and folklore. There are also opportunities for comparative-literature study.

### Master of Arts

For the M.A. degree, two options are available, each allowing the student to emphasize a target language while pursuing courses in Scandinavian languages, literature, or area studies.

1. An emphasis on Scandinavian languages and literature includes acquisition of a working knowledge of literary history, critical theory and text analysis, plus study of one secondary area.
2. An emphasis on Scandinavian area studies includes the study of Scandinavian folklore, mythology, history, politics, and society, with an emphasis in one of these areas.

*Admission Requirement:* Bachelor of Arts degree with major in Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies, or equivalent background.

*Graduation Requirements:* Minimum of 40 credits in courses or seminars in Scandinavian and related subjects approved by the department, of which at least 20 credits must be in courses numbered 500 and above; reading knowledge of French or German (another non-Scandinavian language may be substituted with faculty approval); written and oral examination; option between thesis and non-thesis program. Candidates in Scandinavian languages and literature must satisfy the departmental requirements in Old Icelandic.

### Doctor of Philosophy

For the Ph.D. degree, the student concentrates primarily on one of two areas: Scandinavian languages and literature, or Scandinavian philology and linguistics, with an emphasis on the student's chosen target language. Major attention is given to the history of the Scandinavian languages, literary history and theory, and genre study. Opportunities for graduate work also exist in such areas as Scandinavian history, politics, mythology, and folklore.

*Admission Requirement:* Master of Arts degree with major in Scandinavian languages and literature or equivalent background.

*Graduation Requirements:* 40 credits beyond the master's degree in courses or seminars in Scandinavian languages and literature and related subjects approved by the department, one year's study of Old Icelandic, a reading knowledge of French and German (other non-Scandinavian languages may be substituted with faculty approval), General Examination for admission to candidacy, 27 credits of SCAND 800 (dissertation) taken over at least three quarters, and a Final Examination on the dissertation.

### Financial Aid

Teaching assistantships in Danish, Finnish, Norwegian, Swedish, and Scandinavian Area Studies are usually available, as well as occasional research assistantships. If funding allows, a Baltic-language teaching assistantship may be available.

## Faculty

### Chair

Terje I. Leiren

### Professors

Rossel, Sven H. \* 1974, (Affiliate); PhD, 1968, University of Copenhagen (Denmark); Danish language and literature, medieval literature; European preromanticism, romanticism, symbolism.

Steene, Birgitta \* 1973, (Emeritus); PhD, 1960, University of Washington; Scandinavian drama and film, children's literature, comparative literature.

### Associate Professors

Conroy, Patricia L. \* 1972; PhD, 1974, University of California (Berkeley); Scandinavian philology, Icelandic language and literature, Danish, Faroese.

Dubois, Thomas A. \* 1990; PhD, 1990, University of Pennsylvania; Nordic folklore and mythology, Finnish, Sami.

Gavel Adams, Ann-Charlotte \* 1986; PhD, 1990, University of Washington; August Strindberg, Scandinavian women's literature, Scandinavian turn-of-the-century drama and art.

Ingebritsen, Christine \* 1992; PhD, 1993, Cornell University; politics, international political economy, European integration, environmental policy.

Leiren, Terje I. \* 1977; PhD, 1978, North Texas State University; Scandinavian history, nationalism, immigration, ethnicity, Norwegian languages.

Remley, Paul G. \* 1988, (Adjunct); PhD, 1990, Columbia University; Old and Middle English, medieval languages and literatures, critical theory.

Sehmsdorf, Henning K. \* 1967, (Emeritus); PhD, 1968, University of Chicago; folklore and mythology, Norwegian language and literature, comparative literature.

Sjavik, Jan \* 1978; PhD, 1979, Harvard University; Norwegian languages and literature, prose fiction, critical theory.

Stecher Hansen, Marianne T \* 1988; MA, 1981, University of Washington; PhD, 1990, University of California (Berkeley); Danish language and literature, Scandinavian literature.

Warme, Lars G. \* 1975, (Emeritus); PhD, 1974, University of California (Berkeley); Swedish language and literature, Scandinavian novel, comparative literature.

### Senior Lecturer

Brandl, Klaus K. \* 1991; PhD, 1991, University of Texas (Austin); foreign language pedagogy, computer-assisted language learning, applied linguistics.

### Lecturers

Dubois, Ia G. 1989; PhD, 1991, University of Washington; Swedish language and literature, ethnicity.

Smidchens, Guntis I. 1993; PhD, 1996, Indiana University; Estonian, Latvian, and Lithuanian languages and literatures; Baltic studies; folklore.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Danish

**DANISH 490 Supervised Reading (\* max. 10)** Readings in a selected area of Danish language, literature, or related fields.

### Estonian

**ESTO 490 Supervised Reading (1-10)** Readings in a selected area of Estonian language, culture, or society.

### Finnish

**FINN 490 Supervised Reading (1-5, max. 10)** Readings in a selected area of Finnish language, culture, or society.

### Latvian

**LATV 490 Supervised Reading (1-10, max. 10)** Readings in a selected area of Latvian language, culture, or society.

### Lithuanian

**LITH 490 Supervised Reading (1-10, max. 10)** Readings in a selected area of Lithuanian language, culture, or society.

### Norwegian

**NORW 490 Supervised Reading (\* max. 10)** Readings in a selected area of Norwegian language, literature, or related fields.

## Swedish

**SWED 490 Supervised Reading (\* max. 12)** Readings in a selected area of Swedish language, literature, or related fields.

## Scandinavian

**SCAND 427 Scandinavian Women Writers in English Translation (5) VLPA** Selected works by major Scandinavian women writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with WOMEN 429.

**SCAND 431 The Northern European Ballad (5) VLPA** Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with C LIT 431.

**SCAND 437 Politics in Scandinavia (5) I&S** Twentieth-century politics in Scandinavia. How Scandinavian countries have been governed. Costs and consequences of their governmental style and its uncertain future. Optimal size of polities, problems of mature welfare states, process of leadership and representation in multiparty systems, decline of political parties. Offered: jointly with POL S 437.

**SCAND 460 History of the Scandinavian Languages (5) VLPA** Development of languages from common Scandinavian to contemporary Danish, Norwegian, Swedish, Faroese, and Icelandic. Recommended: DANISH 203, FINN 203, NORW 203, or SWED 203.

**SCAND 462 Isak Dinesen and Karen Blixen (5) VLPA** The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with WOMEN 462.

**SCAND 481 August Strindberg and European Cultural History (5) I&S/VLPA** Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with EURO 481.

**SCAND 490 Special Topics (1-5, max. 15)** Special topics in Scandinavian art, literature, culture, and history. Course offerings based on instructor's specialty and student demand.

**SCAND 498 Senior Essay (5) VLPA** Undergraduate research and the writing of a senior essay in Scandinavian area studies.

**SCAND 499 Independent Study or Research (1-5, max. 10)** Independent study or research in Scandinavian area studies. May be done in a Scandinavian language or in English.

## Courses for Graduates Only

**SCAND 500 Introductory Readings in Old Icelandic (5)** Systematic study of the grammatical structure of Old Icelandic and the reading of several short prose works.

**SCAND 501 Old Icelandic Language and Literature (5)** Reading of a major work in Old Icelandic literature as a vehicle for discussions about literary history and genre, narrative, and rhetorical strategies.

**SCAND 503 Methods of Scandinavian Studies (5)** Introduction to Scandinavian studies on the graduate level with emphasis on Scandinavian literature, folklore, history, and politics.

**SCAND 504 Contemporary Literary Theory (5)** Contemporary literary theory and its application to Scandinavian texts. Prerequisite: graduate student standing or permission of instructor.

**SCAND 505 Topics in Scandinavian Drama and Film (5, max. 15)** Seminar on a selected topic in Scandinavian drama or film, such as an author (Holberg, Ibsen, Strindberg, Bergman), a period, a genre, or a movement.

**SCAND 508 Topics in Scandinavian Prose (5, max. 15)** Seminar on various topics in Scandinavian prose, including shorter prose texts, as well as a selection of the significant novels of the nineteenth and twentieth centuries.

**SCAND 518 Foreign Language Teaching Methodology (2)** Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

**SCAND 519 Modern Scandinavian Politics (5)** Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with POL S 519.

**SCAND 520 Topics in Scandinavian Poetry (5, max. 15)** Seminar on selected periods of Scandinavian poetry: romanticism, symbolism, modernism, and contemporary poetry. Poetry examined in relation to the literary canon of each country and to Scandinavian literature as a whole. International influences also discussed.

**SCAND 533 Interdisciplinary Approaches to Community in Scandinavia (5)** Humanistic examination of community creation, maintenance, and change in the Nordic region. Examples drawn from folklore, literature, activism, popular culture, history. Focus on issues of gender, belief, and art in relation to community. Coursework includes both individual and collaborative assignments.

**SCAND 590 Special Topics in Scandinavian Literature (1-5, max. 15)**

**SCAND 595 Teaching Assistant Workshop (1)** Focuses on topics in language pedagogy. Required for teaching assistants in Scandinavian languages. Required for all teaching assistants. Credit/no credit only.

**SCAND 600 Independent Study or Research (\*)** Prerequisite: permission of instructor.

**SCAND 700 Master's Thesis (\*)**

**SCAND 800 Doctoral Dissertation (\*)**

## Slavic Languages and Literatures

M253 Smith



General Catalog Web page:  
[www.washington.edu/students/genca/academic/slavic.html](http://www.washington.edu/students/genca/academic/slavic.html)



Department Web page:  
[depts.washington.edu/slavweb/](http://depts.washington.edu/slavweb/)

The Department of Slavic Languages and Literatures offers instruction in the principal East European languages and literatures and in Slavic linguistics, working closely with the School of International Studies. Languages may include Bulgarian, Czech, Polish, Romanian, Russian, Croatian/Serbian, and Ukrainian.

## Graduate Program

Graduate Program Coordinator  
M264 Smith, Box 353580  
(206) 543-6848

The Department of Slavic Languages and Literatures offers a complete program of courses and seminars leading to the Master of Arts and Doctor of Philosophy degrees in Russian and East European languages, literatures, and cultures. Languages taught in the department include Czech, Old Church Slavonic, Polish, Russian, and Croatian/Serbian.

The graduate program is organized to permit completion of the master's degree in four to six quarters and the doctoral degree in three additional years. The duration of each program, however, will depend on the extent of the student's preparation upon entrance into the program.

### Research Facilities

The Suzzallo Library holdings include some 200,000 titles in the languages of Eastern Europe. While the majority of these titles are in Russian, the collection is well provided with resources in Bulgarian, Czech, Hungarian, Polish, Romanian, and Croatian/Serbian languages and literatures.

### Admission Qualifications

*For the Master of Arts Program:* Bachelor of Arts degree with major in Russian or Eastern European languages and literatures, or equivalent background.

*For the Doctor of Philosophy Program:* Master of Arts degree with major in Slavic Languages, Literatures, and Cultures.

### Assistantship Opportunities

The department regularly offers a number of teaching assistantships. In conjunction with the Henry M. Jackson School of International Studies, students in the department are eligible for several other types of fellowships.

## Faculty

### Chair

Jack V. Haney

### Professors

Augerot, James E. \* 1960; MA, 1959, New Mexico Highlands University; PhD, 1968, University of Washington; Slavic linguistics, Romanian, Bulgarian.

Diment, Galya \* 1989; MA, 1978, Claremont Graduate School; PhD, 1987, University of California (Berkeley); nineteenth/twentieth-century Russian literature, comparative literature, modernism, cultural studies.

Haney, Jack V. \* 1965; DPhil, 1970, Oxford University (UK); medieval Russian literature, Slavic folklore.

Kapetanic, Davor \* 1972, (Emeritus); MA, 1954, PhD, 1972, University of Zagreb (Yugoslavia); Yugoslav literature, Slavic literary theory.

Kramer, Karl D. \* 1970; MA, 1957, PhD, 1964, University of Washington; Russian and comparative literature.

Micklesen, Lew R. \* 1966, (Emeritus); PhD, 1951, Harvard University; Slavic linguistics.

### Associate Professors

Coats, Herbert S. \* 1968; MA, 1964, Fordham University; PhD, 1970, University of Illinois; Slavic linguistics.

Dziwirek, Katarzyna A. \* 1993; MA, 1984, University of Illinois; MA, 1985, University of Lodz (Poland); PhD, 1991, University of California (San Diego); linguistics, Polish syntax, and typology.

West, James D. \* 1972; PhD, 1970, Cambridge University (UK); modern Russian literature, art and philosophy.

### Assistant Professor

Crnkovic, Gordana \* 1993; MA, 1991, PhD, 1993, Stanford University; East European literature, film, former Yugoslavia, theory, American literature, comparative literature.

### Senior Lecturer

Polack, Zoya M. 1973; MA, 1975, University of Washington; Russian and Ukrainian languages.

### Lecturer

Boyle, Eloise M. 1995; MA, 1983, PhD, 1988, Ohio State University; twentieth-century Russian literature, pedagogy, teaching methodology.

## Course Descriptions

*See page 39 for an explanation of course numbers, symbols, and abbreviations.*

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Bulgarian

**BULGR 401 Elementary Bulgarian (5)** Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Offered: A.

**BULGR 402 Elementary Bulgarian (5)** Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Prerequisite: BULGR 401. Offered: W.

**BULGR 403 Elementary Bulgarian (5)** Reading of modern texts to increase command of grammar and vocabulary. Prerequisite: BULGR 402. Offered: Sp.

**BULGR 404 Advanced Bulgarian (5) VLPA** Continuation of 401, 402, 403. Selected readings in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: BULGR 403. Offered: A.

**BULGR 405 Advanced Bulgarian (5) VLPA** Continuation of 401, 402, 403. Selected readings in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: BULGR 404. Offered: W.

**BULGR 406 Advanced Bulgarian (5) VLPA** Continuation of 401, 402, 403. Selected readings in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: BULGR 405. Offered: Sp.

### Croatian-Serbian

**CR SB 401 Elementary Croatian/Serbian (5)** Comprehensive introduction to spoken and written literary Croatian and Serbian. Offered: A.

**CR SB 402 Elementary Croatian/Serbian (5)** Comprehensive introduction to spoken and written literary Croatian and Serbian. Prerequisite: CR SB 401. Offered: W.

**CR SB 403 Elementary Croatian/Serbian (5)** Comprehensive introduction to spoken and written literary Croatian and Serbian. Prerequisite: CR SB 402. Offered: Sp.

### CR SB 404 Advanced Croatian/Serbian (5) VLPA

Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and command of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 403. Offered: A.

### CR SB 405 Advanced Croatian/Serbian (5) VLPA

Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and command of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 404. Offered: W.

### CR SB 406 Advanced Croatian/Serbian (5) VLPA

Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and command of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 405. Offered: Sp.

### CR SB 420 Drawn from the Fire: Literature of the Former Yugoslavia in English (5) VLPA

Twentieth-century prose of the former Yugoslavia. Cultural identity at the crossroads between East and West. Relation of Yugoslav literature, created on the European margin, to the European cultural centers. Literature and the myths of socialism and nationalism. Yugoslav oral tradition. Issues of gender.

### Czech

**CZECH 401 Elementary Czech (5)** Introduction to spoken and written Czech. Offered: A.

**CZECH 402 Elementary Czech (5)** Introduction to spoken and written Czech. Prerequisite: CZECH 401. Offered: W.

**CZECH 403 Elementary Czech (5)** Modern Czech prose, leading to a command of the language as a research tool and providing an adequate basis for further study. Prerequisite: CZECH 402. Offered: Sp.

**CZECH 404 Advanced Czech (5) VLPA** Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: 403. Offered: A.

**CZECH 405 Advanced Czech (5) VLPA** Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: 404. Offered: W.

**CZECH 406 Advanced Czech (5) VLPA** Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: 405. Offered: Sp.

### Polish

**POLSH 401 Elementary Polish (5)** Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Offered: A.

**POLSH 402 Elementary Polish (5)** Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Prerequisite: POLSH 401. Offered: W.

**POLSH 403 Elementary Polish (5)** Designed to enlarge general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries. Prerequisite: POLSH 402. Offered: Sp.

**POLSH 404 Advanced Polish (5) VLPA** Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical patterns, and conversation. Prerequisite: POLSH 403. Offered: A.

**POLSH 405 Advanced Polish (5) VLPA** Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical patterns, and conversation. Prerequisite: POLSH 404. Offered: W.

**POLSH 406 Advanced Polish (5) VLPA** Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical patterns, and conversation. Prerequisite: POLSH 405. Offered: Sp.

## Romanian

**ROMN 401 Elementary Romanian (5)** Comprehensive introduction to spoken and literary Romanian. Offered: jointly with RMN 401; A.

**ROMN 402 Elementary Romanian (5)** Comprehensive introduction to spoken and literary Romanian. Prerequisite: ROMN/RMN 401. Offered: jointly with RMN 402; W.

**ROMN 403 Elementary Romanian (5)** Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: ROMN/RMN 402. Offered: jointly with RMN 403; Sp.

**ROMN 404 Advanced Romanian (5) VLPA** Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: ROMN/RMN 403. Offered: jointly with RMN 404; A.

**ROMN 405 Advanced Romanian (5) VLPA** Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: ROMN/RMN 404. Offered: jointly with RMN 405; W.

**ROMN 406 Advanced Romanian (5) VLPA** Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: ROMN/RMN 405. Offered: jointly with RMN 406; Sp.

## Russian

**RUSS 401 Advanced Russian (5) VLPA** Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: either RUSS 303 or RUSS 350. Offered: AWSp.

**RUSS 402 Advanced Russian (5) VLPA** Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 401. Offered: AWSp.

**RUSS 403 Advanced Russian (5) VLPA** Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 402. Offered: AWSp.

**RUSS 420 Topics in Russian Literary and Cultural History (5, max. 20) VLPA** A special topic in the literary and cultural history of Russia. Topics vary.

**RUSS 421 Post-Soviet Literary and Cultural Scene (5, max. 15) VLPA** Russian literature of the second half of the twentieth century. In English.

**RUSS 430 Major Authors (5, max. 15) VLPA** Major Russian writers of the nineteenth and twentieth centuries. Among authors read are Pushkin, Gogol, Lermontov, Turgenev, Tolstoy, Dostoevsky, Chekhov, Babel, If and Petrov, Olesha. Content varies.

**RUSS 450 Intensive Fourth-Year Russian (15) VLPA** Covers material of 401, 402, 403 in one quarter. Meets three hours daily. See credit note above. Prerequisite: either RUSS 303 or RUSS 350. Offered: S.

**RUSS 451 Structure of Russian (5) VLPA** Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: either RUSS 303 or RUSS 350. Offered: A.

**RUSS 452 Structure of Russian (5) VLPA** Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: RUSS 451. Offered: W.

**RUSS 461 Introduction to Russian Literature in Russian (5) VLPA** Analysis of original Russian literary texts representative of different varieties of Russian writing. Vocabulary of Russian literary analysis; typically Russian approaches to literature, some readings of secondary critical texts; discussion in Russian of passages studied. Prerequisite: RUSS 403 or RUSS 450.

**RUSS 463 Introduction to Russian Literature in Russian (5) VLPA** Analysis of original Russian literary texts representative of different varieties of Russian writing. Vocabulary of Russian literary analysis; typically Russian approaches to literature, some readings of secondary critical texts; discussion in Russian of passages studied. Prerequisite: either RUSS 403 or RUSS 450.

**RUSS 481 Russian Language in St. Petersburg (15) VLPA** Daily work in phonetics, grammar, conversation, translation, analytical reading, stylistics, newspaper analysis, and advanced syntax. Prerequisite: either RUSS 403 or RUSS 450.

**RUSS 482 Research Project in St. Petersburg (12) VLPA** Supervised research in student's selected area of concentration, combined with language instruction tailored to the student's field. Successful completion of course requires a 15-page term paper in Russian. Prerequisite: either RUSS 403 or RUSS 450.

**RUSS 483 Russian Literature in St. Petersburg (5, max. 10) VLPA** Selection of courses on specialized topics in Russian literature; specific authors or periods. Prerequisite: either RUSS 403 or RUSS 450.

**RUSS 484 Russian History in St. Petersburg (5, max. 10) VLPA/I&S** Selection of courses on specialized topics in Russian political, economic, social, cultural, or art history. Prerequisite: either RUSS 403 or RUSS 450.

**RUSS 485 Economics in St. Petersburg (5, max. 10) VLPA/I&S** Selection of courses on topics relating to economic issues.

**RUSS 490 Studies in Russian Literature (3-5, max. 15) VLPA** In either Russian or English. Topics vary.

**RUSS 499 Directed Study or Research (1-5, max. 15)** Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Offered: AWSpS.

## Courses for Graduates Only

**RUSS 501 Russian Language for Graduate Students (2, max. 10)** Develops skills of particular use to graduate students. Emphasis on rapid assimilation of variety of written materials with sophisticated understanding and maximum retention of vocabulary, and ability to discuss in Russian the more theoretical and abstract kinds of material. Prerequisite: RUSS 403 or equivalent and graduate standing in Russian, East European, and Central Asian Studies.

**RUSS 502 Russian Translation (3)** Introduction to the theory of translation; translation to and from Russian of selected prose passages in a variety of styles, with emphasis on idiomatic accuracy and stylistic compatibility. Prerequisite: two quarters of RUSS 501 or permission of instructor.

**RUSS 520 Seminar in Russian Poetry (5)** Topics in Russian poetry and poetry criticism to be selected by the instructor and students. Some emphasis on recent theoretical approaches to poetry criticism that are current in Russia and eastern Europe. For advanced MA and Ph.D. students. Offered: alternate years.

**RUSS 521 Russian Literature to 1800 (5)** Representative works of East Slavic, Muscovite, and Russian literature from the beginnings to 1800. Studies include a varied selection of primary texts. Intended as an introduction to the study of modern literature for beginning graduate students in Russian literature. Offered: alternate years.

**RUSS 522 Russian Literature of the Nineteenth Century (5)** Survey of nineteenth-century Russian poetry and prose. Representative works of Russia's major and minor authors, literary trends, and genres. Offered: alternate years.

**RUSS 523 Russian Literature of the Twentieth Century (5)** Survey of twentieth-century Russian poetry and prose. Pre-revolutionary, Soviet, and Émigré authors, trends, and genres. Includes survey of twentieth-century Literary Criticism as well, in particular Russian Formalists and Mikhail Bakhtin. Offered: alternate years.

**RUSS 526 Literary, Cultural, and Film Studies of the Post-Soviet Era (5, max. 15)** Contemporary post-Soviet literature and film. Topics include post-colonialism, gender, reflections of social upheavals, artistic experimentation, issues of commercialism in art, search for new cultural expressions and identity. Readings in both Russian and English. Offered: Sp.

**RUSS 542 Seminar in Contemporary Russian Poetry (5)** One specific problem or theme in contemporary Russian poetry, seen in its widest possible dimensions. Students must read, in Russian, the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them. Offered: alternate years.

**RUSS 543 Seminar in Contemporary Russian Prose (5)** Analysis of Russian prose fiction of the post-1917 period. Selected authors and topics. Offered: alternate years.

**RUSS 554 History of the Russian Literary Language (5)** Russian literary language from the eleventh through the twentieth centuries, with special attention to syntax and lexicon and to the development of notions of literary styles. Offered in Russian. Prerequisite: RUSS 555 or SLAV 565, or permission of instructor. Offered: alternate years.

**RUSS 570 Research Seminar in Russian Literature (5)** *Diment, Haney, Kramer, West* Working in consultation with a faculty adviser, students formulate a topic and prepare a 30-minute oral presentation to be delivered at the seminar and submit a written paper to be read and critiqued, by all participants.

**RUSS 577 Russian Folk Literature (5)** Analysis of representative works of the various genres of folk literature, including the byliny, skazki, historical and lyrical songs, and the spiritual stikhi.

**RUSS 600 Independent Study or Research (\*)**

### Ukrainian

**UKR 401 Elementary Ukrainian (5)** Introduction to spoken and written Ukrainian.

**UKR 402 Elementary Ukrainian (5)** Introduction to spoken and written Ukrainian.

**UKR 403 Elementary Ukrainian (5)** Introduction to spoken and written Ukrainian.

### Slavic

**SLAV 420 The Other Europe: Contemporary East European Fiction (5, max. 15) VLP** *Crnkovič* Contemporary fiction by Czech, East German, Hungarian, Polish, Baltic, and Balkan writers. Topics include: history of colonization, the imagination of social utopia, socialism and nationalism, everyday life under communism, cultural identity between East and West, experimental writing, new fiction in post-communist Eastern Europe. All readings in English.

**SLAV 423 East European Film (5) VLP** *Crnkovič* Survey of major East European film makers. Compares East European and Western production of those directors who worked partially in the West, e.g., Polanski, Forman, Holland, Makavejev. Topics include film in socialist versus market economy, politics, gender, sexuality.

**SLAV 425 Ways of Meaning: Universal and Culture Specific Aspects of Language (5) VLP/IA&S** *Dziwirek* Social and cultural conditioning of language use. Language as a mirror of culture and national character. Universal and culture/language specific components in linguistic expression of emotions, courtesy/politeness and rudeness, prejudice and (in)sensitivities, linguistic expression of gender differences in different cultures. Offered: Sp.

**SLAV 470 Special Topics in Slavic Linguistics (3-5, max. 15) VLP** *Augerot, Coats, Dziwirek* Special topics in Slavic linguistics. Course offerings based on instructor's specialty and student demand. Offered: AWSp.

**SLAV 490 Studies in Slavic Literatures (3-5, max. 15) VLP** Topics vary.

**SLAV 499 Directed Study or Research (1-5, max. 15)** Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Prerequisite: permission of instructor and undergraduate adviser. Offered: AWSpS.

### Courses for Graduates Only

**SLAV 501 Using Slavic Resources (2)** Introduction to graduate studies in Slavic languages, literatures, and cultures. Discusses field of study and research materials and techniques employed.

**SLAV 518 Foreign Language Teaching Methodology (2)** *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518.

**SLAV 519 Slavic Language Pedagogy (3)** *Boyle* Introduction to current issues of foreign language pedagogy. Concentrates on the practical classroom application of methodological theory through lectures and micro-teaching presentation. Topics discussed and practiced include testing, proficiency teaching, teaching listening and reading skills, writing, teaching grammar, and computers. Offered: A.

**SLAV 520 Slavic Literary Theory (3)** *Crnkovič* Slavic and East European theoretical works and their place in contemporary theoretical landscape. Includes survey of Russian formalism, Czech structuralism, and Tartu school semiotics. Literary theory, film theory, cultural studies, feminist theory. Special emphasis on Mikhail Bakhtin.

**SLAV 550 Synchronic Slavic Linguistics (5)** Linguistic analysis of the phonology, morphology, and syntax of Russian and other Slavic languages. Investigation of current theological work in these areas.

**SLAV 551 The Introduction to the Study of Slavic Languages (5)** External and internal history of Slavic literary languages from the beginnings to the present time, including the development of writing systems, external attempts at reform, and the development of vocabulary.

**SLAV 560 Diachronic Slavic Linguistics (5)** Development of the phonological and morphological system of Common Slavic from Indo-European. Evolution of Russian and other modern Slavic languages from Common Slavic. Offered: A.

**SLAV 561 History of the East Slavic Languages (5)** Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the Ukrainian and Byelorussian literary languages. Prerequisite: SLAV 560. Offered: alternate years.

**SLAV 563 History of the South Slavic Languages (5)** Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the South Slavic languages. Prerequisite: SLAV 560.

**SLAV 565 Old Church Slavic (4)** Rise and development of earliest Slavic literary language and a descriptive study of its orthography, phonology, morphology, and syntax. Readings from normalized texts. Offered: alternate years.

**SLAV 566 Readings in Old Church Slavic (4)** Reading and grammatical interpretation of a selected group of canonical texts, as well as some examples of the various later recensions of Old Church Slavonic. Prerequisite: SLAV 555. Offered: alternate years.

**SLAV 570 Seminar on Slavic Linguistics (3)** Investigation and discussion of special topics in Slavic linguistics.

### Slavic Languages and Literatures

**SLAVIC 600 Independent Study or Research (\*)**

**SLAVIC 800 Doctoral Dissertation (\*)**

## Society and Justice

See Political Science.

## Sociology

202 Savery



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Sociology.html](http://www.washington.edu/students/genocat/academic/Sociology.html)



Department Web page:  
[www.soc.washington.edu/soc.html](http://www.soc.washington.edu/soc.html)

The Department of Sociology has a strong commitment to research, publication, and training and is dedicated to providing a rich undergraduate program, both for students majoring in sociology and for others who wish to learn about human society and social relations.

## Graduate Program

Graduate Program Coordinator  
206 Savery, Box 353340  
(206) 543-5396  
[asksoc@u.washington.edu](mailto:asksoc@u.washington.edu)

Sociology seeks to explain social structure, social institutions, and social interaction. The department has graduate program specialization in demography and ecology, deviance and social control, race and ethnic relations, family systems, gender studies, macrosociology, organizations and occupations, quantitative research methodology, social psychology, sociological theory, and stratification.

Emphasis is on empirical research aimed at testing theories and generating new principles. Students are trained in problem formulation, research design, data gathering and analysis, and bringing data to bear on significant questions. Instruction is offered in various methods: statistical, survey, computer, demographic and ecological, interaction observation, experimental, case study, field research, and historical. Students learn social research by participating in faculty projects or developing their own studies. Also available is an extensive program in training students to teach.

The graduate program aims at completion of the Master of Arts degree in two calendar years and the Doctor of Philosophy degree in three years beyond the M.A. degree, although not all students finish in this time. A thesis is required for the M.A. degree. For the Ph.D. degree, the student must be certified in general methodology and in a major and a minor substantive area, in addition to completing an approved dissertation.

### Special Requirements

Applicants for admission to the Master of Arts program are evaluated on undergraduate performance, Graduate Record Examination scores, statement of educational plans, recommendations, and samples of written work. For admission to the Ph.D. program, students are expected to have completed an M.A. degree in sociology in this department or elsewhere. Occasionally, M.A. degrees in other fields are accepted as a basis for admission to the Ph.D. program. The department encourages applications from minority students.

### Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of training.

## Faculty

### Chair

Robert D. Crutchfield

### Professors

Barth, Ernest A. T. 1955, (Emeritus); PhD, 1955, University of North Carolina.

Borgatta, Edgar F. \* 1980, (Emeritus); PhD, 1952, New York University; methodology, social psychology, demography-ecology, aging.

Bridges, George S. \* 1982; PhD, 1979, University of Pennsylvania; deviance, social control, law, and legal institutions.

Burstein, Paul \* 1985; PhD, 1974, Harvard University; political sociology, social stratification, public policy, law.

Campbell, Frederick L. \* 1966; PhD, 1967, University of Michigan; population and ecology, social organization.

Chiro, Daniel \* 1974; PhD, 1973, Columbia University; political sociology, ethnic conflict.

Costner, Herbert L. \* 1959, (Emeritus); PhD, 1960, Indiana University; methodology, social change.

Crutchfield, Robert D. \* 1979; PhD, 1980, Vanderbilt University; deviance, criminology, social control, stratification.

Gillmore, Mary Louise 1977, (Adjunct); MS, 1970, University of Michigan; MA, 1977, PhD, 1983, University of Washington; adolescent sexuality and substance abuse.

Grembowski, David \* 1981, (Adjunct); MA, 1975, Washington State University; PhD, 1982, University of Washington; dental care demand, fluoridation, dental health services research.

Gross, Edward \* 1965, (Emeritus); PhD, 1949, University of Chicago; formal organizations, industrial sociology, symbolic interaction, sociology of law.

Guest, Avery \* 1972; MS, 1964, Columbia University; MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Hamilton, Gary G. \* 1993; PhD, 1975, University of Washington; economic sociology, historical comparative, organizational studies, East Asia.

Handcock, Mark S. 2000, (Acting); PhD, 1989, University of Chicago; spatial statistics.

Hechter, Michael N. \* 1999; PhD, 1972, Columbia University; political sociology, theory, rational choice.

Hirschman, Charles \* 1987; PhD, 1972, University of Wisconsin; demography, race and ethnic relations, social stratification, Southeast Asia.

Howard, Judith A. \* 1982; PhD, 1982, University of Wisconsin; social psychology, sociology of gender, intersections of race/class/gender/sexuality.

Kasaba, Resat \* 1985, (Adjunct); PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Lang, Kurt \* 1984, (Emeritus); PhD, 1953, University of Chicago; political and social effects of the media on mass communication.

Larsen, Otto \* 1958, (Emeritus); PhD, 1955, University of Washington; mass communications, public opinion, collective behavior.

Locke, Hubert G. \* 1976, (Adjunct); MA, 1962, University of Michigan; criminal justice, urban policy, race and ethnic relations, ethics and public policy.

Matsueda, Ross L. \* 1998; PhD, 1984, University of California (Santa Barbara); criminology, juvenile delinquency, deviance, quantitative methods.

Miyamoto, Frank 1941, (Emeritus); MA, 1938, University of Washington; PhD, 1950, University of Chicago; social psychology, collective behavior.

Raftery, Adrian Elmes \* 1985; Doct, 1980, Universite de Paris VI (France); time series, Bayesian statistics, spatial statistics, population estimation, model selection.

Schmitt, David R. \* 1968; PhD, 1963, Washington University; experimental social psychology, behavior analysis.

Schwartz, Pepper J. \* 1972; PhD, 1974, Yale University; family, gender, human sexuality, field methods.

Scott, Joseph W. \* 1985; PhD, 1963, Indiana University; political sociology, family sociology, race/ethnic relations.

Stark, Rodney \* 1971; PhD, 1971, University of California (Berkeley); scientific methods in theory and research, religion, deviance, prejudice, police.

Van Den Berghe, Pierre L. \* 1965, (Emeritus); PhD, 1960, Harvard University; comparative sociology, stratification, race and ethnic relations, kinship, sociology.

Wager, L. Wesley \* 1954, (Emeritus); PhD, 1959, University of Chicago; organizations/occupations, theory, culture.

Weis, Joseph G. \* 1974; DCrim, 1974, University of California (Berkeley); crime, delinquency, social control, deviance.

### Associate Professors

Brines, Julie E. \* 1993; PhD, 1990, Harvard University; gender, stratification, family, methods.

Friedman, Debra 1993, (Affiliate); PhD, 1983, University of Washington; political sociology, theory, education.

Herting, Jerald R. \* 1996, (Research); PhD, 1987, University of Washington; adolescent substance abuse and mental health, quantitative methods, social demography.

Kashima, Tetsuden \* 1976, (Adjunct); PhD, 1975, University of California (San Diego); Japanese American incarceration and social organization, sociology of race and ethnic relations.

Kiser, Edgar Vance \* 1988; PhD, 1987, University of Arizona; political sociology, theory, historical sociology.

Lavelly, William R. \* 1985; PhD, 1982, University of Michigan; social demography of China.

### Assistant Professors

Brewer, Devon 1996, (Affiliate); PhD, 1994, University of California (Irvine); social networks, research methodology.

Kim, Hyojoung \* 1998; PhD, 1995, University of Wisconsin; social movements, comparative historical analysis, social networks, rational choice.

Kuo, Hsiang-Hui D. \* 1996; PhD, 1995, University of Wisconsin; social stratification, life course and aging, quantitative methods, social demography.

Lepore, Paul C. \* 1997; PhD, 1997, University of Wisconsin; social psychology, sociology of education, social structure and personality, sociological methods.

Pettit, Elizabeth M. 1999; PhD, 1999, Princeton University; family, demography, stratification/mobility.

Pfaff, Steven J. 1999; PhD, 1999, New York University; comparative/historical sociology, theory, collective behavior/social movements.

Pitchford, Susan \* 1987; PhD, 1994, University of Washington; race and ethnic relations, social movements, comparative sociology.

Sunindyo, Saraswati \* 1993, (Adjunct); PhD, 1993, University of Wisconsin; feminism and nationalism, comparative women's movements, Southeast Asia.

Warren, John R. \* 1998; PhD, 1998, University of Wisconsin; social stratification and inequality, sociology of education, research methods.

### Senior Lecturer

Black, Albert W. \* 1972; MA, 1968, Wayne State University; PhD, 1976, University of California (Berkeley); race and ethnic relations, stratification, social movements, race and poverty.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**SOC 401 Special Topics in Sociology (5, max. 15) I&S** Selected topics of contemporary interest taught by a sociologist active in the field. Topics vary and may be substantive, theoretical, or methodological.

**SOC 410 History of Sociological Thought (5) I&S** Contributions of individual theorists (from Comte to the present); emphasis on cumulative development of concepts and principles, emergence of sociology as a science, probable future developments.

**SOC 411 Selected Topics in History of Sociological Thought (5) I&S** Specific areas or eras in the history of sociological thought. Emphasis on the development of sociological theory in relation to the intellectual and social setting of the time. Topics change from quarter to quarter. Some topics are: the development of concepts of order in sociological thought; conflict theories; the development of action theory in sociology; German sociology; Marx, Weber, and Simmel.

**SOC 416 Sociological Theory (5) I&S** *Kiser* Theories of individual action, social order, and institutional change. Cumulative development of solutions rather than on works of given theorists. Theories of social order. How sociological treatments of these issues compare with those offered by economists and other social scientists.

**SOC 419- Fieldwork: Observation and Interviewing (5-) I&S** *Becker* Perspective, logic, and techniques of qualitative social research and analysis. Nature and uses of intensive interviewing, participant observation, and analytic ethnography. Application of field research principles. Research project required in addition to reading and analysis of classic studies. Offered: W.

**SOC -420 Fieldwork: Observation and Interviewing (-5) I&S** *Becker* Logic and techniques of qualitative social research and analysis. Intensive interviewing, participant observation, qualitative data analysis (including applications of data base technology, problem reformulation, and techniques of visual documentation). Results of student work reported and discussed in class. Offered: Sp.

**SOC 424- Applied Social Statistics (3-) I&S** Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: W.

**SOC -425 Applied Social Statistics (-3) I&S** Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: Sp.

**SOC 428 Principles of Study Design (3) I&S** *Crutchfield, Guest* Study design from problem formulation to the analysis and interpretation of data. Offered: Sp.

**SOC 429 Practicum in Data Analysis (3) I&S** *Bridges, Crutchfield, Guest* Introduction to selected programs for data analysis and practice in their application. Practice in coordination research problem, data, and mode of analysis into a coherent, interrelated set. Interpretation of results. Offered: A.

**SOC 431 Fertility and Mortality (3) I&S** *Lavelly* Theories of fertility and mortality, demographic transitions, individual variations. Specific analytic approaches. Familiarity with basic fertility and mortality measures, and with the life table, is assumed.

**SOC 432 Population and Modernization (3) I&S** *Hirschman, Lavelly* Examines role of demographic factors in the process of social modernization and economic growth. The approach is both historical, focusing on populations of developed countries since 1700, and analytic, stressing the attempts made by different disciplines to model demographic relationships, with attention to less-developed regions. Offered: jointly with SIS 432.

**SOC 433 Research Methods in Demography (3) I&S** *Hirschman* Basic measures and models used in demographic research. Sources and quality of demographic data. Rate construction, standardization, the life table, stable population models, migration models, population estimation and projection, measures of concentration and dispersion, measures of family formation and dissolution.

**SOC 434 Demographic Issues in Asia (3-5) I&S** *Lavelly* Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. This seminar addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SISEA 434.

**SOC 447 Social Movements (5) I&S** Social movements as collective attempts to change society: why people join; characteristics of successful and unsuccessful movements; consequences of social movement activities.

**SOC 450 Political Economy of Women and Family in the Third World (5) I&S** Theoretical and empirical aspects of the political economy of women and the family in the Third World during the process of development, with a focus on labor. Main theoretical approaches examined and applied to case studies from Asia and Latin America. Offered: jointly with SIS 450.

**SOC 451 Theory and Process of Social Change (5) I&S** *Hamilton* Basic trends in economic and social development; comparative and historical analysis of social and economic changes; the rise of capitalist societies.

**SOC 456 Political Sociology (5) I&S** *Burstein* Relationships between social change and political change. Focus on selected issues, including social bases of democracy, political organization, elections, and consequences of public policy.

**SOC 457 Sociology of Religion (5) I&S** The relations between religion, polity, economy, and social structure; in particular, the political, economic, and social impact of religious beliefs and organizations, as well as the social determination of these beliefs and organizations; the rise of secularism, the rationalization of modern life, and the emergence of political quasi-religions.

**SOC 460 Social Differentiation (5) I&S** Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race.

**SOC 461 Comparative Ethnic Race Relations in the Americas (5) I&S** *Scott* Sketches the ethnoracial systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnoracial systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with AES 461.

**SOC 462 Comparative Race and Ethnic Relations (5) I&S** *Scott* Race and ethnicity as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Offered: jointly with AES 462.

**SOC 465 Complex Organizations (5) I&S** *Hamilton* Examination of the structure of complex organizations. Attention to developing generalizations applicable to industrial organizations, businesses, hospitals, prisons, labor unions, governments, universities, armies, and similar formally instituted organizations. The major focus is on empirical research, with some attention to methodological problems in studying such organizations.

**SOC 466 Economic Sociology (5) I&S** *Hamilton, Reitman* Changing focus of field: cultural variation, work, and the worker; technology, society, and the evolution of industrial forms; types and forms of in-

dustrial organizations; industrial organizations as social and technical systems; issues of control, process, and change; the individual in social and technical systems.

**SOC 472 Juvenile Delinquency (5) I&S** *Crutchfield, Weis* Factors in delinquency, juvenile courts. Programs of treatment and prevention.

**SOC 473 Corrections (5) I&S** *Weis* Analyzes research on diversionary methods and treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution; probation, parole, halfway houses, and other alternatives to incarceration; correctional institutions. Organization of state and federal systems. Problems of administration. Subsidies and governmental control. Planning and public participation. Recommended: SOC 371; SOC 372. Offered: jointly with SO JU 473.

**SOC 481 Issues in Analytic Sociology (5, max. 15) I&S** Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

**SOC 483 Issues in Analytic Sociology (1-3, max. 9) I&S** Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

**SOC 485 Family Change in Western Europe and the United States (5) I&S** Investigates patterns of recent family change. Explores similarities and differences in family life between Western Europe and US as well as variations among countries and among population subgroups within countries. Focuses on differences and similarities in social, economic, political, and cultural environments. Offered: jointly with EURO 485.

**SOC 486 Human Family Systems: Biological and Social Aspects (5) I&S** Biological bases for human mating and reproduction, and an examination of the range of cross-cultural variability in human systems of kinship and marriage. Compares wide range of human and nonhuman species, and Western and non-Western human societies. Interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with ANTH 486.

**SOC 487 Sociology of Gender and Sexuality (5) I&S** Addresses the intersection of gender and sexuality in U.S. society, social institutions and movements, families, and the individual. Topics include the history of sexuality as practiced and politicized since colonial times, major theoretical approaches to sexuality, and how gender and other social status characteristics influence the meanings of sexuality.

**SOC 490 The Urban Underclass (5) I&S** Examines underlying issues which have led to the emergence and perpetuation of an underclass within an affluent society. Explores some of the consequences for these people and for this society. Considers policies that might be used to address problems of the urban underclass.

**SOC 491 Sociology of Science (5) I&S** *Becker* Sociological study of scientific activity. Social origins of scientific thought and practice, the organization of scientific work, and the process of change in science. Major theories in the area, including Merton, Kuhn, and Latour.

**SOC 492 Sociology of Education (5) I&S** *LePore* Emphasizes the ways in which schools and colleges reproduce, reinforce, and challenge prevailing social, economic, and political relationships. Examines the structures, practices, content, and outcomes of schooling and its relationship to the wider society as well as the rise and dynamics of the modern education system.

**SOC 495 Honors Senior Thesis (1-5, max. 5) I&S** Preparation of senior honors thesis. Sociology majors only.

**SOC -497- Honors Senior Seminar (-[3/5]-) I&S** Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: W.

**SOC -498 Honors Senior Seminar (-[3/5]) I&S** Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: Sp.

**SOC 499 Undergraduate Independent Study or Research (2-5, max. 10)** Credit/no credit only.

## Courses for Graduates Only

**SOC 500 Teaching Sociology as a Teaching Assistant (1)** *Bridges* Techniques of quiz section administration, advising of students, and student evaluation important to successful teaching as a Teaching Assistant. Students develop presentations and classroom materials and develop and grade student examinations. Credit/no credit only. Prerequisite: admission to graduate program in sociology.

**SOC 501 Proseminar (3)** Introduction for first-year graduate students to substantive areas of sociology, research and information resources, and issues in graduate education and professional socialization. Credit/no credit only. Offered: A.

**SOC 502 Seminar on Teaching Sociology (3)** *Howard* Techniques of lecturing, leading discussion, evaluating student performance, and other pedagogical skills ancillary to successful teaching. Students develop a course and obtain videotaped feedback of presentations. Prerequisite: completion of MA. Offered: W.

**SOC 503 Seminar on Writing Social Science (3)** *Becker, Burstein, Howard* Techniques, skills, and strategies helpful for publishing in the social sciences. Includes writing and revision of own work and evaluation of the writing of other students. Also includes social scientific analysis of writing and other forms of academic communication. Prerequisite: completion of MA. Offered: A.

**SOC 510 Seminar in Sociological Theory (3)** *Kiser* Macrosociological theories; functionalism and neoevolutionism; conflict and consensus approach; comparative strategies; models and long-range theories; ideology and sociology. From Marx and de Tocqueville to contemporary literature. Offered: A.

**SOC 511 Classical Social Theory (3)** *Chirot* Study of classical masters of social theory: Marx, Durkheim, and Weber, their precursors, and their immediate successors.

**SOC 513 Demography and Ecology (3)** *Hirschman* Theories and research on human fertility, mortality, mobility, migration, and urbanization in social/economic context. Comparative and historical materials on Europe, the United States, and the Third World.

**SOC 514 Current Theories in Social Psychology (3)** *Howard, LePore, Schmitt* Broad graduate-level introduction to the theories in the field of social psychology.

**SOC 516 Organizations (3)** *Hamilton* Broad graduate-level introduction to the theory and research on complex organizations.

**SOC 517 Deviance and Social Control (3)** *Bridges, Crutchfield, Weis* Survey of current research on deviant behavior and mechanisms of social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control.

**SOC 518 Social Stratification (3)** *Burstein* Intensive preparation in theoretical, methodological, and substantive topics in social stratification.

**SOC 528 Seminar on Selected Statistical Problems in Social Research (3)** *Raftery* Prerequisite: SOC 426.

**SOC 529 Multiple Indicators in Social Measurement (3)** Repeated measures, alternate measures and multiple observers in estimating the reliability, assessing the validity, and analyzing conceptual and indicator problems in social measurement. Implications of measurement error for research conclusions. Prerequisite: SOC 424, SOC 426.

**SOC 535 Research Issues in Demography and Population Studies (1-2, max. 7)** Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Offered: AWP.

**SOC 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3)** *Raftery* Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 425 or STAT 395 or permission of instructor. Offered: jointly with STAT 536.

**SOC 539 Selected Topics in Demography and Ecology (3, max. 9)** Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan community. See quarterly announcement for specific problem to be covered.

**SOC 550 Changing Patterns of Family Organization (3)** *Schwartz* History of the family with emphasis on changes in European and American families since 1600. Concomitant changes in other institutions and their relation to changes in the family.

**SOC 551 Family and Gender Relations (3)** *Lye, Schwartz* Overview of major research findings on marriage, the family, and gender, including demographic trends, the place of children in society, courtship, the internal management of intimate relationships, divorce, and social policy.

**SOC 553 Seminar on Gender and Sexuality (3)** Research seminar considering theoretical and empirical approaches to sexuality, with particular attention to the importance of gender. Examines the social control of sexuality by the state and by families, as well as social meanings of sexuality within social movements related to various aspects of sexuality.

**SOC 554 Seminar in the Sociology of Religion (3)** Survey of significant and active areas of theory and research in contemporary social scientific studies of religion.

**SOC 555 Methods in Macro, Comparative, and Historical Sociology (3)** *Chiro, Reitman* Systems of conducting research with qualitative methods brought to bear on broad questions.

**SOC 556 The Evolution of the Family (3)** *van den Berghe* Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with ANTH 556.

**SOC 559 Seminar on Gender Roles (3)** *Brines, Howard* Broad graduate-level introduction to theoretical issues concerning gender and society. Current state of empirical knowledge on the sociology of gender and

strategies for research. Cross-cultural variations in conception of gender roles and how gender intersects with social institutions and social interactions.

**SOC 561 Society, Chronic Illness, and Disability (3)** *Hedrick* Definition and assessment of chronic illness, disability, and health status. Analysis of chronic illness and disability using frameworks from social sciences and public health. Dimensions of disablement as they affect provision of health services. Research on effectiveness of services and approaches to improvement. Prerequisite: permission of instructor. Offered: jointly with HSERV 580; Sp.

**SOC 562 Seminar in Comparative Race Relations (3)** *van den Berghe* Cross-cultural approach to race and ethnic relations, including case studies from Africa and Latin America. Prerequisite: graduate standing in social sciences.

**SOC 566 Seminar in Complex Organizations (3)** Special topic seminars in the field of complex organizations or industrial sociology.

**SOC 569 Demographic Studies of Stratification (3)** *Hirschman* Overview of development of models of socioeconomic achievement ("status attainment" paradigm) in the field of stratification. Begins with work of Blau and Duncan. Covers elaboration of basic models to include race and ethnicity, social psychological variables, class, school and labor market effects, and other structural variables. Prerequisite: SOC 513, SOC 518.

**SOC 574 Seminar in Methods of Criminological Research (3)** *Bridges, Weis* Provides training in the technical analysis of published research in criminology; designs and processes studies in parole prediction, prediction of prison adjustment, and prediction of treatment effect.

**SOC 581 Special Topics in Theory and the History of Sociological Thought (3, max. 9)** Examination of current topics in theory and the history of sociological thought. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 582 Special Topics in Research Methods and Statistical Analysis in Sociology (3, max. 9)** Examination of current topics in research methods and statistical analysis in sociology. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 584 Special Topics in Social Psychology (3, max. 9)** Examination of current substantive topics in social psychology. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 585 Special Topics in Marriage and Family (3, max. 9)** Examination of current substantive topics in marriage and the family. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 586 Special Topics in Organization and Industrial Sociology (3, max. 9)** *Reitman* Examination of current substantive topics in organizational and industrial sociology. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 587 Special Topics in Deviance and Social Control (3, max. 9)** Examination of current substantive topics in deviance and social control. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 588 Special Topics in Stratification and Race Relations (3, max. 9)** Examination of current substantive topics in stratification and race relations. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 589 Special Topics in Macrosociology (3, max. 9)** Examination of current substantive topics in macrosociology. Content varies according to recent developments in the field and the interests of the instructor.

**SOC 590 Special Topics in Sociology (3, max. 9)** Examination of current substantive topics in sociology. Content varies according to recent developments in the field and the interests of the instructor. Topics covered in courses with this number lie outside those covered by other special topics courses numbered 581 through 589.

**SOC 591 Political Sociology (3)** Introduction to political sociology, considering the rise of the modern state, power, political organization, social movements, and other related topics.

**SOC 600 Independent Study or Research (\*)** Credit/no credit only.

**SOC 700 Master's Thesis (\*)** Credit/no credit only.

**SOC 800 Doctoral Dissertation (\*)** Credit/no credit only.

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## South Asian Studies

See International Studies.

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## Southeast Asian Studies

See International Studies.

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## Speech and Hearing Sciences

210 Eagleson



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/speech\\_hearing.html](http://www.washington.edu/students/genocat/academic/speech_hearing.html)



Department Web page:  
[depts.washington.edu/sphsc/](http://depts.washington.edu/sphsc/)

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## Graduate Program

Graduate Program Coordinator  
205 Eagleson, Box 354875  
(206) 685-7400  
[sphscadv@u.washington.edu](mailto:sphscadv@u.washington.edu)

The Department of Speech and Hearing Sciences offers the Master of Science and Doctor of Philosophy degrees. The program consists of a wide range of course work and seminars providing opportunities for the development of scholarly and professional competence in various areas of specialization: language acquisition, phonetics, speech production, hearing, hearing development, psychoacoustics, physiological acoustics, speech perception, computer recognition and generation of speech, and human communication disorders related to language, speech, and hearing. At the master's level, the specific focus is on the clinical procedures involved in their identification, prevention, and remediation of communicative disorders. To complement departmental curricula in various specialization areas, close interdisciplinary relationships are maintained with other University departments and off-

campus centers. Advanced degrees in the speech and hearing sciences equip the student to do research, to teach at the college and university level, and to provide clinical services to the communicatively impaired.

### Special Requirements

Prospective candidates for advanced degrees are expected to have earned 50-60 credits in the speech and hearing sciences at the undergraduate level, depending upon the specific area of graduate specialization chosen. The M.S. degree is intended primarily for students who desire careers as speech-language pathologists and audiologists, but who may or may not continue study for the Ph.D. degree. Students complete the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech-Language-Hearing Association. Students must also meet all Graduate School requirements for the master's degree. A thesis is optional. A non-clinical M.S. degree, requiring a thesis, may be designed as well. (Please contact the graduate program coordinator.) For the Ph.D. degree, individually tailored programs of study are developed to focus on specialized areas of interest within speech science, hearing science, experimental and clinical audiology, and speech/language pathology.

### Financial Aid

A number of teaching and research assistantships are available for qualified graduate students. In addition, the department has traineeships/fellowships supported by the National Institutes of Health and the Department of Veterans Affairs.

### Research Facilities

The department's research laboratories, as well as those of the Virginia Merrill Bloedel Hearing Research Center, contain sophisticated equipment for the collection and analysis of data related to the study of human communication and its disorders. The University Speech and Hearing Clinic and the Center on Human Development and Disability also provide laboratories to support basic and applied research in speech, language and hearing development and disorders, across the life span.

## Faculty

### Chair

Carol Stoel-Gammon

### Professors

Folsom, Richard C. \* 1976; PhD, 1979, University of Washington; pediatric audiology, auditory evoked potentials.

Gates, George A. 1993, (Adjunct); MD, 1959, University of Michigan; otology/neurotology, cochlear implantation.

Kuhl, Patricia K. \* 1976; MA, 1971, PhD, 1973, University of Minnesota; speech perception.

Meltzoff, Andrew N. \* 1977, (Adjunct); PhD, 1976, Oxford University (UK); cognitive and social development of human infants.

Miner, Adah L. 1965, (Emeritus); MA, 1948, University of Washington; PhD, 1962, University of Wisconsin; speech pathology, clinical supervision.

Minifie, Fred D. \* 1971, (Emeritus); PhD, 1963, University of Iowa; speech acoustics.

Olswang, Lesley B. \* 1977; PhD, 1978, University of Washington; language development and disorders/clinical processes.

Prins, David \* 1969, (Emeritus); PhD, 1961, University of Michigan; fluency disorders.

Stoel-Gammon, Carol \* 1983; PhD, 1974, Stanford University; developmental phonology and phonetics.

Thompson, Gary \* 1966, (Emeritus); PhD, 1967, University of Minnesota; pediatric audiology, clinical evaluation.

Thompson, Marie D. \* 1979, (Adjunct); PhD, 1970, University of Washington; special education (hearing impaired).

Werner, Lynne A. \* 1986; PhD, 1980, Loyola University (Chicago); auditory development, infant psychoacoustics.

Wilson, Wesley \* 1966, (Emeritus); PhD, 1969, University of Washington; audiology, infant assessment and aural rehabilitation.

Yantis, Phillip A. \* 1965, (Emeritus); PhD, 1955, University of Michigan; audiology, clinical evaluation.

Yorkston, Kathryn \* 1975, (Adjunct); PhD, 1975, University of Oregon; neurogenic communication disorders in adults.

### Associate Professors

Burns, Edward M. \* 1984; PhD, 1977, University of Minnesota; psychoacoustics.

Carpenter, Robert L. \* 1970; PhD, 1969, Northwestern University; language and language disorders.

Coggins, Truman E. \* 1974; PhD, 1976, University of Wisconsin; language disorders in children.

Cooker, Harry S. \* 1976, (Emeritus); PhD, 1963, University of Iowa; speech physiology.

Moore, Christopher A. \* 1995; MA, 1981, PhD, 1985, Purdue University; speech production, development, and physiology; acoustics, motor control, coordination.

Norton, Susan J. \* 1991, (Adjunct); PhD, 1982, University of Washington; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals.

Rees, Thomas 1971, (Adjunct); MA, 1969, University of Redlands; PhD, 1972, University of Washington; audiology.

Reich, Alan R. \* 1977; PhD, 1975, University of Iowa; speech physiology and voice disorders.

Rogers, Margaret A. \* 1992; PhD, 1992, University of Iowa; spoken language production including semantics, phonology, and motor control; speech aphasia/apraxia.

Schwartz, Ilene Sharon \* 1991, (Adjunct); PhD, 1989, University of Kansas; early childhood, classroom-based interventions, and applied behavior analysis.

### Assistant Professors

Kujawa, Sharon Guilds 1997, (Adjunct); PhD, 1993, University of Arizona; audiology.

Souza, Pamela E. \* 1996; MS, 1992, PhD, 1996, Syracuse University; hearing aids, effects of sensorineural hearing loss on speech perception.

Tremblay, Kelly L. 1998; PhD, 1998, Northwestern University; hearing sciences, clinical audiology, evoked potentials, central auditory plasticity.

### Senior Lecturers

Alarcon, Nancy B. 1988; MS, 1981, University of Wisconsin; speech-language disorders/adult.

Labiak, James M. 1974; MA, 1971, University of Washington; audiologic evaluation/calibration.

Sanborn, E. Sue 1988; MA, 1967, PhD, 1971, University of Washington; clinical audiology/aural rehabilitation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**SPHSC 405 Diagnosis of Speech and Language Disorders (3) NW** Principles and procedures for the diagnosis of speech and language disorders. Required for majors. Prerequisite: SPHSC 305. Offered: W.

**SPHSC 406 Treatment of Speech and Language Disorders (3) NW** Principles and procedures for planning, implementing, and evaluating treatment for speech and language disorders. Required for majors. Prerequisite: SPHSC 405. Offered: SpS.

**SPHSC 425 Speech, Language, and the Brain (5) NW** Historical perspectives and current research on speech acoustics, speech perception, and brain processing of speech information; speech development; techniques used in speech analysis; machine recognition of speech; brain imaging techniques, animal communication systems; speech evolution; implications for impaired populations. Offered: A.

**SPHSC 435 Forensic Acoustics: Courtroom Applications of Speech and Hearing Sciences (5) I&S/NW Reich** Forensic applications of speech and hearing sciences: audio tape enhancement; tape authentication; speech transcription; speech level and audibility; speaker identification; voice stress analysis; gunshot, aviation, microphone, and telephone sound analysis; train and emergency vehicle audibility; the judicial process; being an effective expert witness.

**SPHSC 445 Models of Speech Processing (3) NW** Examines models and basic issues concerning how spoken language is processed. Presents current issues, theories, and research relative to the levels of processing entailed in producing and comprehending speech. Required for majors; open to nonmajors. Recommended: SPHSC 302; SPHSC 303; SPHSC 320; SPHSC 425.

**SPHSC 449 Special Studies in Speech Pathology and Audiology (\* max. 30)** Selected special problems in speech pathology and audiology. Offered: S.

**SPHSC 454 Augmentative and Alternative Communication: Access for Technology (3) NW** Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with REHAB 459.

**SPHSC 462 Hearing Development (3) NW** Description of the changes that occur in human hearing during development. Consideration of the possible explanations for early immaturity. Prerequisite: SPHSC 461. Offered: even years; A.

**SPHSC 471 Basic Audiometry (5) NW** Theory and practice of the assessment of hearing function, including standard pure-tone audiometry, speech audiometry, and basic impedance audiometry. Required for majors. Prerequisite: SPHSC 371 which may be taken concurrently; SPHSC 461. Offered: WSp.

**SPHSC 481 Management of Hearing Loss (4) NW** Introduction to methods of communicative rehabilitation of person with hearing loss. Remediation principles of auditory and visual perception, amplification, communication strategies, and information counseling. Required for majors. Prerequisite: SPHSC 471. Offered: WS.

**SPHSC 491 Audiology Practicum in Schools (2)** Special projects in clinical audiology practicum, offered only in the school setting. Provides an opportunity for students to extend audiology practicum experiences into the school environment. Prerequisite: SPHSC 471. Offered: A.

**SPHSC 499 Undergraduate Research (1-5, max. 15)** Offered: AWSpS.

### Courses for Graduates Only

**SPHSC 500 Clinical Methodology for Documenting Change (4)** Introduction to clinical methodology for examining efficacy of treatments for individuals with communication problems. Students consider nature of intervention designed to alter communication disorders and types of accountability questions that need to be raised. They learn methodology for collecting and analyzing data to document effectiveness, effects, and efficiency of treatments.

**SPHSC 501 Neural Bases of Speech, Language, and Hearing (4)** Neuroanatomical and neurophysiological bases of language, hearing, sensory, and motor function. Special emphasis given to brain behavior correlates and behavioral consequences to speech, language, and hearing as a result of neurologic injury or disease.

**SPHSC 502 Advanced Anatomy of Speech and Hearing Structures (2)** Directed independent dissection and study of selected anatomic structures of the speech or hearing mechanisms.

**SPHSC 503 Current Issues in Speech and Hearing Sciences (3)** Application of experimental methods to research in speech and hearing sciences.

**SPHSC 504 Research Methods in Speech and Hearing Sciences (3)** Introduction to empirical methods in the speech and hearing sciences.

**SPHSC 505 Clinical Research in Communication Disorders (3)** Introduction to clinical research. Methodological issues concerning the evaluation of treatment for speech, hearing, and language disorders. Primary emphasis on time series designs. Prerequisite: SOC 504 or permission of instructor.

**SPHSC 510 Physiological Acoustics (3)** Study of pertinent literature and experimental techniques incident to the physiology of the normal and abnormal auditory system. Prerequisite: SPHSC 461.

**SPHSC 511 Psychoacoustics (3)** Review of significant literature and theory pertinent to normal auditory sensitivity, pitch, loudness, and other attributes of auditory sensation. Prerequisite: SPHSC 461, SPHSC 510.

**SPHSC 515 Speech Acoustics (3)** Study of the acoustical correlates of the distinctive parameters of speech. Prerequisite: SPHSC 310, SPHSC 311, SPHSC 514.

**SPHSC 519 Seminar in Speech Science (2, max. 6)**

**SPHSC 520 Advanced Instrumentation for Speech and Hearing Sciences (3)** Design and use of electronic and electroacoustic devices in the speech and hearing sciences. Four hours of laboratory required each week.

**SPHSC 521 Instrumentation for Audiology (4)** Introduction to basic instrumentation used in audiology and hearing science; detailed instruction in audiometer calibration including a review of current national and international standards pertinent to audiology; emphasis on use rather than theory. Prerequisite: permission of instructor.

**SPHSC 530 Language Disorders in Children (4)** Consideration of the nature of language impairment in children, the types of children in whom language impairment is an important dimension, and approaches to treatment.

**SPHSC 531 Neurogenic Motor Speech Disorders (4)** The nature of apraxia of speech and dysarthria and the assessment and treatment of those disorders. Prerequisite: SPHSC 501 or permission of instructor.

**SPHSC 532 Neurogenic Language Disorders (4)** Nature of aphasia and other neurogenic language disorders; evaluation and treatment of those disorders. Prerequisite: SPHSC 501 or permission of instructor.

**SPHSC 533 Medical Speech Pathology (3)** Nature of speech pathology practiced in medical settings. Prerequisite: SPHSC 501, SPHSC 531, SPHSC 532, and SPHSC 535 or permission of instructor.

**SPHSC 534 Dysphagia and Associated Disorders (3)** Anatomic and physiologic bases of function and dysfunction associated with speech-language disorders. Mastication and swallowing problems, their causes, assessments, and management. Prerequisite: SPHSC 501 or permission of instructor.

**SPHSC 535 Voice and Resonance Disorders (4)** Physiology, acoustics, and perception of voice quality and speech resonance. Etiology, evaluation, and treatment of voice and resonance disorders.

**SPHSC 536 Assessment of Language Impairment in Children (4)** Principles and procedures used in the assessment of speech- and language-disordered children and adolescents.

**SPHSC 537 Fluency Disorders (4)** Characteristics of fluent speech and the nature and treatment of stuttering in children and adults are studied in relation to normal speech production processes, human learning, principal explanations of stuttering, and treatment systems.

**SPHSC 538 Management of Acquired Cognitive Disorders (2)** Epidemiology, neuropathology, assessment, and management of acquired cognitive disorders. Focus on traumatic brain injury in adults and children, dementia, and right brain injury. Prerequisite: SPHSC 501 and SPHSC 532 or permission of instructor.

**SPHSC 539 Articulation and Phonological Disorders (4)** Patterns of normal phonological development. Nature, assessment, and treatment of phonological disorders.

**SPHSC 542 Counseling and Interactive Skills for Speech-Language Pathologists and Audiologists (2-3)** Introduction to counseling theory and practice in speech-language pathology, audiology, and related fields. Provides opportunities for learning and practicing counseling skills. Addresses key counseling issues, including professional boundaries, intense emotions, and counselor's feelings and reactions. Prerequisite: graduate standing or permission of instructor.

**SPHSC 551 Advanced Practicum in Speech Pathology Evaluation (1-10, max. 10)** Laboratory experience in the evaluation of speech and language disorders. Credit/no credit only. Prerequisite: SPHSC 536 and permission of instructor.

**SPHSC 552 Advanced Practicum in Speech Pathology Management (1-10, max. 10)** Laboratory experience in the management of speech and language disorders. Credit/no credit only. Prerequisite: permission of instructor.

**SPHSC 555 Preinternship in Speech and Hearing Sciences (1-10, max. 10)** Practicum in speech pathology or audiology designed to teach the clinical regimen of a participating professional center prior to assuming a full internship assignment. Credit/no credit only.

**SPHSC 560 Studies in Speech Science and Disorders (3)** Examines contemporary models and research paradigms in speech science and disorders. Topics include respiratory physiology, laryngeal physiology, aerodynamics of speech production, articulatory dynamics, speech acoustics, and speech perception.

**SPHSC 561 Studies in Hearing Sciences and Disorders (3)** Examines contemporary models and research paradigms in the area of hearing science and disorders. Topics include psychoacoustics; amplification; electrophysiological evaluation; physiological acoustics; and perceptual consequences of hearing loss.

**SPHSC 562 Studies in Language Science and Disorders (3)** Examines research in the area of language science and disorders including word recognition and production; storage of retrieval of word form and meaning; comprehension and production of sentences and discourse; and language in social context. Topics examined relative to development, language impairments, and normal language processing.

**SPHSC 563 Proseminar: Instructional Development Forum (1, max. 3)** *Olswang* Emphasizes instructional techniques and issues as they relate to teaching in the discipline of communication sciences and its disorders. Topics include course development, grading, student-faculty relations, teaching methods, and diversity. Credit/no credit only. Prerequisite: graduate standing in Speech and Hearing Sciences.

**SPHSC 564 Teaching Practicum (1-5, max. 5)** Provides experience in preparing and giving lectures, leading discussions, preparing and grading assignments and tests, and working directly with undergraduate and graduate students. Prerequisite: doctoral student standing and permission of instructor. Credit/no credit only. Offered: AWSpS.

**SPHSC 565 Speech and Language Pathology Proseminar (1, max. 6)** Consideration of professional issues and student and faculty research. Credit/no credit only.

**SPHSC 566 Seminar in Speech-Language Development (2, max. 6)** Prerequisite: permission of instructor.

**SPHSC 567 Research Seminar in Speech and Hearing Sciences (1)** A platform for the presentation and exchange of scientific information (research data, new hardware and hardware development, scientific papers) resulting from ongoing research projects by graduate students and faculty within the Speech and Hearing Sciences department. Credit/no credit only.

**SPHSC 568 Grant Writing in Hearing, Language, and Speech Science (3)** Design and writing of grant proposals in speech, language, and hearing sciences and disorders. Explanation of the funding process at various agencies, particularly the National Institutes of Health. Students prepare a proposal and review the proposals of their peers. Prerequisite: upper-level doctoral standing and permission of instructor.

**SPHSC 569 Seminar in Speech-Language Pathology (2, max. 6)**

**SPHSC 570- Assessment of Auditory Dysfunction I (4-)** Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

**SPHSC 571 Assessment of Auditory Dysfunction II (-4)** Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

**SPHSC 572 Pediatric Audiology (3)** Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiologic techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisite: SPHSC 471 or equivalent.

**SPHSC 573 Physiologic Assessment of Auditory Function (4)** Consideration of physiologic techniques that may be used to evaluate the normal and disordered auditory system. Outside laboratory required. Prerequisite: SPHSC 461, SPHSC 571.

**SPHSC 574 Assessment of Balance Function (4)** Examines normal anatomy and physiology of the peripheral and central vestibular system. Reviews peripheral and central vestibular disorders and treatment protocols. Major focus of assessment on electronystagmography with associated lab. Provides overview of rotational and posturography measures of balance function. Prerequisite: permission of instructor.

**SPHSC 575 Medical Backgrounds in Audiology (3)** Diseases and injuries of the ear resulting in reduced audition. Prerequisite: SPHSC 571 or permission of instructor.

**SPHSC 580 Rehabilitative Audiology (3)** Explores technology to enhance communication effectiveness of hearing impaired persons. Selection and training in the use of assistive systems and cochlear implants. Advanced perception assessment and training methodology. Prerequisite: SPHSC 571 and SPHSC 583.

**SPHSC 581 Management of Hearing-Impaired Children (3)** Management of hearing-impaired children, including identification of target behaviors and methods for modification such as individualized therapy programs and parent and teacher involvement.

**SPHSC 582 Hearing Aid Amplification (4)** Acoustic amplification and methods of determining electroacoustic characteristics. Includes earmold technology. Prerequisite: SPHSC 471 and SPHSC 570 or permission of instructor.

**SPHSC 583 Hearing Aid Selection (4)** Consideration of strategies utilized in selecting acoustic amplification for the hearing impaired, including review of pertinent research literature. Prerequisite: SPHSC 582 or permission of instructor.

**SPHSC 588 Audiology Proseminar (1, max. 3)** Consideration of professional issues and student/faculty research in specific areas of interest. Credit/no credit only.

**SPHSC 589 Seminar in Audiology (2, max. 6)** Prerequisite: permission of instructor.

**SPHSC 591 Advanced Practicum in Audiology (1-10, max. 10)** Credit/no credit only. Prerequisite: permission of instructor.

**SPHSC 599 Research Practicum (\* max. 12)** Supervised laboratory experience in experimental approach to problems in speech and hearing sciences. Prerequisite: permission of instructor.

**SPHSC 600 Independent Study or Research (\* max. 10)** Prerequisite: permission of instructor.

**SPHSC 601 Internship (1-10, max. 10)** Supervised field experiences in settings other than public schools. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPSP.

**SPHSC 602 Internship in the Schools (3-10, max. 10)** Supervised field experience in a public school setting. Credit/no credit only. Prerequisite: permission of instructor.

**SPHSC 700 Master's Thesis (\* max. 10)**

**SPHSC 800 Doctoral Dissertation (\* max. 10)**

## Speech Communication

205 Raitt



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/speech\\_comm.html](http://www.washington.edu/students/genecat/academic/speech_comm.html)



Department Web page:  
[depts.washington.edu/spcom/](http://depts.washington.edu/spcom/)

Speech communication is the study of how people in specific contexts verbally and nonverbally negotiate meanings. The discipline studies such contexts as classrooms, families, political campaigns, and online environments, and examines how meanings are interactively constructed there. Course work is designed to enable students to enhance their theoretical knowledge by understanding speech communication as an outcome of choices, a social activity, and an aesthetic endeavor; to improve their critical capabilities through analysis of communicative behavior and discourse; and to develop their abilities to apply theory and criticism in communication practices.

## Graduate Program

Graduate Program Coordinator  
205 Raitt, Box 353415  
(206) 543-4860

Graduate study specialties include philosophy of communication; communication theory; interpersonal, small-group, political, instructional, cultural/intercultural, and developmental communication; communication education; oral interpretation; argument; rhetorical theory; criticism; and public address. Emphasis is on both social scientific and humanistic methods of scholarly inquiry.

The M.A. program with thesis requires at least 31 credits of approved course work and a thesis (9 credits). The M.A. program without thesis requires at least 45 credits, including a creative project.

The Ph.D. program usually requires four years of study beyond the baccalaureate degree.

## Special Research Facilities

The Instructional Resource Center provides support for the development and use of print, photographic, video, computer, and Web-based materials for teaching and research. In addition, a laboratory complex provides facilities for investigating phenomena that range from intimate interpersonal communication to worldwide computer-mediated public discourse. In early 2000, the laboratory included, among other items, 49 work stations, 12 servers, CD-R/CD-RW and DVD-RAM drives, digital video editing, robotic video cameras, dual-deck VCRs, digital audio editing, and 32-channel digital mixing equipment, along with extensive libraries of software for video and audio production, animation, image creation, and Web development.

## Admission Qualifications

A background of academic work adequate for pursuit of the degree sought is required. Applicants for the Ph.D. are normally expected to have an M.A. in speech communication or communications. A GPA and Graduate Record Examination scores that give promise of success in the department's graduate program are required.

## Financial Assistance

The department annually awards a number of teaching assistantships.

## Faculty

### Chair

Barbara P. Warnick

### Professors

Baskerville, Barnet 1940, (Emeritus); MA, 1944, University of Washington; PhD, 1948, Northwestern University; public address, rhetorical criticism.

Bennett, W. Lance \* 1974, (Adjunct); MPhil, 1973, PhD, 1974, Yale University; American politics, comparative politics, political communication, mass media, political culture.

Bosmajian, Haig A. \* 1965, (Emeritus); PhD, 1960, Stanford University; rhetoric, freedom of speech.

Coney, Mary B. \* 1976, (Adjunct); PhD, 1973, University of Washington; writing style and theories of technical communication, rhetoric, reader response theory.

Nielsen, Thomas R. 1946, (Emeritus); MA, 1948, University of Washington; PhD, 1953, Northwestern University; contemporary rhetorical theory, ethics of rhetoric.

Philipsen, Gerry F. \* 1978; PhD, 1972, Northwestern University; ethnography of communication.

Scheidel, Thomas M. \* 1976, (Emeritus); MA, 1955, PhD, 1958, University of Washington; communication theory and research, small group processes.

Stamm, Keith R. \* 1973, (Adjunct); PhD, 1968, University of Wisconsin; communities and newspapers, political communication, communication and environmental problems.

Staton, Ann Q. \* 1977; PhD, 1977, University of Texas (Austin); instructional communication.

Stewart, John R. \* 1969; PhD, 1970, University of Southern California; philosophy of qualitative research and interpersonal communication.

Warnick, Barbara P. \* 1980; PhD, 1977, University of Michigan; rhetorical theory and criticism.

### Associate Professors

Manusov, Valerie L. \* 1993; PhD, 1989, University of Southern California; the interplay between communication behaviors and cognitions in interpersonal interactions.

Parks, Malcolm R. \* 1978; PhD, 1976, Michigan State University; communication theory, interpersonal communication, research methods.

Post, Robert M. \* 1960; PhD, 1961, Ohio University; oral interpretation of literature.

Rivenburgh, Nancy \* 1989, (Adjunct); MS, 1982, Boston University; PhD, 1991, University of Washington; international communications, the media, intercultural relations and identity, international news.

### Assistant Professors

Ceccarelli, Leah M. \* 1996; MA, 1992, PhD, 1995, Northwestern University; rhetoric of science, rhetorical criticism.

Gastil, John W. \* 1997; PhD, 1994, University of Wisconsin; political participation and deliberative forms of democratic decision making.

Wulf, Donald H. \* 1982, (Affiliate); PhD, 1984, University of Washington; communication in instructional settings, including interpersonal and small-group communication.

### Senior Lecturer

Nyquist, Jody D. \* 1966; MA, 1967, University of Washington; communication occurring in higher education and/or business/industry training units.

## Lecturers

Coutu, Lisa 1990; PhD, 1996, University of Washington; culture and communication.

Zediker, Karen E. 1996; , PhD, 1995, University of Washington; philosophy of communication, instructional communication, conflict management.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**SP CMU 400 Theoretical Backgrounds in Speech Communication (5) VLPA/I&S** Capstone course, surveying development of the discipline and describing and analyzing its contemporary emphases. Students link appropriate interdisciplinary research and applications to their own 2-5 year post-baccalaureate trajectories.

**SP CMU 421 Advanced Speech Composition (5) VLPA/I&S** Preparation and delivery of public speeches with emphasis on style, thought organization, and proof. Analysis of model speeches. Recommended: SP CMU 220.

**SP CMU 423 Public Discourse on the Internet (5) I&S/VLPA** Study of public advocacy and persuasion in internet environments, including public interest advocacy sites, political campaigns, advertisements, editorials, and essays. Various critical models applied to analyze narratives, style, argument structure, and credibility of internet discourse. Recommended: SP CMU 310, SP CMU 425, or SP CMU 426.

**SP CMU 425 Historic American Public Discourse (5) VLPA/I&S** Rhetorical criticism of historical public speeches, essays, and declarations. Includes readings of public texts in their historical and political context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers the beginnings of the nation to the middle of the 20th century.

**SP CMU 426 Contemporary American Public Discourse (5) VLPA/I&S** Rhetorical criticism of contemporary public messages. Includes reading of public texts in their context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers mid-20th century to the present.

**SP CMU 434 Argumentation Theory (5) VLPA/I&S** Theory and research on the structure and properties of argument, argument fields, argument modeling, the influence of audience, argument criticism, and related topics. Prerequisite: either SP CMU 220 or SP CMU 334.

**SP CMU 440 Oral Interpretation of Poetry (3) VLPA** Study of forms of verse, representing various literary movements and cultures, through analysis and oral presentation. Recommended: SP CMU 140.

**SP CMU 442 Oral Interpretation of Fiction (3) VLPA** Analysis and oral interpretation of narrative perspectives in diverse works of prose fiction. Recommended: SP CMU 140.

**SP CMU 444 Oral Interpretation of Modern and Contemporary Dramatic Literature (3) VLPA** Study of dramatic literature from Ibsen to the present for purposes of developing understanding, appreciation, and ability to communicate its meaning. Playwrights from various cultures represented. Recommended: SP CMU 140.

**SP CMU 455 Communication in Children's Environments (5) VLPA/I&S** Study of the communication

capacity of children with emphasis on the analysis of the communication process in formal and informal learning environments. Includes examination of communication-based educational approaches and instructional strategies.

**SP CMU 456 Communication in Adolescent Environments (5) VLPA/I&S** Study of the communication process in youth environments with a primary focus on formal and informal learning. Includes critical analysis of communication in contemporary instructional settings and the development of communication strategies for teaching and learning.

**SP CMU 471 Persuasion (3) VLPA/I&S** Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

**SP CMU 472 Empirical Approaches to Interpersonal Communication (5) I&S** Examination of theories and research on the development and deterioration of interpersonal relationships. Emphasis on the nature of interpersonal interaction, the role of language and nonverbal communication in relationships, functional and dysfunctional interaction patterns, and the dynamics of interpersonal networks.

**SP CMU 474 Communication, Conflict, and Cooperation (5) VLPA/I&S** Role of communication in resolving informal conflicts and in facilitating interpersonal and intergroup cooperation. Review of empirical literature. In-class simulations and exercises.

**SP CMU 475 Organizational Communication (5) VLPA/I&S** Role of communication in organizations, the types of problems arising, and approaches to their resolution. Communication in the human relations and productivity of organizations. Applying communication skills in various organization roles.

**SP CMU 476 Models and Theories in Speech Communication (5) I&S** Examination of selected theories and models of speech communication as well as of criteria applicable to them. Emphasis on the nature and function of theories and models, especially as these relate to basic principles underlying the scientific, interpretive, and critical study of speech communication phenomena. Offered: jointly with CMU 476.

**SP CMU 477 Political Deliberation (5) I&S** Exploration of philosophical and empirical writings on political deliberation in small groups, campaigns, and other public settings. Contemporary deliberative theory. Participation in face-to-face discussions on current issues. Recommended: SP CMU 368, SP CMU 369, or SP CMU 373.

**SP CMU 478 Intercultural Communication (5) I&S** Investigates intercultural communication theory and its application for varying levels of human interaction: interpersonal, intergroup, and international. Recommended: SP CMU 384. Offered: jointly with CMU 421.

**SP CMU 482 Computer-Mediated Interpersonal Communication (5) I&S** Examination of relationships and groups formed through computer-mediated interpersonal communication. Focus on how people manage interactions and identities, develop interpersonal relationships, engage in collaboration and conflict, and develop communities in virtual environments. Involves both the study and use of network-based computer-mediated systems.

**SP CMU 495 Internship Theory and Practicum (3-5, max. 5)** Faculty-supervised study of communication principles in internship contexts. Readings to aid students in observations of communication concepts combined with individualized reading structured around topics of interest for each student.

**SP CMU 496 Honors Seminar (5) VLPA/I&S** Preparation for researching and writing senior honors thesis.

**SP CMU 497 Honors Thesis (5, max. 15) VLPA/I&S** Researching and writing honors thesis.

**SP CMU 498 Special Topics in Speech Communication (2-5, max. 15)** Lecture, seminar, and/or team study. Topics vary.

**SP CMU 499 Undergraduate Research (1-5, max. 10)**

## Courses for Graduates Only

**SP CMU 501 Introduction to Graduate Research in Speech Communication (3)**

**SP CMU 506 Nonverbal Communication Theory and Research (5)** Primary theories and research on nonverbal communication. Focus on developmental and social aspects of nonverbal cues, including review of communicative functions served by nonverbal channels. Topics include tie of paralinguistic systems to language, deception, relational messages, acquisition of cue use, and emotional expression. Research methods for studying nonverbal behavior.

**SP CMU 510 Rhetoric in Society (4)** Selected works of major rhetorical theorists such as Aristotle, Cicero, Augustine, Campbell, Whately, Perelman, and Burke. Examines how rhetorical themes are responsive to and symptomatic of societal conditions and values.

**SP CMU 521 Studies in Greek and Roman Rhetoric (5)** Development of the Greek tradition in rhetorical theory, criticism, and pedagogy from Homer to Augustine; analysis of the contributions of major figures and works to that tradition.

**SP CMU 524 Studies in Contemporary Rhetoric (5)** Critical analysis of theories of twentieth-century rhetoric.

**SP CMU 525 Rhetorical Criticism (5)** History and method of rhetorical criticism. Application of critical standards to various rhetorical artifacts.

**SP CMU 526 The Rhetoric of Scientific Revolutions (3)** Examines selected topics in the history of science, underscoring the interplay of language, situation, culture, and prior tradition in the quest for exact knowledge of the natural world. Focuses on one science: biology, geology or psychology, examining selected revolutions within that discipline.

**SP CMU 527 Gender, Race, and Media (5)** Analysis of the role of media in construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with CMU 589 and WOMEN 589.

**SP CMU 530 Philosophical Issues in Rhetorical and Communication Theory (5)** Survey of selected philosophical controversies among speech communication theorists, and analysis of one philosopher's approach to communication. Topics include paradigm descriptions of communication, rhetoric and knowledge, linguistic analysis and communication, hermeneutics and dialogue.

**SP CMU 550 Instructional Design in Speech Communication (5)** Research, theory, and practice relevant to instructional design in speech communication. Instructional models, writing instructional objectives, strategies, and evaluative measures.

**SP CMU 551 Proseminar on Teaching Speech Communication (1-3, max. 9)** Rotating special-topics proseminar for teaching assistants on issues related to teaching speech communication and professional development. Content varies. Topics include cultural diversity, reflective teaching, developing a teaching portfolio, assessing oral communication, discussion teaching. Credit/no credit only.

**SP CMU 555 Instructional Communication (5)** Communication in instructional environments. Nature of instructional communication, paradigms for instructional communication research, quantitative and qualitative approaches to instructional communication, verbal and nonverbal classroom interaction.

**SP CMU 560 Social Scientific Perspectives on Interpersonal Communication (5)** Social scientific research and theory on the role of communication in developing and maintaining interpersonal relationships. Nature of interpersonal communication, relationship change processes, interpersonal control through communication, and personal communication networks.

**SP CMU 570 Organizational Communication (5)** Examination of social scientific theory and research on communication in organizations. Topics include quantitative and qualitative approaches to process of organizational communication, function and structure of macro networks, superior-subordinate relationships, and the role of communication in organizational change, development, and effectiveness.

**SP CMU 572 Theories of Human Communication (4)** Description and evaluation of theoretical approaches to the study of human communication. Exploration of their applications to specific subject areas.

**SP CMU 575 Philosophy of Interpretive Research in Communication (5)** Introduces interpretive researchers to foundations of this approach in Dilthey, Gadamer, Schutz, Weber, Wittgenstein, and others. Emphasizes Gadamer's philosophical hermeneutics.

**SP CMU 577 Fieldwork Research Methods (3-6, max. 12)** Methods of fieldwork research in communication studies, with emphasis on participant observation, ethnography, and discourse analysis.

**SP CMU 580 Research Methods in Speech Communication (5)** Application of behavioral research principles to problems in quantification, design, and analysis of data in speech communication research.

**SP CMU 581 Advanced Research Methods in Speech Communication (4)** Application of social scientific methods to problems in quantification, design, and analysis of communication data. Emphasis on advanced data collection concerns, multivariate data analysis, and computer operation. Prerequisite: SP CMU 580.

**SP CMU 584 Ways of Speaking (5)** Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned styles of communicative conduct. Offered: jointly with ANTH 584.

**SP CMU 588 Small-Group Communication (5)** Major small-group theories relevant to communicative behavior. Descriptive and experimental research findings in current speech communication literature. Prerequisite: SP CMU 473.

**SP CMU 590 Seminar in Theory of Speech Communication (5, max. 15)**

**SP CMU 592 Seminar in Public Address (3-4, max. 12)**

**SP CMU 593 Seminar in Rhetorical Theory (3-4, max. 12)**

**SP CMU 595 Seminar in Speech Communication Education (3-4, max. 12)**

**SP CMU 597 Seminar in Interpersonal Communication (3-4, max. 12)** Examination of social scientific literature on selected topics. Subject changes from year to year; topics include conflict resolution, information processing, communication networks, feedback systems, audience composition research, communication effects.

**SP CMU 600 Independent Study or Research (\*)**

**SP CMU 700 Master's Thesis (\*)**

**SP CMU 800 Doctoral Dissertation (\*)**

## Statistics

B313 Padelford



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/statistics.html](http://www.washington.edu/students/genecat/academic/statistics.html)



Department Web page:  
[www.stat.washington.edu](http://www.stat.washington.edu)

Probability provides the conceptual foundation and mathematical language for the logic of uncertainty and induction. Statistics is concerned with procedures for the acquisition, management, exploration, and use of information in order to learn from experience in situations of uncertainty and to make decisions under risk. Statistical practice includes design of experiments and of sampling surveys; exploration, summarization, and display of observational data; drawing inferences, and assessing their uncertainty; and building mathematical models for systems with stochastic components.

By means of joint faculty appointments and joint research projects, courses, and seminars, the Department of Statistics maintains active academic contacts with the School of Business Administration; the College of Engineering; the departments of Applied Mathematics, Atmospheric Sciences, Cardiology, Computer Science, Economics, Genetics, Geological Sciences, Geophysics, Mathematics, Psychology, Radiology, Sociology, and Zoology; the National Research Center for Statistics and the Environment; the Quantitative Ecology and Resource Management program; the Center for Statistics and the Social Sciences; the Applied Physics Laboratory; the Applied Statistics Division of the Boeing Company; Microsoft Research; and the StatSci division of Math Soft. The department has an especially close relationship with the Department of Biostatistics; for example, the two departments are jointly developing new curricula in statistical genetics.

## Graduate Programs

Graduate Program Coordinator  
B309 Padelford, Box 354322  
(206) 543-8296

The graduate programs emphasize both the theory and application of statistics, including probability theory, mathematical statistics, data analysis, statistical computing, and scientific applications. Computing facilities in the Department of Statistics rank among the best of any statistics programs in the country and reflect the department's expertise in the field of statistical computing. An ongoing statistical consulting program provides the students with practical experience in using statistics and in communicating with clients. Under faculty supervision, participants in the program assist members of the University community in applying statistical methodology. The department offers Master of Science and Doctor of Philosophy degrees.

## Admission Requirements

Background in mathematics, statistics, or a quantitative field, with 30 or more quarter credits in mathematics and statistics, to include a year of advanced (second-year) calculus, one course in linear algebra, and one course in probability theory; Graduate Record Examination scores, including the Advanced Mathematics subject test; and three letters of recommendation from appropriate former or current faculty.

## Master of Science

**Graduation Requirements:** In addition to Graduate School requirements, at least twelve approved courses numbered 400 or above with a value of 36 credits or more; of these, at least six courses must be numbered in the 500 series (exclusive of STAT 512, 513) with a value of 18 credits or more, and with a coherent theme. Approved proficiency in statistical computing. Satis-

factory participation in statistical consulting and the departmental seminar. Passage of an appropriate final master's examination or successful completion of a master's thesis which can count as up to three courses worth 9 credits but cannot replace any of the six courses in the 500 series mentioned above. All programs must be approved in advance by the departmental graduate program coordinator.

## Doctor of Philosophy

**Graduation Requirements:** In addition to Graduate School requirements, appropriate training in statistics and related sciences. Appropriate General Examination of basic graduate-level knowledge in statistics and probability (including two preliminary examinations). Satisfactory performance in MATH 424, 425, 426. Satisfactory performance in three approved core-course sequences chosen from STAT 570, 571, 572; 581, 582, 583; 521, 522, 523; 534, 535, 538; and 516, 517, 518. (In some circumstances, other graduate-level mathematical science courses may be used as a substitute.) Approved performance in statistical consulting (typically STAT 598 and 599). Demonstration of proficiency in computing. 1 credit of STAT 590 per quarter. Demonstration of ability to read technical literature in Chinese, French, German, Russian, or Spanish. Dissertation. Final Examination.

## Financial Aid

The department annually awards a limited number of teaching and research assistantships for the support of new and continuing graduate students on the basis of academic promise.

## Faculty

### Chair

Werner Stuetzle

### Professors

Besag, Julian E. \* 1989; BS, 1963, University of Birmingham (UK); spatial statistics, applications to epidemiology, image analysis, agriculture; inference via MCMC.

Birnbaum, Z. W. \* 1939, (Emeritus); PhD, 1929, John Casimir State University (Poland); probability, mathematical statistics (distribution-free statistics, reliability theory).

Burdzy, Krzysztof \* 1988, (Adjunct); PhD, 1984, University of California (Berkeley); probability theory.

Felsenstein, Joseph \* 1968, (Adjunct); PhD, 1968, University of Chicago; evolution and population genetics.

Fleming, Thomas Richard \* 1984; MA, 1974, PhD, 1976, University of Maryland; survival analysis, cancer clinical trials, AIDS research, sequential analysis.

Ford, E. David \* 1985, (Adjunct); PhD, 1968, University College, London (UK); forest ecology and ecophysiology, crop growth, quantitative methods, philosophy of science.

Guttorp, Peter \* 1980; PhD, 1980, University of California (Berkeley); point processes, stochastic models, applications in hydrology, atmospheric and environmental science.

Handcock, Mark S. 2000, (Acting); PhD, 1989, University of Chicago; spatial statistics.

Kronmal, Richard A. \* 1964; PhD, 1964, University of California (Los Angeles); nonparametric density estimation, computer algorithms, cardiovascular data analysis, clinical trials.

Lunneborg, Clifford E. \* 1962, (Emeritus); PhD, 1959, University of Washington; psychometrics, multivariate models, individual differences in cognition.

Martin, R. Douglas \* 1974; PhD, 1969, Princeton University; robust methods, time series, wavelets and neural networks.

Nelson, Charles R. \* 1975, (Adjunct); PhD, 1969, University of Wisconsin; econometric analysis of time series data, financial markets, monetary economics.

Perلمان, Michael D. \* 1979; PhD, 1967, Stanford University; multivariate analysis, graphical Markov models, decision theory, probability inequalities, convexity.

Raftery, Adrian Elmes \* 1985; Doct, 1980, Universite De Paris VI (France); time series, Bayesian statistics, spatial statistics, population estimation, model selection.

Sampson, Paul D. \* 1981, (Research); PhD, 1979, University of Michigan; spatial statistics and environmetrics, morphometrics, applied multivariate analysis.

Scholz, Friedrich-Wilhelm \* 1972, (Affiliate); PhD, 1971, University of California (Berkeley); large sample theory, reliability, risk and tolerance analysis, bootstrap, extreme value theory.

Shorack, Galen \* 1965; PhD, 1965, Stanford University; empirical processes, robustness, nonparametric statistics.

Siegel, Andrew F. \* 1983, (Adjunct); MS, 1975, PhD, 1977, Stanford University; statistics, computing, corporate finance, investments, data analysis.

Stuetzle, Werner \* 1984; PhD, 1977, Swiss Federal Institute of Technology; nonparametric methods in multivariate analysis, statistical applications of computer graphics.

Thompson, Elizabeth A. \* 1985; PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, statistics of conservation.

Wellner, Jon A. \* 1983; PhD, 1975, University of Washington; large-sample theory, asymptotic efficiency, empirical processes, semiparametric models.

### Associate Professors

Haynor, David R. \* 1979, (Adjunct); PhD, 1971, University of California (Berkeley); MD, 1979, Harvard University; medical image processing and segmentation, image deformation, functional MRI, expression arrays.

Percival, Donald B. \* 1979, (Affiliate); PhD, 1983, University of Washington; time series and signal analysis, computational environments, statistics of clocks.

Richardson, Thomas S. \* 1996; PhD, 1996, Carnegie Mellon University; graphical models, algorithmic model selection, Bayesian inference, causal models.

Wakefield, Jonathan Clive \* 1999; PhD, 1992, Nottingham University (United Kingdom); Bayesian data analysis, statistical methods in epidemiology, spatial epidemiology.

Zeh, Judith \* 1982, (Research); PhD, 1979, University of Washington; estimation of whale population size and dynamics, statistics in infectious disease research.

### Assistant Professors

Gneiting, Tilmann J. \* 1997; PhD, 1997, Bayreuth University (Germany); spatial and environmental statistics, positive definite functions.

Stephens, Matthew 2000; PhD, 1997, University of Oxford (UK); statistical genetics.

### Lecturer

Courbois, Jean-Yves Pip 1999; PhD, 2000, Oregon State University; survey methodology, design-based inference, interactive data visualization, data communication.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**STAT 403 Introduction to Resampling Inference (4) NW** Introduction to computer-intensive data analysis for experimental and observational studies in empirical sciences. Students design, program, carry out, and report applications of bootstrap resampling, rerandomization, and subsampling of cases. Credit allowed for 403 or 503 but not both. Prerequisite: either STAT 220, STAT 301, STAT/ECON 311, STAT 341, STAT 361, STAT/MATH 390, or STAT/ECON 481. Offered: Sp.

**STAT 421 Applied Statistics and Experimental Design (4) NW** Computer-aided data analyses using comparisons between batches, analysis of variance and regression. Evaluation of assumptions, data transformation, reliability of statistical measures (jackknife, bootstrap). Fisher-Gosset controversy. Prerequisite: either STAT 342, STAT/MATH 390, or STAT/ECON 481; recommended: MATH 308. Offered: A.

**STAT 423 Applied Regression and Analysis of Variance (4) NW** Regression analysis. Problems in interpreting regression coefficients. Estimation, including two-stage least squares. Guided regression: building linear models, selecting carriers. Regression residuals. Analysis of variance. Nonparametric regression. Factorial designs, response surface methods. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, or STAT/ECON 481; recommended: MATH 308. Offered: W.

**STAT 427 Introduction to Analysis of Categorical Data (4) NW** Techniques for analysis of count data. Log-linear models, logistic regression, and analysis of ordered response categories. Illustrations from the behavioral and biological sciences. Computational procedures. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

**STAT 428 Multivariate Analysis for the Social Sciences (4) NW** Multivariate techniques commonly used in the social and behavioral sciences. Linear models for dependence analysis (multivariate regression, MANOVA, and discriminant analysis) and for interdependence analysis (principal components and factor analysis). Techniques applied to social science data using computer statistical packages. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

**STAT 480 Sampling Theory for Biologists (3) NW Gallucci, Rustagi** Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 480; even years.

**STAT 481 Introduction to Mathematical Statistics (5) NW** Probability, generating functions; the  $d$ -method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 136 or MATH 126 with either MATH 308 or MATH 309. Offered: jointly with ECON 481; A.

**STAT 486 Experimental Design (3) NW** Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sample size, pseudoreplication, factor structure. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 486.

**STAT 491 Introduction to Stochastic Processes (3) NW** Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 396. Offered: jointly with MATH 491; A.

**STAT 492 Introduction to Stochastic Processes (3) NW** Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 491. Offered: jointly with MATH 492; W.

**STAT 498 Special Topics (1-5, max. 15) NW** Reading and lecture course intended for special needs of students. Offered: when demand is sufficient.

**STAT 499 Undergraduate Research (1-5, max. 15)** Offered: AWSpS.

### Courses for Graduates Only

**STAT 506 Applied Probability and Statistics (4)** Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with AMATH 506.

**STAT 512 Statistical Inference (4)** Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory. Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 395 and STAT 421, STAT 423, or BIOST 512 (concurrent registration permitted for these three). Offered: A.

**STAT 513 Statistical Inference (4)** Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory. Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 512. Offered: W.

**STAT 516- Stochastic Modeling of Scientific Data (4-)** Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 511 or STAT 396. Offered: A.

**STAT 517 Stochastic Modeling of Scientific Data (-4)** Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 516-. Offered: W.

**STAT 518 Stochastic Modeling Project (4)** Supervised, applied project based on stochastic modeling of scientific data. Prerequisite: STAT 517. Offered: Sp.

**STAT 519 Time Series Analysis (3)** Descriptive techniques. Stationary and nonstationary processes, including ARIMA processes. Estimation of process mean and autocovariance function. Fitting ARIMA models to data. Statistical tests for white noise. Forecasting. State space models and the Kalman filter. Robust time series analysis. Regression analysis with correlated errors. Statistical properties of long memory processes. Prerequisite: STAT 513. Offered: A.

**STAT 520 Spectral Analysis of Time Series (4)** Estimation of spectral densities for single and multiple time series. Nonparametric estimation of spectral density, cross-spectral density, and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, or permission of instructor. Offered: jointly with E E 520; W.

**STAT 521 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with MATH 521; A.

**STAT 522 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with MATH 522; W.

**STAT 523 Advanced Probability (3)** Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: MATH 426. Offered: jointly with MATH 523; Sp.

**STAT 524 Design of Medical Studies (3)** Emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for students in biostatistics and other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of STAT 421, STAT 423, BIOST 513 or EPI 512; or permission of instructor. Offered: jointly with BIOST 524; even years.

**STAT 529 Sample Survey Techniques (3)** Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: STAT 421, STAT 423, QMETH 500 or BIOST 511 or equivalent; or permission of instructor. Offered: jointly with BIOST 529.

**STAT 530 Wavelets: Data Analysis, Algorithms, and Theory (3)** Review of spectral analysis. Theory of continuous and discrete wavelets. Multiresolution analysis. Computation of discrete wavelet transform. Time-scale analysis. Wavelet packets. Statistical properties of wavelet signal extraction and smoothers. Estimation of wavelet variance. Prerequisite: some Fourier theory and linear algebra; STAT 390, STAT 481, or STAT 513; or permission of instructor. Offered: Sp.

**STAT 533 Classical Theory of Linear Models (3)** Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: STAT 421 or STAT 423; and STAT 513, BIOST 513, and a course in matrix algebra. Offered: jointly with BIOST 533; Sp.

**STAT 534 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 534; Sp.

**STAT 535 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 535; A.

**STAT 538 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 538; W.

**STAT 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3)** Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: STAT 395 or SOC 425 or permission of instructor. Offered: jointly with SOC 536.

**STAT 542 Multivariate Analysis (3)** Multivariate normal distribution; partial and multiple correlation; Hotelling's  $T^2$ ; Bartlett's decomposition; various likelihood ratio tests; discriminant analysis; principal components; graphical Markov models. Prerequisite: STAT 582 or permission of instructor. Offered: alternate years.

**STAT 544 Bayesian Statistical Methods (3)** Statistical methods based on the idea of a probability distribution over the parameter space. Coherence and utility. Subjective probability. Likelihood principle. Conjugate families. Structure of Bayesian inference. Limit theory for posterior distributions. Sequential experiments. Exchangeability. Bayesian nonparametrics. Empirical Bayes methods. Prerequisite: STAT 513 or permission of instructor. Offered: alternate years.

**STAT 550 Statistical Genetics I: Mendelian Traits (3)** *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power; latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with BIOST 550; A.

**STAT 551 Statistical Genetics II: Quantitative Traits (3)** *Monks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BIOST 515; or permission of instructor. Offered: jointly with BIOST 551; W.

**STAT 552 Statistical Genetics III: Medical Genetics Studies (3)** *Wijsman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with BIOST 552; Sp.

**STAT 570 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 513; STAT 533 or STAT 421 and STAT 423, and a course in matrix algebra for STAT 570. Offered: jointly with BIOST 570; A.

**STAT 571 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 570. Offered: jointly with BIOST 571; W.

**STAT 572 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 571. Offered: jointly with BIOST 572; Sp.

**STAT 573 Statistical Methods for Categorical Data (3)** Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasilielihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: STAT 571 and STAT 582. Offered: jointly with BIOST 573; alternate years.

**STAT 574 Multivariate Statistical Methods (3)** Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: STAT 570 or permission of instructor. Offered: jointly with BIOST 574; alternate years.

**STAT 576 Statistical Methods for Survival Data (3)** Statistical methods for censored survival data. Covers parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either STAT 423, BIOST 513, or Q SCI 483, or equivalent. Offered: jointly with BIOST 576; alternate years.

**STAT 577 Advanced Design and Analysis of Experiments (3)** Concepts important in experimental design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Greco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response surface experiments. Prerequisite: STAT 570 or STAT 421 (minimum grade 3.0), or permission of instructor. Offered: jointly with BIOST 577.

**STAT 578 Special Topics in Advanced Biostatistics (\* max. 3)** Advanced-level topics in biostatistics offered by regular and visiting faculty members. Prerequisite: permission of instructor. Offered: jointly with BIOST 578.

**STAT 581 Advanced Theory of Statistical Inference (3)** Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jack-knife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 513 and MATH 426. Offered: A.

**STAT 582 Advanced Theory of Statistical Inference (3)** Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jack-knife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 581. Offered: W.

**STAT 583 Advanced Theory of Statistical Inference (3)** Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jack-knife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 582. Offered: Sp.

**STAT 590 Statistics Seminar (\* max. 15)** Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSp.

**STAT 591 Special Topics in Statistics (1-5, max. 15)** Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: A.

**STAT 592 Special Topics in Statistics (1-5, max. 15)** Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: W.

**STAT 593 Special Topics in Statistics (1-5, max. 15)** Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: Sp.

**STAT 598 Techniques of Statistical Consulting (1)** Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with B10ST 598; ASp.

**STAT 599 Statistical Consulting (\* max. 12)** Consulting experience in data analysis, applied statistics. Student required to provide consulting services to students and faculty three hours per week. Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

**STAT 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

**STAT 700 Master's Thesis (\*)** Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

**STAT 800 Doctoral Dissertation (\*)** Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

## Women Studies

B110 Padelford



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/women\\_studies.html](http://www.washington.edu/students/genecat/academic/women_studies.html)



Department Web page:  
[depts.washington.edu/webwomen/](http://depts.washington.edu/webwomen/)

Women Studies is an interdisciplinary department that offers students a cohesive framework for the study of women's and men's lives within historical and contemporary contexts, and from multi-disciplinary, multi-cultural, and international perspectives. As a field of inquiry, Women Studies challenges traditional scholarship about human societies and fosters the construction of new theoretical and methodological approaches to understanding diverse experiences and realities. Students select a variety of courses offering breadth in Women Studies scholarship, while pursuing concentrated study in a particular track, such as women and arts; gender, race, ethnicity, women, and health; and women and the law; or self-designed programs.

## Graduate Program

Graduate Program Coordinator  
B110C Padelford, Box 354345  
(206) 543-6900  
[womenst@u.washington.edu](mailto:womenst@u.washington.edu)

The Department of Women Studies offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in interdisciplinary women studies as well as in a chosen discipline. The core faculty represent the following disciplines: anthropology, American Indian studies, economics and development, history, international studies, English, sociology, and psychology. Although students are required to work primarily with a core faculty member in Women Studies, they have the opportunity to study with more than 60 faculty members from a wide range of disciplines who are adjunct faculty to Women Studies. M.A. students must complete a thesis or practicum. Ph.D. students must complete a dissertation.

## Admission Requirements

Applicants are admitted to begin study during autumn quarter only and are required to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School application, one copy of official transcripts, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE).

## Program Requirements

All students are required to complete 15 credits of the core seminars: History of Feminism (WOMEN 501), Problems in Feminist Theory (WOMEN 502), and Feminist Research and Methods of Inquiry (WOMEN 503). Under the guidance of a core faculty mentor and advisory committee, the student shapes an individual program of study. The master's program usually requires two years of graduate study; the doctoral program usually requires three years of study beyond the master's level, including independent field research and preparation of a dissertation. Ph.D. students must exhibit proficiency in a language relevant to their theoretical and regional areas of specialization. Students are urged to establish foreign language competency as undergraduates before entering the graduate program or as early as possible in their graduate careers.

## Financial Aid

A limited number of teaching and research assistantships are offered to Ph.D. students.

## Faculty

### Chair

Shirley J. Yee

### Professors

Allen, Carolyn \* 1972, (Adjunct); MA, 1966, Claremont Graduate School; PhD, 1972, University of Minnesota; twentieth-century literature, women writers, contemporary critical theory.

Allen, David G. \* 1988, (Adjunct); PhD, 1975, University of Iowa; philosophy of science, critical and feminist theory, psychosocial nursing theory.

Baldasty, Gerald J. \* 1974, (Adjunct); MA, 1974, University of Wisconsin; PhD, 1978, University of Washington; communications history, media and gender, race, government-press relations.

Barlow, Tani E. \* 1994; MA, 1979, PhD, 1985, University of California (Davis); history of modern China, gender studies, feminist theory, historiography.

Bereano, Philip L. \* 1975, (Adjunct); JD, 1965, Columbia University; MRP, 1971, Cornell University; technology assessment, biotech policies, policy and technology, social values, citizen participation.

Blake, Kathleen \* 1971, (Adjunct); PhD, 1971, University of California (San Diego); Victorian literature, children's literature, women's studies.

Boersma, P. Dee \* 1974, (Adjunct); PhD, 1974, Ohio State University; ecology and conservation biology, reproductive strategies, colonial seabird biology.

Butler, Johnella E. \* 1987, (Adjunct); EdD, 1979, University of Massachusetts; Afro-American and multicultural studies, comparative American ethnic literature, African diaspora.

Cauce, Ana Mari \* 1986, (Adjunct); PhD, 1984, Yale University; community/developmental psychology, socialization of children/adolescents of color, ethnic identity.

Clatterbaugh, Kenneth C. \* 1966, (Adjunct); PhD, 1966, Indiana University; modern philosophy, social philosophy, gender studies.

Glenn, Susan A. \* 1993, (Adjunct); PhD, 1983, University of California (Berkeley); twentieth-century U.S. social and cultural history including women's history.

Goldsmith, Layne \* 1983, (Adjunct); MA, 1975, San Jose State College; MFA, 1979, Cranbrook Academy of Art; fiber arts and related historic and contemporary textile structures and processes.

Gorbman, Claudia L. \* 1990, (Adjunct); PhD, 1978, University of Washington; film studies: history, theory, criticism; film sound and music.

Gordon, Margaret T. \* 1988, (Adjunct); PhD, 1972, Northwestern University; news media and public policy, trust in government, urban policy.

Graham, Katherine J. 1988, (Adjunct); MN, 1967, PhD, 1978, University of Washington; quality of life across life, work; health systems.

Hartsock, Nancy C. M. \* 1984, (Adjunct); PhD, 1972, University of Chicago; feminist theory, Marxism, contemporary political theory.

Howard, Judith A. \* 1982, (Adjunct); PhD, 1982, University of Wisconsin; social psychology, sociology of gender, intersections of race/class/gender/sexuality.

Jacobs, Sue-Ellen \* 1974; PhD, 1970, University of Colorado (Boulder); anthropological studies of women, applied anthropology, ethnohistory, Native North America.

Jeffords, Susan E. \* 1985; MA, 1977, PhD, 1981, University of Pennsylvania; feminist theory, American popular culture, and the representation of Vietnam.

Kaplan, Sydney J. \* 1971, (Adjunct); PhD, 1971, University of California (Los Angeles); twentieth-century literature, women writers, feminist criticism.

Lawson, Victoria A. \* 1986, (Adjunct); PhD, 1986, Ohio State University; Latin America, critical development studies, feminist geography.

Lebsock, Suzanne D. \* 1995, (Adjunct); MA, 1973, PhD, 1977, University of Virginia; history of women, American social history, history of the American South.

McElroy, Colleen J. \* 1972, (Adjunct); PhD, 1973, University of Washington; Black literature, women writers, poetry writing.

Richey, Cheryl A. \* 1973, (Adjunct); DSW, 1974, University of California (Berkeley); cultural and gender issues, intervention design and research.

Schauman, Sally \* 1979, (Adjunct); MS, 1971, University of Michigan; landscape ecology, stressed landscapes, countryside conservation.

Schwartz, Pepper J. \* 1972, (Adjunct); PhD, 1974, Yale University; family, gender, human sexuality, field methods.

Silberstein, Sandra V. \* 1982, (Adjunct); PhD, 1982, University of Michigan; TESL, critical theory, discourse analysis, sociolinguistics, language and culture.

Sokoloff, Naomi B. \* 1985, (Adjunct); PhD, 1980, Princeton University; Hebrew language and literature.

Steele, Cynthia 1986, (Adjunct); PhD, 1980, University of California (San Diego); Latin American literature and cultural studies; Mexican literature, film, and photography.

Treat, John W. \* 1983, (Affiliate Adjunct); PhD, 1982, Yale University; Japanese language and literature.

Woods, Nancy \* 1978, (Adjunct); PhD, 1978, University of North Carolina; women's health.

### Associate Professors

Anagnost, Ann S. \* 1990, (Adjunct); PhD, 1985, University of Michigan; ethnography of the state, ideology and popular culture, peasant society; China.

Brines, Julie E. \* 1993, (Adjunct); PhD, 1990, Harvard University; gender, stratification, family, methods.

Cabeen, Louise \* 1993, (Adjunct); MFA, 1989, The School of Art Institute Of Chicago; socially critical art with research specialties in textile history and techniques.

Cummings, Katherine \* 1985, (Adjunct); PhD, 1985, University of Wisconsin; feminist, psychoanalytical, and literary theory, modern and contemporary literature.

Di Stefano, Christine \* 1985, (Adjunct); PhD, 1984, University of Massachusetts; political theory (modern and contemporary), feminist theory, political culture.

Dubois, Thomas A. \* 1990, (Adjunct); PhD, 1990, University of Pennsylvania; Nordic folklore and mythology, Finnish, Sami.

Dubrow, Gail Lee \* 1989, (Adjunct); MA, 1979, University of Oregon; PhD, 1991, University of California (Los Angeles); preservation, urban design, public art, public history, gender, multiculturalism.

England, Kim V. L. 1999, (Adjunct); MA, 1984, PhD, 1988, Ohio State University; feminist geographies, labor markets, social identities and space.

Friedman, Kathie \* 1987, (Adjunct); MA, 1979, Other, 1990, State University of New York (Binghamton); sociology of gender, immigration, race, and ethnicity in the U.S.

Gavel-Adams, Ann-Charlotte \* 1986, (Adjunct); PhD, 1990, University of Washington; August Strindberg, Scandinavian women's literature, Scandinavian turn-of-the-century drama and art.

Ginorio, Angela B. \* 1981; PhD, 1979, Fordham University; women and/in science, violence and women, socially defined identities, psychology issues for Latinas.

Heuving, Jeanne D. \* 1990, (Adjunct); PhD, 1988, University of Washington.

Ingebritsen, Christine \* 1992, (Adjunct); PhD, 1993, Cornell University; politics, international political economy, European integration, environmental policy.

Jarosz, Lucy A. \* 1990, (Adjunct); PhD, 1990, University of California (Berkeley); political economy of development, food and agriculture, feminist geography, political ecology.

Kenney, Nancy J. \* 1976; PhD, 1974, University of Virginia; neural and endocrine controls of food and fluid intake, physiological basis of motivation.

Klawitter, Marieka \* 1990, (Adjunct); MS, 1986, PhD, 1992, University of Wisconsin; family and employment policy, sexual orientation, women's studies.

Magyary, Diane L. \* 1981, (Adjunct); PhD, 1981, University of Washington; family centered health care of children at risk, disabled or handicapped.

Mitchell, Katharyne 1993, (Adjunct); PhD, 1993, University of California (Berkeley); urban, cultural and economic geography, Pacific Rim, migration, transitional studies.

Moody, Joycelyn K. \* 1991, (Adjunct); MA, 1980, University of Wisconsin; PhD, 1993, University of Kansas; nineteenth-century American, African-American, and women's literature, autobiography.

Noble, Kathleen D. \* 1984, (Research); PhD, 1984, University of Washington; feminist talent development, spirituality and mental health, feminist psychological theory.

Rhodes, Lorna A. \* 1983, (Adjunct); PhD, 1973, Cornell University; medical anthropology, anthropology of institutions, religion, psychiatry.

Roberts, Jean Valerie \* 1992, (Adjunct); PhD, 1982, University of Pittsburgh; ancient philosophy, ethics, philosophy of feminism.

Ross, Luana K. 1999; MSW, 1981, Portland State University; PhD, 1992, University of Oregon; criminology/deviance, race/ethnic relations and gender, documentary film.

Salas, Elizabeth 1987, (Adjunct); MA, 1977, California State University, Los Angeles; PhD, 1987, University of California (Los Angeles); New Mexican history and politics, Chicana, Mexicana and Chicano history, minorities in the military.

Sears, Laurie J. \* 1989, (Adjunct); PhD, 1986, University of Wisconsin; Southeast Asia, historiography.

Simpson, Caroline Chung \* 1994, (Adjunct); MA, 1989, University of Houston; PhD, 1994, University of Texas (Austin); Asian American literature and culture, post-war fiction and film.

Stacey, Robin C. \* 1988, (Adjunct); PhD, 1986, Yale University; medieval history, Celtic.

Stecher Hansen, Marianne T \* 1988, (Adjunct); MA, 1981, University of Washington; PhD, 1990, University of California (Berkeley); Danish language and literature, Scandinavian literature.

Stygall, Gail \* 1990, (Adjunct); PhD, 1989, Indiana University; rhetoric and composition, English language linguistics, law and literature.

Twine, France Winddance 1994; MA, 1990, PhD, 1994, University of California (Berkeley); critical race feminisms, racism/antiracism, whiteness studies, multiracial families, Brazil, Britain.

Ward, Deborah \* 1987, (Adjunct); PhD, 1987, Boston University; health policy and politics, women's paid and unpaid caregiving work.

Yee, Shirley J. \* 1988; PhD, 1987, Ohio State University; U.S. women's history, African-American history, nineteenth-century U.S. social history.

### Assistant Professors

Boyer, Debra 1988, (Affiliate); PhD, 1986, University of Washington; feminist research methodology, policy and evaluation issues, urban applied anthropology.

Dong, Yue 1996, (Adjunct); MA, 1991, University of Oregon; PhD, 1996, University of California (San Diego); late 19th and 20th century China, social and cultural history, urban history, gender studies.

Ensign, B. Josephine \* 1994, (Adjunct); MS, 1986, Virginia College of Medicine; MPH, 1992, DPH, 1994, Johns Hopkins University; community-based health service for adolescents.

Khanna, Ranjana \* 1996, (Adjunct); PhD, 1993, York University (Canada); postcolonial theory, transnational feminism, twentieth-century writing.

Ostmeier, Dorothee \* 1993, (Adjunct); PhD, 1993, Johns Hopkins University; eighteenth and twentieth century literature and philosophy, critical theory, German studies.

Ramamurthy, Priti \* 1997; PhD, 1995, Syracuse University; political economy of development, third-world feminism, irrigation, agro-food systems, South Asia.

Rose, Elaine 1993, (Adjunct); PhD, 1993, University of Pennsylvania; labor, development, applied microeconomics.

Schroeder, Carole A. 1993, (Adjunct); MSN, 1985, University of Nevada; PhD, 1993, University of Colorado (Denver); women's health, community health, models of care delivery, health care systems.

Sunindyo, Saraswati \* 1993; PhD, 1993, University of Wisconsin; feminism and nationalism, comparative women's movements, Southeast Asia.

Taylor, Janelle S. \* 1999, (Adjunct); PhD, 1999, University of Chicago; anthropology of medicine, science, and technology; reproduction; gender; consumption.

Thomas, Lynn M. \* 1997, (Adjunct); MA, 1989, Johns Hopkins University; MA, 1993, Northwestern University; PhD, 1997, University of Michigan; Africa, cultural and social.

Weinbaum, Alys E. \* 1998, (Adjunct); PhD, 1998, Columbia University; 19th and 20th century American and European literature.

Woody, Andrea I. \* 1997, (Adjunct); PhD, 1997, University of Pittsburgh; philosophy of science, history of science, philosophy of feminism.

### Lecturer

Tupper, Kari Lynn 1988; PhD, 1997, University of Washington; literature and law, American studies, women writers.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsat/](http://www.washington.edu/students/crsat/).

**WOMEN 405 Comparative Women's Movements and Activism (5) I&S** *Sunindyo* Comparative cultural, national, and historical study of women's movements and activists. Critically analyzes multiple arenas of women's movements and resistance. Topics include feminist anti-racism, pre-nationalism and nationalism, economics, electoral politics, women's and human rights, and international/transnational feminisms. Prerequisite: either WOMEN 205, WOMEN 305, or SOC 364.

**WOMEN 415 Gender and Education (5) I&S** Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with EDC&I 440; S.

**WOMEN 424 Women in Midlife (5) I&S** Explores women's lives, experiences, and concerns in the middle years. Topics include physical and physiological changes; psychological development; representations and treatment of midlife women in literature, media, and other institutions; economics of aging; crosscultural and subcultural differences in the aging process; the synergistic effects of sexism and ageism on women.

**WOMEN 425 Femininity, Feminism, and Antifeminism in Popular Culture (5) VLPA/I&S** *Twine* Explores shifting meanings and reconfigurations of femininity, feminism, and antifeminism in United States popular culture. Analyzes the incorporation and transformation of feminist critiques of dominant ideologies into popular culture. Popular forms examined may include television serials, music videos, advertisements, films, and novels. Prerequisite: WOMEN 200.

**WOMEN 427 Women and Violence (5) I&S** *Ginorio* Multi-disciplinary explorations of the continuum of violence which affects women's lives, ranging from experience in personal settings (family violence) to cultural or state policies (prisons, wars). Violence against women explored in the context of societal, political, and state violence. Recommended: WOMEN 200.

**WOMEN 429 Scandinavian Women Writers in English Translation (5) VLPA** *Gavel-Adams* Selected works by major Scandinavian women writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with SCAND 427.

**WOMEN 440 Reading Native American Women's Lives (5) I&S** *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada. Prerequisite: either WOMEN 342, WOMEN 423, AIS 201, AIS 330, or AIS 423. Offered: jointly with AIS 440.

**WOMEN 442 Images of Natives in the Cinema and Popular Cultures (5) I&S/VLPA** *Ross* Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Offered: jointly with AIS 442. Prerequisite: AIS 330 and WOMEN 200.

**WOMEN 447 Economics of Gender (5) I&S** *Rose* Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: ECON 300. Offered: jointly with ECON 447.

**WOMEN 450 Language and Gender (5) I&S, VLPA** *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450 and LING 458.

**WOMEN 454 Women, Words, Music, and Change (5) VLPA/I&S** *Jacobs* Comparative analysis of use of myths, tales, music, and other forms of expressive culture to account for, reinforce, and change women's status and roles. Recommended: WOMEN 353. Offered: jointly with ANTH 454.

**WOMEN 455 Contemporary Feminist Theory (5) I&S** *Barlow* Raises the question of how political contexts condition the way some ideas become theory. Emphasizes the present crises in thinking about a transnational feminism.

**WOMEN 456 Feminism, Racism, and Anti-Racism (5) I&S** *Twine* Examines meaning of racism and feminism in women's lives in an international context. Building upon an analysis of racial hierarchies and institutionalized racism, explores strategies used by women engaged in feminist and anti-racist activism. Prerequisite: WOMEN 200.

**WOMEN 458 Ideologies and Technologies of Motherhood (5) I&S** *Twine* Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with ANTH 484.

**WOMEN 462 Isak Dinesen and Karen Blixen (5) VLPA** *Stecher-Hansen* The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with SCAND 462.

**WOMEN 468 Latin American Women (5) VLPA/I&S** *Steele* The elaboration of discourses of identity in relation to gender, ethnicity, social class, and nationality, by women writers from South America, Mexico, Central America, and the Caribbean. Testimonial literature, literature and resistance, women's experimental fiction. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 468.

**WOMEN 485 Issues for Ethnic Minorities and Women In Science and Engineering (3/5) I&S** Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with PHYS 451.

**WOMEN 488 Women and Science (5) I&S** *Ginorio* Explores science as a method of inquiry and as a profession while also expanding knowledge about women through the use of biographies of women scientists, discipline-based and feminist critiques, and the psycho-social concept of socially defined identities. Recommended: one Women Studies course and one college-level science course.

**WOMEN 489 Ethnicity, Gender, and Media (5) I&S** *Baldasty* Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with CMU 489/AES 489.

**WOMEN 490 Special Topics in Women Studies (2-5, max. 15) I&S** Exploration of specific problems and issues relevant to the study of women. Offered by visiting or resident faculty members. Primarily for upper-division and graduate students.

**WOMEN 491 Senior Thesis I (3) I&S** Introductory course of the senior thesis sequence required of all majors. Students attend a weekly seminar, select a thesis topic, and contract with an appropriate faculty adviser. Successful completion of the course is contingent on submission of an acceptable thesis proposal. Majors and senior standing only. Offered: A.

**WOMEN 492 Senior Thesis II (3) I&S** Second course in senior thesis sequence required of majors. Majors and seniors only. Prerequisite: WOMEN 491. Offered: W.

**WOMEN 493 Senior Thesis III (4) I&S** Research and writing of thesis under supervision of a faculty member. Required of all majors. Prerequisite: WOMEN 492. Offered: AWSpS.

**WOMEN 495 Tutoring Women Studies (5)** Students train to serve as tutors in designated courses. Facilitate weekly group discussions, assist with writing assignments, explain course materials. Credit/no credit only.

**WOMEN 497 Fieldwork in Women Studies (1-15, max. 15)** Internships in local agencies. Allows development of specific skills in area of specialization. Credit/no credit only. Offered: AWSpS.

**WOMEN 499 Undergraduate Research (1-5, max. 10)** Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWSpS.

## Courses for Graduates Only

**WOMEN 501 History of Feminism (5)** *Barlow, Yee* Study of feminism from the 18th through the 20th centuries in the national, international, and intranational world system, with a focus on imperialism, colonialism, nationalism, and modernity. Surveys the literature in a global context, supplemented by critical essays and historiographic reviews.

**WOMEN 502 Cross Disciplinary Feminist Theory (5)** *Barlow* Raises questions about how feminism becomes theory and what the relation of feminist theory is to conventional disciplines. Readings exemplify current crises in feminism (e.g., the emergence of neo-materialism; critical race theory; citizenship; identity; transnational and migrancy and questions of post-colonialism) to consider disciplinization.

**WOMEN 503 Feminist Research and Methods of Inquiry (5)** *Allen* Explores appropriate research methodologies for interdisciplinary work. Asks how scholarship is related to feminism as a social movement and to the institutions in which we work. Focuses on how similar objects of study are constituted in different disciplines for feminist scholars. Offered: Sp.

**WOMEN 512 Critical and Interdisciplinary Approaches to Women's Health (3)** *Ensign, Schroeder* Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with NURS 512; W.

**WOMEN 534 Feminism and History of Women in China (5)** Explores historical question of gendered subjects in modern China and feminist stories of emancipation of Chinese women asking how these render invisible other kinds of history. Prerequisite: background in China studies or ability to handle Chinese primary sources.

**WOMEN 553 Discourses in Feminist Anthropology Seminar (5)** *Jacobs* Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with ANTH 555; W.

**WOMEN 589 Gender, Race, and Media (5)** Analysis of the role of media in construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with CMU 589 and SP CMU 527.

**WOMEN 600 Independent Study or Research (\*)**  
Offered: AWSpS.**WOMEN 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSpS.**WOMEN 701 Master's Practicum (\*)** Offered: AWSpS.**WOMEN 800 Doctoral Dissertation (\*)**

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## Zoology

106 Kincaid



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/zoology.html](http://www.washington.edu/students/genecat/academic/zoology.html)



Department Web page:  
[www.zoology.washington.edu](http://www.zoology.washington.edu)

Zoology is a natural science concerned primarily with animals: their development, structure, and function, and their relationship with their environments.

Zoology field courses are offered both at the main campus and at the Friday Harbor Laboratories. See individual course listings for location.

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## Graduate Program

Graduate Program Coordinator  
106 Kincaid, Box 351800  
(206) 685-8240

Programs of study leading to the degree of Doctor of Philosophy are available in the areas of cell biology, molecular biology, developmental biology, developmental genetics, ecology, evolution, behavior, invertebrate and vertebrate morphology, organismic and comparative physiology, endocrinology, and neurobiology, as well as mathematical approaches to the above topics. Interdisciplinary programs are offered in developmental biology, cell and molecular biology, and neurobiology.

## Research Facilities

Modern instruments (TEM, confocal microscopy) and special facilities (radioisotope, neurophysiology, and sea-water rooms) needed for instructional and research purposes are available in Kincaid Hall. The department also houses a superb computational facility consisting of SGI machines and a variety of UNIX, Mac and PC workstations. Extensive natural-history collections are housed at the Burke Museum. The facilities of the Friday Harbor Laboratories on San Juan Island are available for research. The department is within 100 yards of the Magnuson Health Sciences Center, one of the top medical-research institutions in the country. Several researchers at the Fred Hutchinson Cancer Research Center are appointed as affiliate faculty in the department.

## Special Requirements

Completed applications for entry in autumn quarter must be received by January 15.

Entering students should have preparation in several of the areas listed above, organic chemistry, physical chemistry in some cases, two quarters of college physics, and mathematics through calculus.

All students are required to acquire at least three quarters of teaching experience regardless of their source of support.

## Financial Aid

Normally all prospective candidates for the Ph.D. degree are supported by teaching or research assistantships or by fellowships or traineeships from national or private agencies. Summer appointments are available both on the Seattle campus and at the Friday Harbor Laboratories on San Juan Island.

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## Faculty

### Chair

Barbara T. Wakimoto

### Professors

Beecher, Michael D. \* 1978, (Adjunct); MA, 1965, PhD, 1970, Boston University; animal communication, animal behavior, sensory processes.

Boersma, P. Dee \* 1974; PhD, 1974, Ohio State University; ecology and conservation biology, reproductive strategies, colonial seabird biology.

Brenowitz, Eliot A. \* 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Cloney, Richard A. \* 1962, (Emeritus); PhD, 1959, University of Washington; invertebrate embryology, histology, morphogenetic movements, metamorphosis, biology of ascidians.

Daniel, Thomas L. \* 1984; PhD, 1982, Duke University; functional morphology, biomechanics, mechanics and energetics of animal locomotion.

Deyrup-Olsen, Ingrith J. \* 1964, (Emeritus); PhD, 1944, Columbia University; general physiology, cell-membrane phenomena.

Ebrey, Thomas 2000, (Research); PhD, 1968, University of Chicago; phototransaction in biology, halo bacteria.

Edwards, John S. \* 1967; PhD, 1960, Cambridge University (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology.

Felsenstein, Joseph \* 1968, (Adjunct); PhD, 1968, University of Chicago; evolution and population genetics.

Foe, Victoria 1984, (Research); PhD, 1975, University of Texas (Austin); cell cycle control and morphogenesis in *Drosophila* embryos.

Gorbman, Aubrey \* 1963, (Emeritus); PhD, 1940, University of California (Berkeley); endocrinology and neuroendocrinology.

Graubard, Katherine \* 1979, (Research); PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.

Hauschka, Stephen D. \* 1972, (Adjunct); PhD, 1966, Johns Hopkins University; muscle gene regulation, gene therapy, stem cell phenotypic conversion.

Herring, Susan W. \* 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Hille, Merrill B. \* 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.

Huey, Raymond B. \* 1977; PhD, 1975, Harvard University; evolutionary and physiological ecology, herpetology, behavior.

Karr, James \* 1991; PhD, 1970, University of Illinois; ecology and conservation biology, water resources, environmental sciences, natural resources.

Kenagy, George James \* 1976; PhD, 1972, University of California (Los Angeles); ecophysiology and behavior, reproduction and life history, population biology, evolution, mammalogy.

Kingsolver, Joel \* 1986; PhD, 1981, Stanford University; physiological ecology and evolutionary morphology of insects.

Kohn, Alan J. \* 1961, (Emeritus); PhD, 1957, Yale University; invertebrate zoology, ecology and functional morphology of marine invertebrates.

Kozloff, Eugene N. \* 1964, (Emeritus); PhD, 1950, University of California (Berkeley); biology of lower invertebrates, ciliates, orthonectids, turbellarians and kinorhynchans.

Laird, Charles D. \* 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Martin, Arthur W. 1958, (Emeritus); PhD, 1936, Stanford University; comparative invertebrate physiology.

Moody, William J. \* 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.

Morse, M. Patricia 1992, (Acting); PhD, 1966, University of New Hampshire; invertebrates, interstitial molluscs, functional ultrastructure of bivalve heart-kidney and blood

Murray, James D. \* 1988, (Adjunct); PhD, 1956, DSc, 1968, Oxford University (UK); mathematical biology, biological pattern formation, wound healing, spread of epidemics.

Nordlander Edwards, Ruth 1997, (Acting); PhD, 1968, DDS, 1980, Case Western Reserve University; frog embryology and axonal guidance.

Odell, Garrett M. \* 1985; PhD, 1972, Johns Hopkins University; mathematical biology, ecology, models in cell and developmental biology.

Orians, Gordon H. \* 1960, (Emeritus); PhD, 1960, University of California (Berkeley); ecology and ethology, vertebrate social systems, community structure, plant-herbivore interactions.

Paine, Robert T. \* 1962, (Emeritus); PhD, 1961, University of Michigan; experimental ecology, organization and structure of marine communities.

Palka, John M. \* 1969; PhD, 1965, University of California (Los Angeles); neurophysiology, sensory physiology, developmental neurobiology.

Pietsch, Theodore W. \* 1978, (Adjunct); PhD, 1973, University of Southern California; ichthyology.

Pinter, Robert B. \* 1967, (Adjunct Emeritus); MS, 1960, PhD, 1964, Northwestern University; cybernetics, robotics, biophysics.

Reeder, Ronald H. \* 1981, (Affiliate); PhD, 1965, Massachusetts Institute of Technology; regulation of ribosomal RNA transcription by RNA polymerase I.

Riddiford, Lynn M. \* 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology, mechanisms of hormone action.

Rohwer, Sievert A. \* 1973; PhD, 1971, University of Kansas; ecology and evolution of social behavior, avian biology and systematics.

Schubiger, Gerold A. \* 1972; PhD, 1968, University of Zurich (Switzerland); developmental genetic control of *Drosophila* embryos, pattern formation in imaginal disks.

Steiner, Robert A. \* 1977, (Adjunct); PhD, 1975, University of Oregon; neuroendocrinology.

Strathmann, Richard R. \* 1973; PhD, 1970, University of Washington; invertebrate development, larval ecology and developmental strategies of marine invertebrates.

Truman, James W. \* 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect neural development, circadian rhythms.

Wakimoto, Barbara T. \* 1984; PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.

Ward, Peter D. \* 1984, (Adjunct); PhD, 1976, McMaster University (Canada); invertebrate paleontology, paleobiology.

Whiteley, Arthur H. \* 1947, (Emeritus); PhD, 1945, Princeton University; comparative developmental physiology of invertebrates, gene action, fertilization.

Willows, A. O. Dennis \* 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.

Wingfield, John C. \* 1985; PhD, 1973, University College of North Wales (UK); environmental and hormonal control of avian reproductive cycles.

Yao, Meng Chao \* 1988, (Affiliate); PhD, 1975, University of Rochester; regulation of gene amplification and chromosome rearrangements in Tetrahymena.

### Associate Professors

Bakken, Aimee \* 1973; PhD, 1970, University of Iowa; gene regulation during oogenesis and embryogenesis, developmental, cellular and molecular biology.

Cooper, Mark S. \* 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.

Dethier, Megan N. 1985, (Research); PhD, 1981, University of Washington; marine intertidal ecology, shoreline classification systems, plant-herbivore interactions.

Edwards, Scott V. 1994; PhD, 1992, University of California (Berkeley); molecular population genetics and evolution, avian comparative biology and systematics.

Griffiths, W. Mary 1971, (Emeritus); MA, 1942, PhD, 1953, University of California (Berkeley); zoology.

Kimelman, David \* 1989, (Adjunct); PhD, 1985, Harvard University; molecular regulation of early vertebrate development.

Ostrander, Elaine A. \* 1994, (Affiliate); PhD, 1987, Oregon Health Sciences University; study of human cancer susceptibility genes.

Parkhurst, Susan M. 1994, (Affiliate); PhD, 1995, Johns Hopkins University; developmental, genetic and molecular analysis of *Drosophila* embryogenesis.

Priess, James R. \* 1993, (Affiliate); PhD, 1983, University of Colorado (Boulder); reliability models, fault trees.

Wright, Robin L. \* 1990; PhD, 1985, Carnegie Mellon University; biogenesis of membranes, yeast cell biology.

### Assistant Professors

Bosma, Martha \* 1987; PhD, 1986, University of California (Los Angeles); development of CNS neuronal properties, electrophysiology and imaging of single cells.

Groom, Martha 1989, (Adjunct); PhD, 1995, University of Washington; environmental studies.

Grünbaum, Daniel 1998, (Research); PhD, 1991, Cornell University; theoretical ecology, marine biology, biomechanics, biomedical ecology, conservation biology.

Maron, John L. \* 1998, (Adjunct); PhD, 1996, University of California (Davis); plant population biology, plant-consumer interactions, conservation biology.

Moens, Cecilia B. \* 1998, (Affiliate); PhD, 1993, University of Toronto; molecular and medical genetics.

Naeem, Shahid \* 1998; PhD, 1988, University of California (Berkeley); ecosystem consequences of declining plant, animal, and microbial biodiversity.

O'Carroll, David C. \* 1998; PhD, 1989, Flinders University (Australia); neuroethology, sensory systems and behavior, visual processing.

Parrish, Julia \* 1990, (Research); PhD, 1988, Duke University; behavioral ecology, conservation biology, predator-prey interactions.

Raible, David W. \* 1995, (Adjunct); PhD, 1989, University of Pennsylvania; zebrafish neural development.

Ruesink, Jennifer 1990; PhD, 1996, University of Washington; marine community ecology, especially food web interactions, species, invasions, and conservation.

Rutherford, Suzanne L. 1999, (Affiliate); PhD, 1995, University of California (San Diego); developmental canalization and the evolution of networks of signal transduction pathways.

Schindler, Daniel E. \* 1997; PhD, 1995, University of Wisconsin; ecosystem and community ecology, especially of aquatic systems; limnology.

Secord, David L. 1995, (Adjunct); PhD, 1995, University of Washington; population and community ecology, marine ecology and biodiversity, conservation biology.

Swalla, Billie J. 1999; PhD, 1988, University of Iowa; evolution of invertebrates studied by comparison of gene expression and sequences.

Wasser, Samuel K. \* 1982, (Adjunct); PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

### Lecturers

Frederickson, Richard 1994; PhD, 1970, University of North Dakota; human physiology.

Herron, Jon 1997; PhD, 1996, University of Washington; evolution, physiological ecology, population genetics, evolutionary psychology.

Petersen, Karen E. 1991; PhD, 1983, University of New Mexico; introductory human physiology, comparative vertebrate anatomy, vertebrate natural history.

Ramenofsky, Marilyn 1987; PhD, 1982, University of Washington; environmental endocrinology, physiology and behavior of avian migration.

Rudkin, Alison H. 1974; MS, 1973, University of Washington; physiology and development.

Shellenbarger, David 1977; PhD, 1974, University of Iowa; developmental biology, cell biology.

Wenderoth, Mary Pat 1994; PhD, 1987, Rush Medical College; animal physiology and anatomy, muscle development, science education.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsocat/](http://www.washington.edu/students/crsocat/).

**ZOOL 403 Comparative Vertebrate Histology (5) NW** Microscopic and submicroscopic anatomy of vertebrates. Emphasis on mammals. Light microscopy and interpretation of ultrastructure. Functions of basic tissue types and organs as related to structure. Prerequisite: either BIOL 202 or BIOL 355.

**ZOOL 408 Mechanisms of Animal Behavior (4) NW** *Beecher, Brenowitz* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either BIOL 102, BIOL 203, or PSYCH 200. Offered: jointly with PSYCH 408; W.

**ZOOL 409 Sociobiology (5) NW** *Rohwer* Biological bases of social behavior, emphasizing evolution as a paradigm. Topics are: individual versus group selection, kin selection, altruism, group versus indi-

vidual living, mating systems, parental care of offspring, and competitive strategies. Prerequisite: either PSYCH 200 or both BIOL 202 and BIOL 203. Offered: jointly with PSYCH 409.

**ZOOL 410 Ethology and Ecology Laboratory (4) NW** *Boersma* Field projects on foraging and social behavior, species interactions and structure of terrestrial and marine communities, including special student research problems. Students may be required to share a portion of the transportation costs of field trips. Prerequisite: BIOL 472. Offered: Sp.

**ZOOL 414 Molecular Evolution (5) NW** *S Edwards* Survey of empirical approaches to the study of molecular evolution and ecology, drawing on examples from a variety of taxa and the recent literature. Topics include DNA sequencing and systematics, fingerprinting approaches in behavioral ecology, and adaptive evolution at the molecular level.

**ZOOL 430 Marine Zoology (8) NW** *Strathmann* Survey of groups of invertebrate animals represented in marine environments; natural history, ecology, distribution, habitat, adaptation, and trophic interrelationships. Permission of Director, Friday Harbor Laboratories required for registration. Recommended: 20 credits in biological sciences. Offered: at Friday Harbor Laboratories; Sp.

**ZOOL 432 Marine Invertebrate Zoology (9) NW** Comparative morphology and biology of marine invertebrates with emphasis on field and laboratory studies. Representatives of all major and most minor phyla are collected, observed alive, and studied in detail. Not open for credit to students who have taken 433 or 434. Recommended: 20 credits in biological sciences. Offered: at Friday Harbor Laboratories; S.

**ZOOL 433 Invertebrate Zoology (5) NW** Comparative biology and morphology of invertebrates. Laboratory work emphasizes structures and functions. Deals with principles of animal organization, Protista, simpler multicellular animals, echinoderms, and chordates. Not open to students who have taken 430 or 432. Prerequisite: BIOL 102 or BIOL 202. Offered: A.

**ZOOL 434 Invertebrate Zoology (5) NW** Comparative biology and morphology of invertebrates. Laboratory work emphasizes structures and functions. Emphasizes annelids and related worms, mollusks, and arthropods. Not open to students who have taken 430 or 432. Prerequisite: BIOL 102 or BIOL 202. Offered: W.

**ZOOL 435 Parasitology (5) NW** General course covering the principles of parasitism and the major groups of animal parasites. Prerequisite: BIOL 102 or BIOL 202.

**ZOOL 436 Invertebrate Endocrinology (3) NW** Survey of endocrine mechanisms used by invertebrate groups to regulate homeostasis, growth, reproduction, and behavior. Special emphasis given to invertebrate model systems that provide unique insights into basic biological processes. Prerequisite: either BIOL 202, ZOOL 301, or ZOOL 315; either CHEM 220, CHEM 224, CHEM 239, or CHEM 337; either PHYS 115 or PHYS 122.

**ZOOL 438 Comparative Endocrinology (3) NW** *Wingfield* Hormonal integration of living processes at all levels in animals: molecules, cells, organs, organisms, populations. Prerequisite: either BIOL 202 or BIOL 102 with either ZOOL 301 or ZOOL 315; recommended: a 400-level course in physiology and biochemistry.

**ZOOL 439 Comparative Endocrinology Laboratory (2) NW** *Wingfield* A broad introduction to endocrine techniques with appropriate experiments to accompany and enlarge on material presented in 438. Prerequisite: ZOOL 438 which may be taken concurrently.

**ZOOL 440 Biomechanics (4) NW** *Daniel* Physical biology emphasizing a mechanical approach to ecological, evolutionary, and physiological questions. Basic principles underlying fluid and solid mechanics to explore responses of animals to flows, loads, and motions. Recommended: either BIOL 102 or BIOL 202; either MATH 125 or Q SCI 292; either PHYS 114 or PHYS 121.

**ZOOL 444 Entomology (3) NW** Biology of terrestrial arthropods, with emphasis on insects. Structure, classification, physiology, and ecology of insects. Interrelationships of insects and man. Prerequisite: either BIOL 102 or both BIOL 202 and BIOL 203. Offered: Sp.

**ZOOL 445 Entomology Laboratory (2) NW** Structure and function of arthropods, with emphasis on insects. Field studies and taxonomy of important insect groups. Students may be required to share a portion of the transportation costs of field trips. Prerequisite: ZOOL 444 which may be taken concurrently. Offered: Sp.

**ZOOL 448 Concepts of Nervous System Function (3) NW** *Palka* Broad examination of integrative mechanisms in central nervous system function, with emphasis on sensory processing, plasticity, and control of behavior. Examples are taken from a variety of animal groups. Prerequisite: BIOL 202.

**ZOOL 451 Vertebrate Zoology (5) NW** *Kenagy* The biology of vertebrate animals, emphasizing their diversity, adaptations, and evolutionary history. Introduces aspects of behavior, physiology, morphology, and ecology that emerge from the comparative study of vertebrates. Laboratory includes local field trips, films, and introduction to regional vertebrate fauna. Prerequisite: either BIOL 102 or both BIOL 202 and BIOL 203.

**ZOOL 453 Comparative Anatomy of Vertebrates (5) NW** Comparison of the structure of vertebrates with emphasis on evolution and organ system functions. Prerequisite: BIOL 202; recommended: B STR 301; ZOOL 451. Offered: W.

**ZOOL 455 Developmental Biology of Animals (4) NW** *Schubiger* Embryology and subsequent development of vertebrate and invertebrate animals, including *Xenopus*, mammals, chicks, *Drosophila*, echinoderms. Morphological changes in developing animals; experimental analysis of developing systems; underlying genetic and biochemical regulation of development. Prerequisite: either BIOL 202, BIOL 401, or either BIOL 355, BIOC 405, BIOC 440, or ZOOL 301 with either GENET 371 or GENET 372.

**ZOOL 456 Developmental Biology of Animals Laboratory (3) NW** *Shellenbarger* Normal development of living embryos (frog, chick, insect, echinoderm). Internal anatomy of embryos on prepared slides. Comparisons between vertebrate and invertebrate animals. Scientific style reports on experiments. Prerequisite: ZOOL 455 which may be taken concurrently.

**ZOOL 457 Methods and Problems in Development (3) NW** *Schubiger, Kimelman* Special topics in development. Integrating classical and current approaches. Developmental genetics, experimental embryology, molecular mechanisms of developmental regulation, and gene function in cell determination and cell differentiation in animal systems. Prerequisite: either ZOOL 455 or BIOL 202 with BIOL 401 and either GENET 371 or GENET 372.

**ZOOL 459 Developmental Neurobiology (3) NW** *Bosma* Invertebrate and vertebrate examples illustrate the mechanisms used in constructing nervous systems. Focus on the cellular and molecular mechanisms that underlie questions about the basis of neuronal diversity, axonal pathfinding and target recognition, synaptogenesis, and activity-dependent plasticity. Prerequisite: either BIOL 202, BIOL 355, or ZOOL 301; either BIOL 401 or ZOOL 455.

**ZOOL 464 Natural History of Birds (5) NW** *S Edwards, Wingfield* Field, lecture, and laboratory study of birds framed in biological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orientation, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which students are required to share a portion of transportation costs. Prerequisite: either BIOL 102 or both BIOL 202 and BIOL 203. Offered: Sp.

**ZOOL 467 Comparative Animal Reproduction (3) NW** *Ramenofsky, Wingfield* Reproductive mechanisms, environmental influences on reproductive endocrinology, physiology, behavior, ecology of vertebrates. Discussions extend from organismal to cellular level, and focus on diversity of reproductive patterns among vertebrates. Prerequisite: BIOL 102 or both BIOL 202 and BIOL 203; recommended: biochemistry and physiology.

**ZOOL 468 Comparative Animal Reproduction Laboratory (2) NW** *Ramenofsky, Wingfield* Laboratory and field studies on animal reproduction involving endocrinology, anatomy, behavior, and ecology. Accompanies, supplements, and extends material presented in 467. Prerequisite: ZOOL 467 which may be taken concurrently.

**ZOOL 470 Techniques for Mathematical Biology (3) NW** *Odell* Equips students to use, rather than prove, many applied mathematics techniques essential in mathematical biology. Includes instruction to use symbolic computation software (Mathematica, Macsyma) to do by computer the kind of mathematical formula manipulation that mathematicians formerly performed by hand. Recommended: calculus, linear algebra.

**ZOOL 471 Models in Biology (4) NW** *Odell* Explores use of models in biology in a wide range of topics, including morphogenesis, nerve signals, ecological interactions, population biology, and evolutionary theory. Emphasis on the biological insights models can provide rather than mathematical techniques. Prerequisite: either ZOOL 470, MATH 125, MATH 128, MATH 134, MATH 145, or Q SCI 292.

**ZOOL 484 Animal Physiology (3) NW** *Huey, Riddiford, Truman* Physiology at levels of organisms and behavior, organ systems, and cells—an evolutionary and integrative perspective. Organismal physiology: metabolism, temperature, locomotion, osmoregulation, respiration, circulation, digestion. Prerequisite: either BIOL 202, ZOOL 301, ZOOL 315, or BIOL 355; either CHEM 155, CHEM 160, CHEM 162, CHEM 164, CHEM 165, or CHEM 220; either PHYS 114 or PHYS 121.

**ZOOL 485 Animal Physiology (3) NW** *Huey, Riddiford, Truman* Physiology at levels of organisms and behavior, organ systems, and cells—an evolutionary and integrative perspective. Integrative physiology: neurons, muscles, and hormones. Prerequisite: either BIOL 202, ZOOL 301, ZOOL 315, or BIOL 355; either CHEM 160, CHEM 162, CHEM 164, CHEM 165, or CHEM 220; either PHYS 114 or PHYS 121.

**ZOOL 486 Animal Physiology Lab (2) NW** *Huey, Riddiford, Truman* Experimental design and techniques, data analysis, written reports. Project labs in organismal-level physiology. Prerequisite: ZOOL 484 which may be taken concurrently.

**ZOOL 487 Animal Physiology Lab (2) NW** *Huey, Riddiford, Truman* Experimental design and techniques, data analysis, written reports. Experiments in integrative physiology. Prerequisite: ZOOL 485 which may be taken concurrently.

**ZOOL 490 Undergraduate Seminar (3, max. 6) NW** Supervised reading and group discussion on selected concepts of zoology. Recommended: one upper-division zoology course.

**ZOOL 491 Topics in Zoological Research (1, max. 3) NW** Undergraduate seminar on research problems currently under investigation by department faculty members. Includes discussions and laboratory demonstrations of aims, techniques, and results of zoological research. Credit/no credit only. Recommended: one upper-division zoology course.

**ZOOL 492 Animal Migration (3) NW** Undergraduate seminar on evolution, ecology, behavior, and physiology of migration. Student presents a seminar and leads class discussion on a selected topic. Prerequisite: either BIOL 102 or BIOL 203; recommended: course in physiology, ecology, or animal behavior.

**ZOOL 498 Special Problems in Zoology (1-5, max. 15)** Recommended: one upper-division zoology course. Offered: AWSpS.

## Courses for Graduates Only

**ZOOL 506 Topics in Developmental Biology (1-2, max. 15)** Seminars and discussions of aspects of growth of special current interest.

**ZOOL 509 Topics in Vertebrate Biology (1-3, max. 15)** *Rohwer* Detailed consideration of topics in behavioral integration, communication, and social organization. Prerequisite: ZOOL 409 or PSYCH 409 or equivalent.

**ZOOL 520 Seminar (1)** Credit/no credit only. Offered: A.

**ZOOL 521 Seminar (1)** Credit/no credit only. Offered: W.

**ZOOL 522 Seminar (1)** Credit/no credit only. Offered: Sp.

**ZOOL 525 Seminar in Mathematical Biology (2, max. 12)** *Daniel, Kareiva, Odell* Examines mathematical models in a broad range of topics in biology, from cellular and subcellular to organismal and population phenomena. Participants present research topics, supplemented with selected readings from the primary literature, showing how mathematical methods and experimental or field biology are merged to predict observable phenomena. Credit/no credit only.

**ZOOL 528 Advanced Topics in Physiology (1-3, max. 15)** Recent developments. Prerequisite: one 400-level course in physiology.

**ZOOL 529 Advanced Topics in Physiology (1-3, max. 15)** Recent developments. Credit/no credit only. Prerequisite: one 400-level course in physiology.

**ZOOL 530 Science and Environmental Policy (3)** Role of science and scientists in formulating public policy related to the environment. Conceptualizes policy processes as a means of understanding opportunities for, and limits of, science in development and implementation of public policy. Prerequisite: concurrent registration in ZOOL 531. Offered: W.

**ZOOL 531 Science and Environmental Policy: Case Histories (2)** Examples of the use of scientific analysis in the development of environmental policies. Prerequisite: concurrent registration in ZOOL 530. Offered: W.

**ZOOL 533 Advanced Invertebrate Zoology (9)** Invertebrate fauna of the San Juan Archipelago. Topic changes from year to year. Individual research projects are emphasized. Prerequisite: course in invertebrate zoology and permission of Director of Friday Harbor Laboratories. Offered: at Friday Harbor Laboratories; SpS.

**ZOOL 536 Comparative Invertebrate Embryology (9)** Diversity in developmental patterns in major marine taxa. Analysis of evolutionary changes in development. Emphasis on observation of live em-

bryos and larvae. Prerequisite: permission of Director of Friday Harbor Laboratories; recommended: courses in invertebrate zoology and developmental biology. Offered: at Friday Harbor Laboratories; SpS.

**ZOOL 538 Advanced Invertebrate Physiology (9)** General and comparative aspects of nerve and muscle physiology with particular emphasis upon neuronal control of behavior, neuronal interactions, and other advanced topics determined by visiting faculty. Extensive laboratory experience, including intracellular and extracellular stimulating and recording techniques. Offered: at Friday Harbor Laboratories; Sp.

**ZOOL 540 Topics in Cellular Developmental Biology (1, max. 16)** *Bakken, Cooper, Hille, Moody* Seminar on current topics dealing with cellular aspects of developmental biology. Variable topics on both vertebrate and invertebrate development. Credit/no credit only.

**ZOOL 541 Experimental Design in Cell Biology (1.5)** *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest covered in depth in order to follow a line of investigation and critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with CONJ 536 .

**ZOOL 543 Morphogenesis and Gene Networks (1, max. 12)** *Odell* Seminar on current topics in genetic networks and the mechanics of morphogenesis. Topics vary.

**ZOOL 557 Topics in Molecular Insect Endocrinology (1, max. 12)** *Riddiford* Assigned reading and discussion of current topics in molecular insect endocrinology. Prerequisite: ZOOL 438 or ZOOL 485 or equivalent.

**ZOOL 568 Chemical Integration (2, max. 6)** *Wingfield* Graduate seminar dealing with current problems in endocrinology and neuroendocrinology. Credit/no credit only.

**ZOOL 570 Evolutionary Physiological Ecology (2, max. 16)** *Huey, Kingsolver* Assigned reading, discussion, and student presentations on issues in physiological and ecological aspects of evolution. Topics variable. Credit/no credit only. Prerequisite: BIOL 454 and BIOL 472 or equivalent.

**ZOOL 571 Current Topics in Evolution (1, max. 16)** *Huey, Kingsolver* Assigned reading and discussion of current topics in evolution. Topics variable. Credit/no credit only. Prerequisite: BIOL 454 or equivalent.

**ZOOL 572 Topics in Ecology (1-3, max. 15)** Graduate seminar on modern problems in ecology. Prerequisite: BIOL 472 or equivalent.

**ZOOL 575 Topics in Historical Ecology (2, max. 14)** Assigned reading and discussion of the history of conceptual issues or significant individuals. Topics variable. Credit/no credit only. Prerequisite: BIOL 472 or equivalent.

**ZOOL 577 Marine Invertebrate Biology (1, max. 8)** Seminar on current topics in biology or marine invertebrates at all levels of biological organization. Topics variable. Credit/no credit only. Prerequisite: ZOOL 433 and ZOOL 434 or equivalent.

**ZOOL 578 Advanced Ecology (5)** Strategies of reproduction, habitat selection, foraging and spacing; theory of competition and predator-prey interactions; niche theory and community structure. Prerequisite: BIOL 472 or equivalent.

**ZOOL 579 Criticism in Evolutionary Ecology and Behavior (2, max. 16)** *Rohwer* Critical analysis of manuscripts under preparation that treat evolutionary ecology, morphology, and behavior. Topics variable. Credit/no credit only. Prerequisite: ZOOL 409 or equivalent introduction to evolutionary thinking.

**ZOOL 580 Environmental Physiology and Behavior (2, max. 14)** *Kenagy, Wingfield* Current conceptual issues and research results. Topics vary. Credit/no credit only. Prerequisite: two upper-division courses in physiology or behavior or equivalent.

**ZOOL 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**ZOOL 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSpS.

**ZOOL 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.



# School of Business Administration

## Dean

Yash P. Gupta  
114 Mackenzie

## Associate Dean for Academic Affairs

Kamran Moizadeh  
116 Mackenzie  
busadmin@u.washington.edu

 *General Catalog Web page:*  
[www.washington.edu/students/gencaf/academic/School\\_BusinessAdmin.html](http://www.washington.edu/students/gencaf/academic/School_BusinessAdmin.html)

 *School Web page:*  
[depts.washington.edu/bschool/](http://depts.washington.edu/bschool/)

Men and women embarking on business careers will have the opportunity to influence many of the social, political, and economic forces in today's world. The School of Business Administration prepares students for professional careers in management and related disciplines in both the private and public sectors.

The School of Business Administration offers an undergraduate program leading to the degree of Bachelor of Arts (BA) in Business Administration and graduate programs leading to the degrees of Master of Business Administration (MBA), Executive Master of Business Administration (EMBA), Master of Professional Accounting (MPAcc), and Doctor of Philosophy (PhD). Evening BA and MBA programs are also offered.

Business Administration became an independent unit within the University system in 1917. It has been accredited by the American Assembly of Collegiate Schools of Business (now known as the International Association for Management Education) since 1921.

## Facilities and Services

Most Business School classes and activities are in four buildings. Balmer Hall, named for Thomas Balmer, former president of the University Board of Regents, contains classrooms and computer labs. There are four computer labs in Balmer Hall that are available to Business School students. Mackenzie Hall, named in memory of Prof. Donald Mackenzie, Chair of the Department of Accounting from 1949 to 1955, contains the Dean's Office, the Undergraduate Program Office, the Graduate Program Office, the PhD Program Office, Business Administration Computer Services (BACS), Office of Development and External Relations, faculty offices, five department offices, and other business administration program offices. Nearby Lewis Hall contains the Business Career Center and other faculty and administrative offices. A fourth building, on the north side of Balmer, has three distinct components: the Bank of America Executive Education Center (which includes the James B. Douglas Executive Forum), the Boeing Auditorium, and the Albert O. and Evelyn Foster Business Library.

To serve the continuing education needs of middle- and senior-level managers, the School of Business Administration offers a number of certificate programs, either University-initiated or co-sponsored with various community and industry organizations. The Management Program, a nine-month, one night per week program, strengthens understanding and skills in all areas of management and provides an opportunity for successful managers to learn from a distinguished faculty

and each other. Short courses and seminars are offered throughout the year in all areas of management, including marketing strategy, finance and accounting for non-financial executives, negotiation skills, and many others. In addition, the School develops and runs custom programs under contract with individual companies and organizations. Information on continuing education programs may be obtained from the Office of Executive Programs, (206) 543-8560, fax (206) 685-9236, uwexp@u.washington.edu.

## International Business Programs

International business programs are coordinated and developed by the School's Center for International Business Education and Research (CIBER). These activities include the Global Business Program, seminars, internships, business foreign-language programs, special guest-speaker programs, and study tours. In addition, the MBA program coordinates fifteen foreign-exchange programs around the world. Although the Marketing and International Business Department offers a general curriculum in international business, each of the five academic departments within the School maintains faculty with special international teaching and research expertise. Internationally oriented courses are offered by each department.

The Education for the Global Entrepreneur (EDGE) program teams undergraduate and graduate students with local businesses to provide information and assistance necessary to compete successfully in the international arena. This is accomplished through student consulting teams, overseas research projects which involve Business School students on exchange programs, and student interns.

At the MBA level, the Business School offers the Global Business Program (GBP) that provides opportunities for MBA students to build on the international business foundation that every MBA develops through the first year of the program. In addition to international business electives, the GBP includes overseas travel through study tours, quarter-long exchange programs, and international internships. GBP students also participate in the weekly Global Business Forum, which brings top international business leaders to campus to discuss important issues facing their companies and industries.

Questions regarding these programs may be directed to the Program Assistant, CIBER, 303 Lewis, (206) 685-3432, fax (206) 685-4079, uwiciber@u.washington.edu.

## Entrepreneurship Programs

The focus of the Business School's entrepreneurship programs is on nurturing skills that generate creative ideas, innovative processes, and new business growth. These skills are developed through special academic certificate programs, a high-tech entrepreneurship speaker series, internships, a business plan competition, club activities, and consulting opportunities with area businesses.

The Program in Entrepreneurship and Innovation (PEI) is open to both undergraduate and graduate students from the Business School as well as other schools and colleges of the University. Graduate students who wish to complete this specialization must participate in the PEI consulting club, attend the High-Tech Entrepreneurship Speaker Series, complete several PEI core classes, and participate in the Business Plan Competition. Contact PEI for more information at (206) 685-9868.

The Business and Economic Development Program (BEDP) matches undergraduate and graduate student consulting teams with small-business owners in Seattle's inner city to implement business development projects. Through courses, independent study options, summer internships, and hands-on projects with inner-city entrepreneurs, students explore the challenges faced by central city businesses, while also providing valuable assistance. Questions about the

Business and Economic Development Program can be directed to the program office at (206) 543-9327.

## Business Career Center

The Business Career Center coordinates all MBA and MPAcc career services. These include career counseling and career management workshops, the administration of special career events such as career fairs, company presentations, on-campus MBA and MPAcc recruitment, and a job-listing service. The Business Career Center also administers alumni and executive mentoring programs. Questions regarding these programs and services may be directed to the center's office, 202 Lewis, (206) 685-2410.

## Instructional Resources Office

The Instructional Resources Office promotes excellence in teaching by providing resources in current practice and research in teaching and learning. The office serves faculty and teaching assistants with individual consultations, coordinates a teaching preparation program for doctoral students, and offers assistance with instructional innovations.

## Honor Societies

Beta Gamma Sigma is the national scholastic honor society in the field of business. Election to membership is available to both undergraduate and graduate students in business. Selection is based on outstanding scholastic achievement.

Beta Alpha Psi is the accounting honor society. Membership is based primarily on scholastic achievement, but some community service is also required. Beta Alpha Psi provides a mechanism for students, professionals, and educators to meet on both formal and informal bases.

## Student Organizations

The goals and interests of graduate students are served by the MBA Association, the Association of Black Business Students, Challenge for Charity, Graduate Consulting Club, MBA Finance Club, Global Business Association, Graduate Accounting Club, Environmental Business Alliance, Graduate and Professional Student Senate, MBA Marketing Club, Program in Entrepreneurship and Innovation Club, PEI Consulting Network, Net Impact, High-Tech Club, MBA Speak-easy, Women in Business, and the Doctoral Association.

## Graduate Programs

Gary Sundem  
Associate Dean for Masters Programs

### Admission

Qualified students who are graduates of the University of Washington or other accredited colleges or universities may be admitted autumn quarter to graduate degree programs. GPA, Graduate Management Admission Test score, work experience, educational and professional objectives, and other factors are considered in the admission process. Inquiries concerning the details of admission should be made to the specific degree program of interest, University of Washington, Graduate School of Business Administration, Mackenzie Hall, Box 353200, Seattle, WA 98195.

### Application Procedure

Applications to graduate programs are considered for entry in autumn quarter only. The formal deadlines for application are: February 1 for the PhD program; December 1, January 1, February 1, and March 1 for domestic applicants for the MBA; February 1 for international applicants for the MBA; April 1 for Evening

MBA; and April 15 for the Executive MBA and MPAcc programs. Students are encouraged to apply as early as possible for the full-time MBA program.

The Graduate School of Business Administration offers programs of study leading to the advanced degrees of Master of Business Administration, Executive Master of Business Administration, Master of Professional Accounting, and Doctor of Philosophy.

## Master of Business Administration

Executive Director  
JoAnne Starr  
110 Mackenzie Hall, Box 353200  
(206) 543-4661  
mba@u.washington.edu

The Master of Business Administration degree program has been designed for students who are preparing for a professional career in management. A period of two academic years, or 96 academic credits, is required for most students to complete the MBA program. The program consists of 48 credits of required first-year courses and 48 elective credits. The student may take no more than 24 credits in any one elective area.

The evening MBA program, initiated in the fall of 1996, is targeted toward fully employed college graduates who seek a management degree that can be earned outside their regular working hours. Instruction takes place two evenings per week and students typically take two courses per quarter. The program consists of 76 academic credits, with normal completion of degree requirements in eleven quarters.

### Special Programs

Within the MBA program, there are options for special study: Global Business Program; Program in Entrepreneurship and Innovation; and the interdisciplinary Global Trade, Transportation, and Logistics Studies. The following concurrent degree programs are also available: MBA/JD with the School of Law, MBA/MAIS with the Henry M. Jackson School of International Studies, MBA/MSE with the College of Engineering's Program in Engineering and Manufacturing Management, and MBA/MHA with the School of Public Health and Community Medicine.

## Executive Master of Business Administration

Assistant Dean  
Ann Lightbody  
(206) 685-1333  
emba@u.washington.edu

Since the autumn of 1983, the Executive MBA Program has provided an additional pathway to the Master of Business Administration degree. The EMBA program provides an intensive executive-development experience to a select group of midcareer managers who continue to work full-time while pursuing the MBA degree. Candidates for this two-year program should have seven or more years of increasingly successful work experience including three to four years in management, and currently hold mid- or top-level management positions. They are typically sponsored by their organizations and have been identified as employees with high potential to advance as general managers. Students are selected to ensure diversity of industry, functional areas and organizational size.

The Executive MBA degree program is offered in two scheduling options. Both run for two academic years, September through June. (1) The Puget Sound Option meets on campus for a full day once a week, on alternating Fridays and Saturdays. In addition, students attend spring and fall residence sessions each

year. (2) The Northwest and Beyond Option meets on campus once a month, generally for three consecutive days, Thursday through Saturday. Between monthly sessions, students continue to interact with faculty and classmates online via the Internet and interactive groupware. This format is designed for individuals from the greater Northwest as well as those from the Puget Sound area whose schedules preclude weekly attendance.

While the scope of the curriculum is comparable to that of the regular MBA program, the pace is more intense and the perspective is that of a general manager. There are 21 required courses and no electives.

Applications are accepted throughout the year, with an application deadline of April 15 for the class beginning each autumn. Late applications are handled on a space-available basis.

## Master of Professional Accounting

Managing Director  
Francine Shafer  
231 Mackenzie  
(206) 616-4964

The Master of Professional Accounting (MPAcc) prepares students for high-level careers with major accounting and consulting firms, governmental agencies, and industry. Students with undergraduate degrees in accounting may complete the program in four quarters. Students with no prior business background must take an expanded version of the program. Enrollment is limited to 25 to 30 students in each of two tracks—Accounting and Audit (A&A) and Taxation. MBA students with a strong interest in accounting and taxation may earn a joint MBA/MPAcc degree.

## Doctor of Philosophy

Program Coordinator  
Jaime Banaag  
102 Mackenzie  
(206) 543-4111  
baphd@u.washington.edu

The Ph.D. program in business administration is a research-based program designed to train scholars interested in academic careers, although this training is also useful for individuals seeking research positions in business and government, as well as in consulting firms.

With the guidance of faculty members who have similar interests, Ph.D. students complete a program of formal coursework (a minimum of 18 courses) and participate in doctoral seminars, independent study, and research. A faculty supervisory committee is appointed early in the program to assist each student in constructing a course of study that fits that individual's background and interests. Students select one major area of specialization and complete requirements in two or three additional minor areas that support their major area of specialization (including areas outside the Business School, such as economics, psychology, and mathematics). Throughout the program, doctoral students receive support and training that hone their skills as teachers and course developers.

Major areas of concentration include accounting, finance, human resource management and organizational behavior, marketing, information systems, operations management, operations research, and strategic management. All doctoral students are required to have research methods as one of their minor areas.

Doctoral study is full-time and year-round, and students are admitted autumn quarter only. Most candidates will require four to five years to complete the

program. The School's goal is to make financial aid available, in the form of research and teaching assistantships, to all of its doctoral students. In addition to service appointments, fellowships are available on a competitive basis to support students engaged in their dissertation research during the final part of their programs.

### Special Requirements

Applicants to graduate business programs are required to submit scores on the Graduate Management Admission Test. Those admitted to the MBA program must demonstrate understanding of the fundamental concepts of calculus.

## Accounting

Accounting involves development and communication of financial and operational information for business and nonprofit economic entities. The curriculum includes understanding accounting information systems, using accounting information in managerial decision making, preparing and auditing financial statements under generally accepted accounting and auditing standards, and understanding the fundamental aspects of personal and corporate taxation. Elective courses provide in-depth instruction in managerial and financial accounting, not-for-profit accounting, and taxation. Courses provide a foundation for careers in accounting (public, industrial, private, or governmental), for a general business career, or for other professions such as law.

## Faculty

### Chair

Stephan E. Sefcik

### Professors

Berg, Kenneth B. \* 1950, (Emeritus); MS, 1941, PhD, 1952, University of Illinois; financial and managerial accounting.

Bowen, Robert M. \* 1978; PhD, 1978, Stanford University; financial and managerial accounting.

Burgstahler, David C. \* 1980; PhD, 1981, University of Iowa; financial and managerial accounting, statistical methods.

Dukes, Roland E. \* 1979; PhD, 1974, Stanford University; financial and managerial accounting.

Heath, Loyd C. \* 1962, (Emeritus); PhD, 1965, University of California (Berkeley); financial accounting.

Jiambalvo, James \* 1977; PhD, 1977, Ohio State University; managerial accounting, auditing.

Mueller, Fred J. \* 1953, (Emeritus); PhD, 1956, Ohio State University; auditing, not-for-profit, tax accounting.

Noreen, Eric W. \* 1976; PhD, 1976, Stanford University; managerial accounting.

Ramanathan, K. V. \* 1972; PhD, 1970, Northwestern University; managerial accounting.

Sefcik, Stephan E. \* 1986; PhD, 1983, University of Illinois; financial reporting and environmental accounting issues.

Shevlin, Terrence J. \* 1985; PhD, 1986, Stanford University; financial accounting, capital markets, taxation.

Sundem, Gary L. \* 1971; PhD, 1971, Stanford University; information systems, managerial accounting, information economics.

**Associate Professors**

Kennedy, S. Jane 1991; MBA, 1977, University of Alberta (Canada); PhD, 1992, Duke University; financial and managerial accounting.

Shores, Donna J. \* 1986; MS, 1980, University of Wisconsin; PhD, 1986, Stanford University; financial and managerial accounting.

**Assistant Professors**

Kadous, Kathryn K. 1998; PhD, 1996, University of Illinois; auditing, financial accounting.

Myers, James N. 1996; PhD, 1997, University of Michigan; accounting/financial statement analysis.

Paperman, Joseph B. 1995; MS, 1984, Purdue University; PhD, 1997, Cornell University; capital markets/financial accounting.

Rajgopal, Shivaram 1998; PhD, 1998, University of Iowa; reverse recognition accounting.

**Senior Lecturers**

Resler, William M. 1982; JD, 1972, University of Washington; LLM, 1973, New York University; tax accounting.

Rice, Steven J. 1985; MS, 1971, Oklahoma State University; PhD, 1974, University of Texas (Austin); tax accounting.

**Lecturers**

Angell, Patricia L. 1998; MPAcc, 1999, University of Washington.

Britzmann, Jeannie R. 1993; MPAcc, 1994, University of Washington; tax accounting.

Creech, William R. 1992; LLM, 1983, New York University; taxation.

Gillick, James V. 1986; BBA, 1957, University of Louisville.

Wells, William L. 1988; MPAcc, 1989, University of Washington; financial reporting, not-for-profit accounting.

## Finance and Business Economics

Finance and Business Economics address the financial and economic aspects of business decision making. The Finance curriculum focuses on financial management and the financial markets within which firms and individual investors operate. Business Economics courses concern the economic behavior of firms, including factors that determine costs and prices, and real and monetary forces (such as government policies) that affect the national and international economic environment.

### Faculty

**Chair**

Lawrence D. Schall

**Professors**

Alberts, William \* 1967, (Emeritus); PhD, 1961, University of Chicago; capital investment planning, business strategy, economics of industrial organization.

Bourque, Philip J. \* 1957, (Emeritus); PhD, 1956, University of Pennsylvania; business economics.

Bradford, William D. 1994; MBA, 1968, PhD, 1972, Ohio State University; corporate finance, small and minority business, financial markets and institutions.

Conrad, Douglas A. \* 1977, (Adjunct); MHA, 1973, University of Washington; MBA, 1977, PhD, 1978, University of Chicago; managed care, corporate finance in managed care.

D'ambrosio, Charles A. \* 1960, (Emeritus); PhD, 1962, University of Illinois; finance.

Ferson, Wayne E. \* 1992; PhD, 1982, Stanford University; financial economics and investments.

Frost, Peter A. \* 1969; PhD, 1966, University of California (Los Angeles); investments, business finance, econometrics, monetary theory.

Haley, Charles \* 1966; PhD, 1968, Stanford University; business finance, financial management of banks, international finance.

Hanson, Kermit O. 1948, (Emeritus); MS, 1940, PhD, 1950, Iowa State University; accounting and statistics.

Hess, Alan C. \* 1967; PhD, 1969, Carnegie Mellon University; banking, financial markets, microeconomics and macroeconomics.

Higgins, Robert C. \* 1967; PhD, 1969, Stanford University; financial management, international financial management.

Johnson, Dudley \* 1960, (Emeritus); PhD, 1957, Northwestern University; business economics.

Kamara, Avraham \* 1984; PhD, 1986, Columbia University; financial economics, investment, futures and options.

Karpoff, Jonathan M. \* 1983; PhD, 1982, University of California (Los Angeles); corporate finance, law and economics, natural resources.

Malatesta, Paul H. \* 1980; PhD, 1982, University of Rochester; corporate finance, security and capital markets, corporate mergers, and empirical methods in finance.

Roley, V. Vance \* 1983; PhD, 1977, Harvard University; financial markets, finance, monetary theory, monetary policy.

Schall, Lawrence D. \* 1968; PhD, 1969, University of Chicago; corporate finance, valuation, leasing, performance evaluation, acquisitions.

Siegel, Andrew F. \* 1983; MS, 1975, PhD, 1977, Stanford University; statistics, computing, corporate finance, investments, data analysis.

**Associate Professors**

Dewenter, Kathryn L. \* 1992; PhD, 1993, University of Chicago; international finance, macroeconomics.

Koski, Jennifer Lynch \* 1991; MBA, 1987, Harvard University; PhD, 1991, Stanford University; corporate finance, market microstructure.

Pigott, William 1954, (Emeritus); MA, 1955, PhD, 1957, University of Washington; finance and business economics.

Pontiff, Jeffrey E. \* 1992; PhD, 1994, University of Rochester; corporate finance, capital market theory, closed-end mutual funds, investments.

Rice, Edward M. \* 1979; PhD, 1978, University of California (Los Angeles); corporate finance, microeconomics, industrial organization.

**Assistant Professor**

Novaes, Walter 1993; PhD, 1993, Massachusetts Institute of Technology; corporate finance, contract theory, industrial organization.

**Senior Lecturers**

Glassman, Debra A. 1989; PhD, 1980, University of Wisconsin; international finance, international economic policy, macroeconomics.

Hadjimichalakis, Karma G. 1976; MA, 1968, PhD, 1974, University of Rochester; monetary policy, bank-

ing, financial markets, domestic and international macroeconomics.

Tarhouni, Ali A. 1985; MA, 1978, PhD, 1983, Michigan State University; economic theory, international trade and finance, financial markets.

## Management and Organization

Management and Organization provides an understanding of the processes and structures of organizations through three distinct programs. The Human Resource Management and Organizational Behavior (HRMOB) courses address personnel and industrial-relations topics such as selection, performance appraisal, compensation, and negotiations, as well as behavioral topics such as leadership, motivation, and group dynamics. They prepare students for managing an organization's human resources effectively. The Organization and Environment (O E) courses examine organization theory, organization design, and management of technology and innovation, as well as the social, political, legal, and ethical environments in which organizations operate. They give students the knowledge, perspective, and analytical tools to deal effectively with organization-environment interactions. The Business Policy (B POL) courses focus on organizational effectiveness from the viewpoint of top management. Emphasis is placed on an integrated view through strategic management and control, planning, decision making, and entrepreneurship.

### Faculty

**Chair**

Charles William L. Hill

**Professors**

Fenn, Margaret P. \* 1950, (Emeritus); DBA, 1963, University of Washington; organizational behavior and administrative theory.

French, Wendell L. \* 1958, (Emeritus); EdD, 1956, Harvard University; organizational behavior, human resources management, organization development.

Gist, Marilyn Elaine \* 1987; PhD, 1985, University of Maryland; cognitive processes involved in motivation training and work task performance.

Henning, Dale A. \* 1955, (Emeritus); PhD, 1954, University of Illinois; administrative theory and organizational behavior.

Hill, Charles William L. \* 1988; PhD, 1983, University of Manchester (UK); business policy, corporate strategy, multinational enterprise.

Huber, Vandra Lee \* 1987; DBA, 1982, Indiana University; human resource decision making, compensation, and performance appraisal.

Johnson, Richard A. \* 1969, (Emeritus); DBA, 1958, University of Washington; business policy.

Jones, Thomas M. \* 1977; PhD, 1977, University of California (Berkeley); ethics, business, government and society.

Kast, Fremont E. \* 1978, (Emeritus); DBA, 1956, University of Washington; administrative theory and organizational behavior.

Lee, Thomas W. \* 1983; PhD, 1984, University of Oregon; administrative theory and organizational behavior, human resources management.

Mitchell, Terence R. \* 1969; PhD, 1969, University of Illinois; organizational behavior.

Moxon, Richard W. \* 1971; DBA, 1973, Harvard University; international business.

Newell, William T. \* 1963, (Emeritus); PhD, 1962, University of Texas (Austin); operations management and business policy.

Peterson, Richard B. \* 1971; PhD, 1966, University of Wisconsin; cross-cultural management, industrial relations.

Rosenzweig, Jim E. \* 1956, (Emeritus); PhD, 1956, University of Illinois; administrative theory and organizational behavior.

Saxberg, Borje O. \* 1957; PhD, 1958, University of Illinois; administrative theory, organizational behavior, entrepreneurship.

Scott, William George \* 1966, (Emeritus); DBA, 1957, Indiana University; administrative theory and organizational behavior.

Sutermeister, Robert A. 1949, (Emeritus); MA, 1942, University of Washington; personnel and organizational behavior.

Vesper, Karl H. \* 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.

Wheeler, Bayard O. 1948, (Emeritus); MA, 1930, University of Washington; PhD, 1942, University of California (Berkeley); urban economics.

#### Associate Professors

Butler, John E. \* 1985; PhD, 1985, New York University; entrepreneurship, technology and innovation, strategic management.

Hansen, Gary S. \* 1984; PhD, 1987, University of Michigan; business and corporate strategy, innovation and entrepreneurship.

Kienast, Philip K. \* 1970; PhD, 1972, Michigan State University; human resources management.

Kotha, Suresh \* 1996; MBA, 1983, Rensselaer Polytechnic Institute; MArch, 1985, MS, 1986, PhD, 1988, Rensselaer Polytechnic Institute; competitive strategy, competing on the Internet and e-commerce, and international management.

Strong, Dennis Fulton \* 1967, (Emeritus); PhD, 1959, University of Washington; business history.

Wickman, James A. \* 1953, (Emeritus); DBA, 1961, University of Washington; risk control and insurance.

Wicks, Andrew C. \* 1992; PhD, 1992, University of Virginia; normative business ethics including stakeholder theory, trust, and managed care.

#### Assistant Professors

Boeker, Warren \* 1998; PhD, 1987, University of California (Berkeley); strategic management.

Chen, Xiao-Ping 1999; PhD, 1998, University of Illinois; cross-cultural management, organizational behavior.

Fuller, Sally R. 1992; PhD, 1993, University of Wisconsin; organizational behavior and organizational theory.

Rindova, Violina 1998; PhD, 1999, New York University; strategic management and entrepreneurship.

Sarasvathy, Saras D. 1998; PhD, 1998, Carnegie Mellon University; entrepreneurship and finance.

Schulz, Martin 1993; PhD, 1993, Stanford University; organizations, qualitative and quantitative methods.

#### Lecturers

Berger, Robert H. 1985; JD, 1967, MBA, 1983, University of California (Berkeley); law.

Gautschi, Frederick H. 1988; PhD, 1978, University of California (Berkeley); law, organization behavior.

George-Falvy, Jane 1989; PhD, 1995, University of Washington; organizational behavior and human resource management.

Hauser, Owen Shannon 1990; MBA, 1974, Pepperdine University; entrepreneurship.

Huwe, Ruth A. 1990; PhD, 1999, University of Washington; speech communication, negotiation.

## Management Science

The Department of Management Science consists of three subareas: Information Systems (IS), Operations Management (OPMGT), and Quantitative Methods (QMETH). The Information Systems area focuses on the management of computer-based information systems. The IS curriculum is designed to give students a basic understanding of IS technology and its impact on all phases of an organization. Specific areas of study include telecommunications and network design, systems analysis and design, database management, expert systems, and applications programming. The Operations Management (OPMGT) area of study refers to the functional area of management which produces goods or services in an organization. Specifically, the OPMGT curriculum focuses on the many changes which have occurred in the past ten years in the way that managers think, plan, and operate manufacturing and service facilities. The area includes courses in logistics, quality, inventory and supply-chain management, project management, and waiting lines, among others. The Quantitative Methods (QMETH) area focuses on the theory and application of mathematical and statistical tools in the modeling and analysis of business problems. The QMETH curriculum includes courses in statistics and data analysis as well as courses in operations research (e.g., linear programming, forecasting, using spread-sheets to construct decision support models).

## Faculty

#### Chair

Theodore Klasterin

#### Professors

Chiu, John S. Y. \* 1960, (Emeritus); PhD, 1960, University of Illinois; business statistics.

Faaland, Bruce H. \* 1971; PhD, 1971, Stanford University; manufacturing, networks, production scheduling, mathematical programming, forestry.

Gupta, Yash P. 1999; PhD, 1976, University of Bradford (UK); management and administration.

Klasterin, Theodore \* 1974; PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Moinzadeh, Kamran \* 1984; MS, 1982, PhD, 1984, Stanford University; operations management, production management, inventory, quality and supply chain management.

Siegel, Andrew F. \* 1983; MS, 1975, PhD, 1977, Stanford University; statistics, computing, corporate finance, investments, data analysis.

Tamura, Hirokuni \* 1967; MS, 1961, PhD, 1967, University of Michigan; statistical models for auditing, cost accounting, total quality management/global strategy.

#### Associate Professors

Mookerjee, Vijay \* 1991; MBA, 1984, Indian Institute of Technology (India); PhD, 1991, Purdue University; artificial intelligence, decision support systems, expert systems.

Schmitt, Thomas G. \* 1979; MBA, 1974, University of Cincinnati; DBA, 1979, Indiana University; management of service and manufacturing operations.

#### Assistant Professors

Dewan, Sanjeev \* 1998; PhD, 1991, University of Rochester; economics of information systems and information technology.

Dey, Debabrata \* 1997; MS, 1989, Syracuse University; MS, 1992, PhD, 1994, University of Rochester; database theory/design, telecommunications, heterogeneous/distributed systems, software engineering.

Hillier, Mark S. \* 1993; MS, 1991, PhD, 1994, Stanford University; operations management, inventory, commonality, mathematical programming applications.

Jain, Apurva 1999; PhD, 1999, Purdue University; supply chains, Web retailing, logistics, inventory.

#### Senior Lecturers

Burrows, William E. 1968; MA, 1972, University of Washington; systems analysis/design methodologies and data/file structures.

Morita, June G. \* 1982; MA, 1978, PhD, 1984, University of California (Berkeley); sample surveys, quality control, survival analysis, statistical data analysis, statistics education.

Pilcher, Martha G. \* 1987; MS, 1978, PhD, 1985, Georgia Institute of Technology; operations research/operations management, health care applications and logistics.

## Marketing and International Business

Marketing (MKTG) provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, measurement and analysis of markets, pricing, physical movement of goods, product development, promotion, and sales administration. Marketing careers may involve specialization in Internet marketing, product or brand management, advertising, selling, sales management, marketing research, retailing, wholesaling, and international marketing for a wide spectrum of firms and industries. International Business (I BUS) includes trade, payments, and multinational corporate systems and activities. The area prepares students for international responsibilities in domestic business firms, governmental agencies, and overseas business. Courses in Business Communications (B CMU) stress writing in organizations to accomplish goals, oral reporting, business plan presentation, and the use of computer graphics in communication.

## Faculty

#### Chair

Gary Erickson

#### Professors

Erickson, Gary \* 1980; MBA, 1973, PhD, 1978, Stanford University; quantitative models of marketing and analysis of competitive strategies.

Gautschi, David A. \* 1992; MBA, 1974, University of Oregon; PhD, 1979, University of California (Berkeley); marketing management, marketing strategies in the global information telecommunications industries.

Gordon, Guy G. 1957, (Emeritus); MBA, 1950, University of Washington; PhD, 1957, University of California (Berkeley); marketing.

Harder, Virgil E. \* 1955, (Emeritus); PhD, 1958, University of Illinois; business communications.

Ingene, Charles A. \* 1982; MA, 1972, PhD, 1975, Brown University; retailing and distribution strategy and marketing management.

Jacobson, Robert L. \* 1984; PhD, 1981, University of California (Berkeley); marketing strategy, marketing management and entrepreneurial management.

Kolde, Endel-Jakob \* 1951, (Emeritus); DBA, 1954, University of Washington; international business and marketing.

MacLachlan, Douglas \* 1970; MBA, 1965, MA, 1970, PhD, 1971, University of California (Berkeley); marketing research, sales forecasting, psychological measurement and statistics.

Moinpour, Reza \* 1966; MBA, 1966, PhD, 1970, Ohio State University; consumer decision making, new product development and marketing research.

Narver, John C. \* 1966, (Emeritus); MBA, 1960, PhD, 1965, University of California (Berkeley); market strategy, market-driven organization, pricing policies, marketing management.

Spratlen, Thaddeus H. \* 1972; MA, 1957, PhD, 1962, Ohio State University; retailing, marketing management, marketing and the city.

Sullivan, Jeremiah J. \* 1975; MA, 1967, PhD, 1970, New York University; MBA, 1975, University of Washington; international business, Japanese management.

Wheatley, John J. \* 1960, (Emeritus); MBA, 1954, PhD, 1959, State University of New York (Buffalo); marketing management, marketing research, sales management.

Yalch, Richard F. \* 1971; MS, 1970, Carnegie Mellon University; PhD, 1974, Northwestern University; advertising management and consumer behavior, marketing management, marketing research.

### Associate Professor

Grathwohl, Harrison L. \* 1958, (Emeritus); DBA, 1957, Indiana University; marketing.

### Assistant Professors

Forehand, Mark Robeck 1997; PhD, 1997, Stanford University; international business.

Louie, Therese A. \* 1993; PhD, 1992, University of California (Los Angeles); behavioral biases that influence the perception of self and others.

Okada, Erica Mina 1999; MBA, 1992, Dartmouth College; PhD, 1999, University of Pennsylvania; international marketing, decision theory and marketing strategy.

Turner, Daniel J. 1999, (Acting); PhD, 2000, Northwestern University; retailing, marketing models.

### Lecturers

Quarton, Mary Ann O. 1995; MBA, 1971, PhD, 1980, Stanford University; retailing and retail management.

Stearns, Elizabeth P. 1995; MBA, 1978, New York University; advertising, direct marketing.

Whelan, John F. 1985; MA, 1977, Yale University; business communications.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

## Accounting

### ACCTG 411 Auditing Standards and Principles (3)

Intensive introduction to the attest function in society today. The environment, the process, and the report of the public auditor are analyzed. Potential extensions of the attest function are examined. Prerequisite: 2.0 in ACCTG 302; 2.0 in ACCTG 311; 2.0 in either ACCTG 320 or ACCTG 330.

### ACCTG 421 Tax Effects of Business Decisions (3)

Issues in taxation, including tax considerations in business decision making, tax effects of business transactions, taxation of compensation, fringe benefits, capital gains, fixed asset transactions, disposition of business distribution from corporations. Prerequisite: 2.0 in ACCTG 302.

### ACCTG 440 Accounting and Financial Management Decisions (3)

Business financial planning with an emphasis of the role of accounting information in financial decisions. Topics include the accounting and finance aspects of business valuation, short and long term financing, short and long term investments, alternative types of debt and equity financing, and related topics. Prerequisite: ACCTG 302; ACCTG 311; FIN 350.

### ACCTG 450 Business Taxation (3)

Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Includes corporate distributions, liquidations, and reorganizations. Prerequisite: 2.0 in ACCTG 421.

### ACCTG 451 Individual Income Taxation (3)

Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual income tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees. Prerequisite: 2.0 in ACCTG 421.

### ACCTG 460 Advanced Cost Accounting (3)

Advanced analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning and control; current developments in cost accounting. Prerequisite: 2.0 in ACCTG 311.

### ACCTG 470 Accounting for Mergers, Acquisitions, and International Operations (3)

Accounting for business combinations, parent-subsidiary and branch relationships, and foreign operations. Prerequisite: ACCTG 321; ACCTG 421 which may be taken concurrently; ACCTG 440 which may be taken concurrently.

### ACCTG 480 Accounting for Not-for-Profit Organizations (3)

Fund and budgetary accounting as applied to public sector organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 2.0 in ACCTG 302.

### ACCTG 485 Advanced Financial Accounting (3)

Accounting for partnerships, accounting for business combinations, parent-subsidiary and branch relationships, foreign exchange. Prerequisite: 2.0 in ACCTG 302.

### ACCTG 490 Special Topics in Accounting (1-6, max. 6)

Special topics of current concern to faculty and students. Offered only when faculty is available and student interest is sufficient. Class is announced in advance of scheduled offerings.

### ACCTG 495 Accounting Internship (1-4, max. 4)

One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Credit/no credit only.

### ACCTG 499 Undergraduate Research (1-6, max. 9)

Arranged and supervised by individual members of the faculty.

## Courses for Graduates Only

Approval of graduate business program office required. Entry code required for nonmajors.

### ACCTG 500 Financial Accounting (3)

Introduction to concepts and procedures underlying determination and presentation of information for financial decisions by investors and other decision makers outside the business enterprise. Study of problems of valuation, income determination, and financial reporting.

### ACCTG 501 Managerial Accounting (3)

Study of the generation and the use of accounting information within the firm for purposes of planning and controlling operations. Topics covered include cost concepts, responsibility accounting systems, cost control, and the use of accounting information in short- and long-term management decision problems. Prerequisite: ACCTG 500.

### ACCTG 503 Introduction to Accounting for Managers (4)

*Noreen, Sundem* Provides potential managers with a basic knowledge of financial and managerial accounting. Focuses on the use, not the preparation, of accounting information. Examples presented for a variety of for-profit and nonprofit organizations.

### ACCTG 505 Intensive Analysis of Accounting Principles and Practices (18)

Covers the subjects in the required core for undergraduate accounting majors: intermediate accounting, advanced accounting, cost accounting, auditing, and tax accounting. Credits will not count toward MBA degree. Prerequisite: ACCTG 215 and ACCTG 225 or equivalent, or permission of instructor.

### ACCTG 510 Problems in Financial Reporting (4)

Extension of 500 emphasizing financial reporting from a user's perspective. Alternative approaches to recognition, valuation, and measurement of assets, equities, and income considered. Choice of accounting methods and effects on the firm of accounting policy regulation also examined. Prerequisite: B A 502 or permission of instructor.

### ACCTG 511 Problems in Managerial and Cost Accounting (4)

Discussion and analysis of costing techniques, use of accounting data in planning and evaluating managerial performance, and use of accounting data in short-run and long-run decisions. Special attention directed to issues in human behavior involved in cost allocation, budgeting, and performance evaluation. Prerequisite: B A 502 or permission of instructor.

### ACCTG 513 Tax Effects of Business Decisions (4)

Importance of tax considerations in making business decisions. Relationship of taxable income to accounting and economic concepts of income, and the economic, political, and social background of important tax provisions. Prerequisite: B A 502 or permission of instructor.

### ACCTG 515 Seminar in Financial Statement Analysis (4)

Emphasizes use of published financial reports by decision makers external to the firm (e.g., investors, creditors). Within each decision context, traditional models and recent empirical research in accounting and finance are discussed. Project required as an application of course subject matter. Prerequisite: B A 502 or permission of instructor.

### ACCTG 517 Seminar in International Accounting (4)

Introduction to the conceptual, managerial, professional, and institutional issues of international accounting. Comparative and empirical studies receive special attention. Current interest topics (e.g., standard setting and transnational financial reporting) are explored. A research paper required. Prerequisite: B A 502 or permission of instructor.

**ACCTG 519 Seminar in Financial Control Systems**

**(4)** Design and administration of formal information systems to aid the planning and control process in large organizations; formulation of divisional financial goals and control criteria; measurement of divisional performance and problems of goal congruence; administration of new investment programs. Prerequisite: B A 502 or permission of graduate office.

**ACCTG 520 Information Quality and Assurance Services**

**(4)** Introduction to assurance services with a focus on financial statement audits. Auditing concepts and procedures, and the role of audits in financial markets.

**ACCTG 521 Cases and Issues in Information Quality and Assurance Services**

**(4)** Analysis of cases and discussions of current issues dealing with assurance services. Prerequisite: ACCTG 520.

**ACCTG 522 Advanced Financial Reporting**

**(4)** Advanced problems related to the measurement of enterprise income and asset and liability valuation.

**ACCTG 523 Advanced Financial Analysis**

**(4)** Explores the use of published financial reports by decision makers external to the firm (e.g. investors and creditors). Emphasis is on traditional and statistical analyses of financial statements for the purposes of making economic decisions. Prerequisite: ACCTG 522.

**ACCTG 524 Individual Taxation**

**(4)** Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees.

**ACCTG 525 Business and International Taxation**

**(4)** Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Included corporate distributions, liquidations, and reorganizations. International dimensions of business taxation are introduced. Prerequisite: ACCTG 524.

**ACCTG 526 Preparation for IPOs and SEC Reporting**

**(4)** Introduces legal issues pertaining to the accounting profession. Discusses the role of operations of the SEC with an emphasis on its functions in regulating information disclosure. Prerequisite: ACCTG 522.

**ACCTG 527 Communications in Professional Accounting**

**(4)** Introduction to the communications practices of professional accountants. Development of effective written and oral skills employed in accounting presentations such as audit reports. Study of results of organizational communications research applicable to accounting firms and units within firms.

**ACCTG 530 Tax Issues in Property Ownership**

**(4)** Analysis of gain and loss realization, recognition, and characterization of such. Detailed exploration of statutory and case law regarding acquisition, ownership, and disposition of assets. Treatment of capital and ordinary gains and losses. Timing issues regarding deferral transactions and installment reporting are analyzed. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 531 Timing and Periods of Taxation**

**(3)** Analysis of the cash and accrual methods of accounting, choice of taxable period and multi-period transaction analysis. Consideration of statute of limitations and mitigation thereof. Details of passive activity losses. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 533 Procedural and Policy Issues**

**(3)** Analysis of the procedures of Federal taxation: assessment, collection, and refund claims. Detailed exploration of the rules governing the statute of limitations and the mitigation thereof. An introduction to

tax policy considerations is given. Tax penalties are explored. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 534 Fundamentals of Corporate Taxation**

**(3)** Detailed analysis of contribution of assets to corporations. Calculation of recognized gains and basic effects of asset contributions. Treatment of income and deduction items of corporate operations. Analysis of distribution of assets to shareholders with respect to their stock. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 535 Advanced Issues in Corporate Taxation**

**(3)** A continuation of 534. Fundamentals of moving assets out of and within corporate solution. Basics of corporate reorganizations: acquisitive and divisive. The details of the election to obtain (or avoid) the Section 338 election are explored in detail. Prerequisite: Undergraduate accounting concentration or equivalent; ACCTG 534 or permission of instructor.

**ACCTG 536 Advanced Issues in Corporate Taxation**

**(3)** Continuation of 534 and 535. Study of complex issues in corporate taxation planning. Substantial portion of course involves resolving case studies to improve analytic skills and to interrelate disparate corporate planning opportunities. Corporate reorganizations are analyzed in detail. Prerequisite: undergraduate accounting concentration or equivalent; ACCTG 535 or permission of instructor.

**ACCTG 537 Income Taxation of Conduits I**

**(3)** *Resler, Rice* Tax consequences to owners and entity from formation, operation, distributions from, and liquidation of partnerships and S corporations. Study of taxable and tax-free formations, nature of "bottom line" income and separately stated items, changes to owners' tax basis, basics of non-liquidating and liquidating distributions. Prerequisite: undergraduate accounting concentration or equivalent. Offered: W.

**ACCTG 538 Income Taxation of Conduits II**

**(3)** A continuation of 537. Study of complex issues in partnership and S corporation taxation. Substantial portion involves resolving case studies to improve analytic skills and interrelate partnership and S corporation planning issues. Sections 751(b) and 736 examined in detail. Prerequisite: undergraduate accounting concentration or equivalent; 537 or permission of instructor.

**ACCTG 539 Tax Research and Decision Making**

**(4)** Decision-making processes in relation to problems of taxation. Tools of tax analysis and research and the communication of conclusions flowing from professional tax work. Role of the professional accountant in client business transactions and in negotiations with taxing authorities is highlighted and simulated on the basis of actual case histories. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 540 Communications for Taxation Professionals**

**(4)** Introduction to the communications forms and to practices professional accountants and accounting managers. Development of effective written and oral skills employed in accounting presentations, such as audit reports and consultants' reports. Study of results of organizational communications research applicable to accounting firms and/or units within firms. Prerequisite: undergraduate accounting concentration or permission of instructor.

**ACCTG 543 Income Taxation of Trusts and Estates**

**(3)** Development of fundamental skills regarding income taxation of trusts and estates. Calculation of distributable net income and the distribution deduction for the fiduciary entity. Basic analysis of the throwback rules. Case studies. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 547 Estate and Gift Taxation**

**(3)** Development of fundamental knowledge of the unified transfer tax on the transfer of property from one person to another. Calculation of gross estate, adjusted

gross estate, and taxable estate. Calculation of gift and estate taxes owing. Discussion of estate planning concepts. Prerequisite: undergraduate accounting concentration or equivalent.

**ACCTG 548 State and Local Taxation**

**(3)** *Resler, Rice* Differences in definition of income at state and federal levels, treatment of state income taxes, piggyback for state income taxes, state tax rates, minimum tax, double taxation of income by home and host states, Uniform Division of Income for Tax Purposes Act, concept of nexus for taxation, multistate tax planning. Offered: S.

**ACCTG 549 Employee Tax Problems and Deferred Compensation**

**(3)** *Resler, Rice* Covers the tax issues facing employees and self-employed tax payers, including deferred compensation arrangements, fringe benefit packages, restricted property, independent contractor status, achieving favorable tax treatment of retirement plans, and substantiating employee business expenses. Offered: S.

**ACCTG 560 Special Topics in Professional Accounting**

**(1-4, max. 4)** Lectures, discussion, and case analyses dealing with special current topics relevant to professional accounting. Satisfies the professional accounting elective requirement for the M.P.Acc. degree program. Prerequisite: permission of instructor.

**ACCTG 562 Accounting for Business Combinations in a Global Marketplace**

**(4)** The examination of acquisitions and mergers in a global context. Explores the issues involved in accounting for domestic and foreign equity investments, partnerships with respect to financial statement interpretations.

**ACCTG 564 Governmental Accounting**

**(4)** Budgetary and financial accounting/reporting as applied at the state, local, and special-purpose governments; financial accounting and reporting for not-for-profit organizations.

**ACCTG 566 Issues in International Accounting**

**(4)** Insights into the conceptual, managerial, professional, and institutional issues of international accounting. Focus on current topics in international accounting and on the cultural, managerial, and governmental forces that shape both internal and external accounting in specific countries.

**ACCTG 568 Advanced Management Accounting**

**(4)** Discussion and analysis of costing techniques, use of accounting data in planning and evaluating managerial performance, and use of accounting data in short-term and long-run decisions. Special attention directed to issues in human behavior involved in cost allocation, budgeting, and performance evaluation. Prerequisite: ACCTG 502.

**ACCTG 579 Special Topics in Accounting**

**(4, max. 12)** Accounting topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offering. Prerequisite: permission of instructor.

**ACCTG 580 Introduction to Accounting Research**

**(4)** Examination of research problems and techniques in accounting. Interdisciplinary nature of accounting research emphasized. Work in finance, economics, and psychology used to develop current trends in accounting research. Prerequisite: doctoral student status.

**ACCTG 581 Seminar in Managerial Accounting**

**(4)** Critical examination of conceptual and practical issues of cost and managerial accounting. Specific topics may change from quarter to quarter, and they include application of behavioral, quantitative, and economic models to managerial accounting problems. Prerequisite: ACCTG 511 or permission of instructor.

**ACCTG 596 Seminar in Financial Accounting Research (4)** Review and critical analysis of research strategies and methods applied to problems in financial reporting practice and financial accounting standard setting. Prerequisite: doctoral student status and ACCTG 580 or equivalent or permission of graduate office.

**ACCTG 597 Seminar in Managerial Accounting Research (4)** Critical analysis of current managerial accounting research, both published and unpublished. Prerequisite: doctoral student status and 581 or equivalent or permission of graduate office.

**ACCTG 599 Doctoral Seminar in Accounting (1, max. 12)** Study and research in advanced topics of Accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philosophy. It is conducted by departmental faculty and occasional distinguished visiting faculty. Prerequisite: doctoral student status.

**ACCTG 600 Independent Study or Research (\* max. 10)**

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## Business Administration

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required.

**B A 500 Business Administration I (16)** Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

**B A 501 Business Administration II (16)** Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

**B A 502 Business Administration III (16)** Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

**B A 541 Environmental Management I (4)** Survey of environmental ethics, environmental laws and regulation, the economics of environmental decisions, and the relationship of business to public policy and the environment. Must be taken concurrently with B A 544. Prerequisite: permission of instructor.

**B A 542 Environmental Management II (4)** Applications of the functional areas of business to environmental concerns. Major federal legislation affecting these concerns applied to business problems in the areas of accounting, finance, marketing, management information systems, and organizational behavior. Must be taken concurrently with 544. Prerequisite: B A 541 or permission of instructor.

**B A 543 Environmental Management III (4)** Case studies that integrate the fundamentals of business and environmental management to address such issues as plant siting, regulatory compliance, production line changes, and innovative, proactive re-

sponses to environmental issues. Case studies include results of student consulting projects and a capstone case in environmental management. Must be taken concurrently with 544. Prerequisite: B A 542 or permission of instructor.

**B A 544 Environmental Management Seminar (1, max. 3)** Guest lecturers from academia, business, government, and advocacy groups discuss environmental science, ethics, law, regulation, economics, finance, accounting, and policy issues. Seminar topics supplement course material in 541, 542, 543 which are to be taken concurrently.

**B A 545 The Global Business Forum: Current Issues in Global Business (1, max. 3)** Discussion of current trends in the global business environment and of international issues facing companies. Leaders from international businesses and other organizations, as well as faculty members from various departments and specializations, invited to share their perspectives with seminar participants. Topics change each quarter.

**B A 560 Cooperative Education in Business (1)** Business practicum: internship with approved business or governmental agency. Open only to students who meet requirements of internship program. Internship credit may not be applied to fulfill specific course requirements or to credits required for graduation. Credit/no credit grading only. Offered: S.

**B A 571- Research Reports (4-)** Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas emphasized. Methods and content of independent research studies subjected to critical evaluation. Open only to MBA non-thesis students. Prerequisite: instructor's approval of preliminary research topic outline.

**B A -572 Research Reports (-4)** Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas emphasized. Methods and content of independent research studies subjected to critical evaluation. Open only to MBA non-thesis students. Prerequisite: B A 571.

**B A 800 Doctoral Dissertation (\* max. 10)**

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## Business Administration Research Methods

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**BA RM 580 Applied Econometrics I (4)** Emphasizes the application of econometric methods rather than the mathematical proofs of statistical procedures. Introduction to the linear regression model, interpretation of summary statistics, bias and precision of regression estimates, analysis of the residuals, and hypothesis testing. Prerequisite: STAT 342 or STAT 395 or STAT 481, or permission of instructor.

**BA RM 581 Applied Econometrics II (4)** Continuation of 580. Measurement errors, distributed lags, and simultaneous equation models. Prerequisite: BA RM 580.

**BA RM 590 Behavioral Research Methods-Theory and Design (4)** Philosophy of science, development of scientific method, and meaning of behavioral research. Historical perspective of scientific investigation and the evaluation of research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisite: STAT 361, STAT 362, or permission of instructor.

**BA RM 591 Behavioral Research Methods-Approaches and Applications (4)** Considers alternative research approaches, such as laboratory and field experimentation, simulation, and surveys, with data-gathering techniques appropriate for each approach. It is primarily concerned with developing alternative approaches to research problems and with discussing specific applications. It builds upon a background of specific statistical tools and techniques and an understanding of theory development and research design. Prerequisite: STAT 361, STAT 362, or permission of instructor.

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## Business Communication

**B CMU 410 Business Reports and Other Specialized Communications (4)** Covers both internal and external communications that businessmen and businesswomen write on the job. Emphasis on various types of internal reports, ranging from short informal memos to the more complex formal reports. Also covered are specialized external types of communications directed to customers. Prerequisite: B CMU 301.

**B CMU 490 Special Topics in Business Communications (1-6, max. 12)** Students and faculty focus on current topics of concern. Prerequisite: B CMU 301.

**B CMU 499 Research in Business Communications (1-6, max. 9)**

### Courses for Graduates Only

**B CMU 510 Business Communications for Managers (4)** Seeks to develop understanding of communications and related theories, to describe strategies for planning managerial communications, and to build skills in oral and written reporting and persuading. Prerequisite: approval of graduate business office.

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## Business Economics

**B ECON 420 Financial Markets (4)** Analysis of the structure and functions of the money and capital markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of Federal Reserve and Treasury in money market developments. Prerequisite: either B ECON 301 or ECON 301.

**B ECON 427 International Finance (4)** Asset choice and institutional operations in international finance, foreign exchange problems, the impact of international financial problems and operations on business, short- and long-term international financing. Prerequisite: either B ECON 300 or ECON 300; either B ECON 301 or ECON 301.

**B ECON 490 Special Topics in Business Economics (1-6, max. 6)** Study and research on topics of current concern to faculty and students. Only offered when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

**B ECON 499 Undergraduate Research (1-6, max. 9)** Research in selected areas of business economics. Recommended: either ECON 301 or B ECON 300 and B ECON 301.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**B ECON 500 Business Economics I (3)** Factors underlying the determination of cost and prices for the industry and the firm, demand and supply analysis and firm behavior. The relation of the economic environment to the microeconomic decisions of the firm.

**B ECON 501 Business Economics II (3)** Analysis of real and monetary factors affecting the national and international economic environment, supply and demand for money, interest rates, stabilization problems and policies, in relation to government and policy effects on business and individual affairs. Prerequisite: B ECON 500.

**B ECON 520 Financial Markets (4)** Analysis of the functions and structure of money markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of the Federal Reserve and Treasury in the money markets. Prerequisite: B A 501.

**B ECON 527 International Finance and Investments (4)** Study of selected problems in financing, international trade, investment, and foreign business operations; international aspects of money markets; problems of evaluation of foreign investments. Prerequisite: B A 502, FIN 502.

**B ECON 528 International Financial Management (4)** Analysis of financial problems facing businesses engaged in international activities: financing foreign investment, financial control of foreign operations, and working capital management including foreign-exchange positions using cases and readings.

**B ECON 579 Special Topics in Business Economics (4, max. 12)** Business economics topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offering. Prerequisite: permission of instructor.

**B ECON 600 Independent Study or Research (\* max. 10)**

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## Business Policy

**B POL 470 Business Policy (4)** Policy making and administration from a general management point of view. Emphasis is on problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. This course integrates and builds upon the work of the core curriculum. Prerequisite: FIN 350; MKTG 301; either HRMOB 300 or HRMOB 400; recommended: OPMGT 301.

**B POL 471 Entrepreneurship (4)** Entrepreneurship presents the real challenges of starting new businesses, focusing on the skills and contacts an entrepreneur needs to develop ideas. The many facets of entrepreneurship—organization form, funding sources, the start-up team, the product launch—are illustrated through field and case studies and guest speakers. Prerequisite: FIN 350; MKTG 301; either HRMOB 300 or HRMOB 400; recommended: OPMGT 301.

**B POL 472 Business Planning for Entrepreneurs and Product Managers (4)** Focuses on the process of developing and selling the new venture's business growth plan. Also covers franchising and business acquisition. Students develop their own business plans for venture concepts. Prerequisite: B POL 471.

**B POL 473 Practicum in Entrepreneurship (4)** Explores requirements and challenges in establishing a business in the State of Washington. Broad areas of interest include developing business concepts, marshalling resources, startup actions, and strategic and operation planning. Recommended: B POL 472.

**B POL 474 Small Business Management (4)** Explores entrepreneurial activities within the special environment of the small firm and family-owned companies. Combines case studies with field projects assisting companies in the Puget Sound area.

**B POL 480 Business Simulation (5)** Critical analysis of integrated business policy formulation in a complex and dynamic industrial environment by means of simulation (business gaming). Prerequisite: FIN 350; MKTG 301; either HRMOB 300 or HRMOB 400; recommended: OPMGT 301.

**B POL 490 Special Topics in Business Policy (1-6, max. 6)** Study and research topics of current interest to faculty and students. Offered only when faculty is available and student interest is sufficient. Class is announced in advance of scheduled offerings.

**B POL 499 Undergraduate Research (1-6, max. 9)**

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**B POL 505 Business Policy and Strategy (3)** Policy decisions and strategic leadership from the general management point of view. Determination of corporate product-service objectives, development of a network of internal operating policies and methods to achieve objectives at a cost satisfactory to the consumer and to society. Prerequisite: all first-year required courses in MBA curriculum.

**B POL 530 Entrepreneurship (4)** Entrepreneurship, both in the form of (1) establishment of new independent businesses owned largely by those who manage them and (2) initiation of new enterprises having exceptional autonomy within larger organizations that finance and own them. Basic knowledge in accounting, marketing, and finance is assumed.

**B POL 532 Developing the New Venture Plan (4)** Process of developing the new venture's business growth plan. Practice of franchising and business acquisition. Students develop their own business plans for venture concepts. Prerequisite: B POL 530.

**B POL 536 Software Entrepreneurship (4)** Case- and project-based course. Focuses on starting a software or hardware company. Guest entrepreneurs, lawyers, and financiers discuss market identification and analysis, planning the business, financing, and typical operating and administrative problems.

**B POL 540 Managing Intellectual Property Rights (4)** Comprehensive analysis of the issues pertinent to the various forms of intellectual property, including how to recognize, develop, maintain, and capitalize on them.

**B POL 541 Ecommerce: Competing on the Internet (4)** Focuses on issues pertinent to the emergence of the global digital economy and its impact on commerce, business models that innovative firms employ in the emerging medium, and the concept of "netpreneurship."

**B POL 555 Intrapreneurship and Corporate Venturing (4)** Focuses on role of managers in fostering profitable growth and entrepreneurial actions within ongoing organizations. Class sessions utilize current analytical and conceptual methods, case and field studies, management development exercises, and *Foodcorp, Inc.* which allows students to simulate management of multinational corporations. Prerequisite: B A 502. Offered jointly with MKTG 555.

**B POL 570 Strategic Planning Systems (4)** Formal institutional procedures for involving the entire organization in strategic planning and quantitative methods for doing such planning. These are applied to

analyzing strategy and firm performance, predicting long-range industry and national environments, formulating corporate-level and business-level strategies, and integrating planning models into the planning process. Prerequisite: B A 502 or permission of graduate office.

**B POL 575 Strategic Decision Making (4)** Focuses on (1) role of strategic leadership in the success of organizations, (2) conceptual-logical methods for doing strategic planning, (3) organization-wide experience methods for formulating policies, and (4) decision methods for use within the strategic coalition. Prerequisite: B A 502 or permission of graduate office.

**B POL 579 Special Topics in Business Policy (4, max. 12)** Study and research in topics of current concern to faculty and students. Offered only when allowed by faculty availability and sufficient student interest. Seminar content announced in advance of scheduled offering.

**B POL 599 Doctoral Seminar in Business Policy (1, max. 12)**

**B POL 600 Independent Study or Research (\* max. 10)**

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## Finance

**FIN 423 Banking and the Financial System (4)** Role of banks and nonbank financial institutions in the financial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

**FIN 450 Problems in Corporate Finance (4)** Case problems in corporate financial management. Includes cases on management of current assets, obtaining short-term loans, raising long-term capital, capital budgeting, and dividend policy. The management point of view is stressed. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

**FIN 453 Financial Theory and Analysis (4)** Business financial strategic planning. Topics include business valuation and financing, performance evaluation, risk analysis, capital budgeting, and inflation and taxes. Emphasizes tools with real-world applications while incorporating modern finance concepts. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

**FIN 460 Investments (4)** Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities portfolios, and total wealth. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

**FIN 461 Financial Futures and Options Markets (4)** Introduction to financial futures and options markets. Instructional aspects and social functions of these markets, pricing of options and futures, and risk shifting by hedging. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

**FIN 490 Special Topics in Finance (1-6, max. 6)** Study and research topics of current concern to faculty and students. Only offered when faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

**FIN 499 Undergraduate Research (1-6, max. 9)** Research in selected areas of business finance, money and banking, or investments, with permission of instructor. Recommend: FIN 350; either B ECON 300 or ECON 300.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**FIN 502 Business Finance (3)** Financial management of the firm, including capital budgets, working capital analysis, and financing policy. Prerequisite: ACCTG 500, B ECON 500, QMETH 500.

**FIN 530 Financial Management of Banks (4)** Analysis of problems in the financial management of commercial banks and other financial institutions. Loan and investment policies, liability management, capital policies, and other selected issues are discussed. Prerequisite: B ECON 520 or permission of graduate office.

**FIN 550 Advanced Business Finance (4)** Systematic coverage of the theory of financial management. Application of quantitative analysis to financial problems of the firm, including the investment and financial decisions, lease analysis, and merger analysis. Prerequisite: B A 502.

**FIN 551 Problems in Business Finance (4)** Examines case studies of a broad range of financial management topics, including financial statement analysis, forecasting financial statements, use of bank credit, working capital management, public and private securities issues, capital budgeting, and business valuation. Prerequisite: B A 502.

**FIN 552 Corporate Planning and Financing (4)** Addresses management of working capital flows and finance operations. Topics include financial statement analysis, *pro forma* forecasting, case budgeting, sources of financing including bank, venture capital, private placements, and leases, and determinants of company financing policy. Cannot be taken for credit in combination with FIN 551. Prerequisite: B A 502.

**FIN 553 Capital Investment Planning (4)** Case discussions used to examine corporate resource allocation decisions. Topics include capital budgeting techniques, estimation of capital costs, capital budgeting systems, strategic investment decisions, and financial restructurings. Prerequisite: FIN 552 or FIN 555.

**FIN 555 Corporate Financing Decisions (4)** Framework for analyzing the effects of non-investment decisions on corporate value. Topics include financing policy, compensation policy, hedging, leasing, and dividend policy. Focus on the role of financial contracting. Prerequisite: B A 502.

**FIN 556 Investment Planning and Evaluation (4)** Analytic tools for valuing and evaluating business entities and for investment planning. Topics include business valuation, performance evaluation, risk analysis, capital budgeting, inflation and tax issues, leasing, and business acquisitions. Prerequisite: B A 502.

**FIN 557 New Venture Financing (4)** Explores the financial issues that face entrepreneurs, including the stages of financing, business cash-flow models, and strategic positioning of the early-stage company. Business angels, venture capital funds, and institutional investors. Strategic alliances, licensing agreements, and exit strategies.

**FIN 560 Investments (4)** Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, securities portfolios, and total wealth. Prerequisite: B A 502 or permission of graduate office.

**FIN 561 Financial Futures and Options Markets (4)** The pricing of options and futures contracts are analyzed and available empirical evidence is examined. Particular attention is given to the ways these

instruments can be used to reduce an investor's or a firm's exposure to risk.

**FIN 579 Special Topics in Finance (4, max. 12)** Finance topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offerings. Prerequisite: permission of instructor.

**FIN 580 Doctoral Seminar in Financial Economics (4)** Study of the financing of the corporation, including recent theoretical and institutional developments. Extensive reading and discussion in designated areas covering problems relating to financial management and to the social and economic implications of the financial process. Prerequisite: ECON 500 or permission of instructor.

**FIN 590 Doctoral Seminar in Capital Market Theory (4)** Decision making under uncertainty, information and capital market efficiency, portfolio theory, capital asset pricing model, arbitrage pricing model, and options pricing model. Prerequisite: ECON 500 or permission of instructor.

**FIN 591 Doctoral Seminar in Corporate Finance (4)** Principles of intertemporal choice, alternative valuation models, theory of investment under uncertainty, impact of dividend and financing decisions on firm valuation in perfect and imperfect markets, and theory of firm organization and agency costs. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

**FIN 592 Doctoral Seminar in Financial Research (4)** Empirical research in finance with emphasis on methodology and scientific method. Empirical research in market efficiency, capital asset pricing model, options pricing model, and impact of firm's dividend and financing decisions on firm value. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

**FIN 599 Doctoral Seminar in Finance (1, max. 12)** Study and research in advanced topics of finance. Generally concerned with unpublished areas of research, conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

**FIN 600 Independent Study or Research (\* max. 10)**

## Human Resources Management and Organizational Behavior

**HRMOB 410 Staffing (4)** Affirmative action, recruitment, testing, interviewing, placement, promotion, and overall human resource planning.

**HRMOB 415 Performance Appraisal and Compensation (4)** The various kinds of systems used by organizations to evaluate and reward employee performance. Job analysis, job evaluation, setting performance standards, giving appraisal feedback, designing incentive systems, administering a salary plan.

**HRMOB 420 Collective Bargaining and Arbitration (4)** Labor-management relations. The legal context, union organizing, grievance administration, collective bargaining. Individual and group simulations used.

**HRMOB 450 Leadership and Decision Making (4)** The manager as leader and decision maker. Various leadership theories, styles, and behaviors. Decision-making models and techniques.

**HRMOB 460 Negotiations (4)** The art and science of negotiations with the goal of making students more effective negotiators in a variety of business situa-

tions, such as budget negotiations, buying and selling, contracts, and merger negotiations. Concept and skill development.

**HRMOB 470 Motivation and Performance (4)** Various strategies for influencing employee motivation and performance. Reward systems, goal-setting procedures, and various techniques to enlarge and enrich ones job. Effects of these formal and informal strategies on job attitudes.

**HRMOB 475 Organization Development and Change (4)** Provides a conceptual understanding of organization development theory, practice, and research. Organization development is an umbrella term for a collection of behavioral science techniques for increasing individual, group, and organizational effectiveness.

**HRMOB 490 Special Topics in Human Resources Management and Organizational Behavior (1-6, max. 6)** Topics of current interest to faculty and students. Offered when allowed by faculty availability and sufficient student interest. Content announced in advance of scheduled offerings.

**HRMOB 499 Undergraduate Research (1-6, max. 9)**

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**HRMOB 500 The Management of Organizational Behavior (3)** Behavioral aspects of management with emphasis on leadership, motivation, and decision making. May include communication, conflict management, group dynamics, and organizational change.

**HRMOB 501 Human Resource Management (3)** Fair employment practice, job analysis, selection, performance appraisal, and training. May include compensation and labor relations.

**HRMOB 510 Staffing (4)** Systems related to manpower planning, recruitment, interviewing, placement, and development. Advanced techniques, with emphasis on validating predictive measures of performance. Criteria development, psychological testing, validation procedures, and cost effectiveness of personnel research.

**HRMOB 515 Performance Appraisal and Compensation (4)** Strategies, procedures, and problems in evaluating and rewarding employees. Performance measurement methods, different appraisal systems, and ways of coaching employees. Ways to integrate performance appraisal into compensation systems.

**HRMOB 525 Dispute Settlement and Labor-Management Cooperation (4)** Goes beyond traditional collective bargaining and grievance arbitration to examine the role of third parties as mediators, interest arbitrators, and fact finders. New forms of labor-management cooperation, such as gain sharing, quality of work life programs and labor-management committees.

**HRMOB 540 Managerial Behavior in Cross-Cultural Settings (4)** The role of culture as it impacts managerial values and behavior in diverse national settings including the United States, western Europe, Latin America, and Japan.

**HRMOB 550 Leadership (4)** Various theories of leadership: trait theories, leader behavior theories, and situational theories. Concept of leadership within the broader framework of power-how power is gained, lost, and distributed within organizations.

**HRMOB 560 Negotiations (4)** Strategy used in negotiations other than labor-management bargaining to develop skills necessary to devise a negotiating strategy appropriate to situation. Negotiation of contracts in simulated business settings, case studies, readings.

**HRMOB 570 Motivation (4)** Approaches that emphasize people's needs, effects of reward systems, and goal setting, as well as topics that show how the social environment and the task itself influence motivation. Different motivational techniques to be used under various conditions.

**HRMOB 575 Theory and Practice in Organizational Development (4)** Theory, practice, and research in organizational development; the applied discipline that seeks to improve organizational effectiveness, efficiency, and morale through causing changes in managerial practices and organizational dynamics. History of the field, intervention techniques, diagnostic methods, and client-consultant relations. Concepts and skill development.

**HRMOB 579 Special Topics in Human Resources Management and Organizational Behavior (4, max. 12)** In-depth study and research on topics of special interest to faculty members and students in the fields of human resources management and organizational behavior. Offered on an ad hoc basis. Content announced before scheduled offering.

**HRMOB 580 The Individual and the Organization (3)** Focuses on attributes the individual brings to the organization. Covers important performance-related processes such as learning, motivation, and decision-making as well as an understanding of personal attitudes and personality traits.

**HRMOB 581 Groups, Teams, and Organizations (3)** Focuses on importance of group processes for organizational effectiveness. Covers concepts of group dynamics including interpersonal communication, role and norm development, and group decision making as well as organizational processes such as team development and organizational culture.

**HRMOB 582 Power, Influence, and Citizenship Behavior (3)** Focuses on ways in which the individual and the organization get things done through working with others. Includes leadership, social influence, and the use and abuse of power, with attention given to positive organizational activities such as citizenship behavior and extra role activities.

**HRMOB 591 Employee Appraisals and Rewards (3)** Focuses on the organization's employee performance appraisal and compensation systems. Examines effects of different practices.

**HRMOB 592 Employee Rights, Protection, and Justice (3)** Focuses on the systems and procedures that safeguard an individual's employment and benefits. Topics include industrial relations and corporate performance, labor-management cooperation, grievance systems, dispute resolution, whistle blowing, and organizational justice.

**HRMOB 599 Doctoral Seminar in Human Resources Management and Organizational Behavior (1, max. 12)** Advanced topics in the fields of human resources management and organizational behavior. May be used by visiting faculty members to present topics of interest to students.

**HRMOB 600 Independent Study or Research (\* max. 10)**

## Information Systems

**I S 423 Object-Oriented Systems (4)** Covers the design and programming of object-oriented application software. Includes introduction to object-oriented principles, representing objects in software, object management, object analysis and design, construction of object-oriented applications, and use of object-oriented language to program working applications. Prerequisite: 3.5 in I S 320.

**I S 460 Systems Analysis and Design I (4)** First course in analysis and design of business information systems. Concentrates on analysis phase of systems development. Systems development life cycle, the feasibility study, analysis of user requirements, and the development of a logical model for the system under study. Prerequisite: I S 320.

**I S 461 Systems Analysis and Design II (4)** Second course in analysis and design of business information systems. Concentrates on design and implementation phases of systems development. Translation of logical system model into physical model, design of modules, file design, testing, implementation. Includes a project using third- and fourth-generation software development tools. Prerequisite: I S 460.

**I S 470 Business Data Communications (4)** Technology and applications of business data communications including characteristics of data, fundamentals of transmission, communications hardware and software, common-carrier services, network configurations (LAN, MAN, WAN), design, management, and security. Exercises in use of information retrieval/distribution systems, file transfer, and Internet resources. Prerequisite: I S 320.

**I S 480 Database Management (4)** Concepts of physical and logical data base organization. Physical file structures used in data management. Logical data models, including hierarchical, network, relational. Data base design, data dictionaries, data manipulation languages. Exercises in design, implementation, and use of data base systems. Survey of commercial data base management systems. Prerequisite: I S 320.

**I S 490 Selected Topics in Information Systems (1-6, max. 20)** Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: I S 320.

**I S 495 Practical Experience in Information Systems (1-4, max. 8)** Undergraduate substantive I S internship and mentorship. Internships can be repeated up to two quarters for maximum of 4 credits; grades based on weekly status reports, paper, demonstration of knowledge. Mentorship program (maximum 1 credit/quarter) allows student to be matched with I S executive; grade based on status reports, other participatory events.

**I S 499 Undergraduate Research (1-6, max. 12)** Selected problems in information systems and computer applications.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors. Students interested in probability and statistics are also urged to consider BA RM 500 and 501.

**I S 504 Computer-Based Information Systems for Management (3)** Introduction to information systems and computer technology. Covers concepts of information use in decision making. Use of decision-support problem-solving tools (e.g., spread sheet, database software). Management's responsibility in defining, developing, using information systems is focal point.

**I S 530 Management of Information Systems Resources (4)** Topics include general control problem in organizations; performance evaluation of data processing managers; technology and cost trends; software cost estimation; capacity planning; short term utilization; queuing and associated externalities; issues in centralization and decentralization of the information system facilities. Prerequisite: B A 501 or I S 504 or equivalent.

**I S 545 Database Management (4)** Concepts of physical, logical database organization. Physical file structures used in data management. Logical data models, including hierarchical, network, relational. Database design. Data dictionaries. Data manipulation languages. Exercise in design, implementation, use of several database management systems. Survey of commercial database management systems. Database administrator's role. Prerequisite: B A 501 or I S 504, and introductory knowledge of a programming language.

**I S 560 Information Systems Development (4)** Offers comprehensive look at information systems development from the initial stage of defining requirements to final evaluation of installed systems. Topics include analysis of user requirements, development of logical system model, translation of logical systems model into physical system model, testing, and implementation. Prerequisite: B A 501 or I S 504 or equivalent.

**I S 579 Selected Topics in Information Systems (4, max. 12)** Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: B A 501 or I S 504 or permission of instructor.

**I S 585 Advanced Database Research (4)** Introduces topics of interest in database research including heterogeneous database, derived data management, expert database systems, logical and physical database design, formal languages for data manipulation, and temporal databases. Prerequisite: doctoral student and previous course work and experience with database management system or permission of instructor.

**I S 586 Data Structures and Algorithms in Information Systems (4)** Design of computer algorithms in information systems. Methods for analyzing in terms of time and space. Data structures and design techniques used in the solution of frequently encountered problems. Prerequisite: doctoral student and working knowledge of a programming language or permission of instructor.

**I S 588 Advanced Expert Systems (4)** Study of methodological, behavioral, and economic considerations of uncertainty handling in expert systems. Topics include the Certainty Factor model, the Dempster-Shaefer theory, and probabilistic belief networks. Prerequisite: doctoral student and introductory knowledge of a programming language and basic probability theory or permission of instructor.

**I S 599 Doctoral Seminar (1, max. 12)** Advanced topics of information systems. Generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

**I S 600 Independent Study or Research (\* max. 10)**

## International Business

**I BUS 440 Business in Asia (4)** Major aspects of the Asian business environment and how Asian enterprises are managed. Problems and opportunities of foreign corporations in Asia. Prerequisite: I BUS 300.

**I BUS 470- Management of International Trade Operations 1 (4-)** Integrated study of international trade functions, practices, concepts, management, strategy, and policy. The approach utilizes lectures, case studies, research, guest speakers, and extensive practical application. Designed as a two-quarter

sequence. Students may enroll at the beginning of any quarter, summer included. Prerequisite: I BUS 300.

**I BUS -471 Management of International Trade Operations 2 (-4)** Integrated study of international trade functions, practices, concepts, management, strategy, and policy. The approach utilizes lectures, case studies, research, guest speakers, and extensive practical application. Designed as a two-quarter sequence. Students may enroll at the beginning of any quarter, summer included. Prerequisite: I BUS 300.

**I BUS 480 Multinational Operations Management (4)** Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative practices and operating policies to international diversities. Prerequisite: I BUS 300.

**I BUS 490 Special Topics in International Business (1-6, max. 12)** Students and faculty focus on current topics of concern. Offered when faculty, student interest, and availability allow. Prerequisite: I BUS 300.

**I BUS 491 CISB Track Seminar (1, max. 6)** Students meet with business community leaders to discuss international aspects of their companies. Allows for networking and sharing experiences with other students as well as practicing foreign languages.

**I BUS 495 International Business Practicum (4)** Offers students opportunity to apply principles, concepts, and skills learned previously to actual business situation. Working on projects provides students an exposure to the issues and choices facing managers operating in an international business environment. Prerequisite: either I BUS 340 and I BUS 470 or I BUS 340 and I BUS 480 or I BUS 340 and MKTG 301 or I BUS 470 and MKTG 301 or I BUS 480 and MKTG 301 or I BUS 470 and I BUS 480.

**I BUS 499 Undergraduate Research (1-6, max. 9)** Prerequisite: I BUS 300.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**I BUS 530 International Business in Less Developed Countries (4)** Understanding the economic, sociocultural, and political environment in the less developed countries. Problems of international trade and investment, north-south relations, commodities, technology transfer, foreign aid, and capital flows. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

**I BUS 540 International Business in Industrialized Countries (4)** Understanding the economic, sociocultural, and political environment in developed, industrialized countries. Problems of international trade and payments relations, economic integration, national policies, and supranational organizations' impact on managerial environments. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

**I BUS 550 Field Studies in International Business (4)** Research, analysis, and report on a specific international business project with an existing organization involved with international trade. Possible tasks include identifying most viable foreign target markets, developing best market entry strategies, establishing international terms and conditions of sale, and completing a preliminary marketing or business plan for clients.

**I BUS 560 Multinational Business Management (4)** Managerial responses to problems of international business organizations and operations. Strategy formulation in an international context; design and control of multinational organization; adaptation of management systems and policies to different economic, sociocultural, and political environments. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

**I BUS 579 Seminar: Special Topics in International Business (4, max. 12)** Application of international business principles to the analysis of a specific issue in trade or resource transfer, or to the business conditions in a particular country. Japan and other Pacific Rim countries are frequent topics. Prerequisite: B A 500 or permission of instructor.

**I 600 Independent Study or Research (\* max. 10)**

## Marketing

**MKTG 430 Sales Force Management (4)** Sales and distribution planning; sales organization and training; management of the sales force; methods of sales, cost, and performance analysis. Prerequisite: MKTG 301.

**MKTG 450 Consumer Behavior (4)** Theory and practice pertinent to marketing decisions of individuals and business firms; utilization of theories from behavioral sciences in marketing research; theories of fashion, characteristics of goods, shopping behavior, product differentiation, market segmentation, and opinion leadership; application of concepts to management of advertising, personal selling, pricing, and channels of distribution. Prerequisite: MKTG 301; recommended: either ECON 311, QMETH 201, PSYCH 213, PSYCH 218, STAT 220, STAT 301, STAT 311, or STAT 390.

**MKTG 452 Marketing Issues for New Ventures (4)** Examines the skills and tools entrepreneurs need for bootstrap marketing in their start-up firms. Students learn to identify target market segments, position their products, estimate demand, set prices, gain access to channels, and manage the issues of rapid growth.

**MKTG 460 Marketing Research (4)** Marketing research process; preliminary steps and research design, questionnaires, secondary and primary data, sampling, processing and interpreting data, evaluation and effective presentation of findings. A class research project provides practical application of methods studied. Prerequisite: MKTG 301; either ECON 311, QMETH 201, PSYCH 213, PSYCH 218, STAT 220, STAT 301, STAT 311, or STAT 390.

**MKTG 475 Retail Structure and Strategy (4)** Analysis of the nature and scope of competition within and between sectors of retail trade. Emphasis is placed on the importance of demographic, environmental, and legal differences between geographical areas in determining the level of competition. Prerequisite: MKTG 370.

**MKTG 480 Advanced Marketing Management (4)** Introduction to advanced marketing management through the application of various decision-making models and selected computer routines to such marketing problems as advertising budgeting, media planning, sales forecasting, sales-force allocation, and pricing. Applications include market simulation, Bayesian approaches, and linear programming. Prerequisite: either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145.

**MKTG 490 Special Topics and Issues in Marketing (1-6, max. 8)** Contemporary topics and issues in marketing: marketing in nonprofit organizations, marketing of services, marketing in the public sector,

and marketing in an economy of scarcity. Ordinarily only one topic area is addressed in any one quarter. Course content reflects contemporary developments and the current interests of instructors and students. Prerequisite: MKTG 301.

**MKTG 499 Undergraduate Research (1-6, max. 9)** Prerequisite: MKTG 301.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**MKTG 501 Marketing Management (3)** Analysis and management of customer satisfaction in goods and services markets by profit and nonprofit organizations. Buyer behavior, market segmentation and product positioning, product policy, pricing, distribution, sales force and advertising management, and market research in the contexts of strategy development, decision making, implementation, and control.

**MKTG 511 Business-to-Business Marketing (4)** *Edwards, Narver* Integrated approach to product marketing management in the business-to-business marketplace. Analysis of core competencies, competitive environment, positioning and segmentation strategies, cost structure, and customer satisfaction. Case-based and project-oriented approach to studying marketing management in the business-to-business market. Prerequisite: B A 501 or permission of instructor.

**MKTG 512 Consumer Marketing (4)** *Louie* Analysis of marketing strategies for consumer products and services. Focuses on consumer satisfaction and brand management including product line and brand developments, pricing strategies, channel and retail relationships, and marketing communication strategies for consumer goods and services. Prerequisite: B A 501 or permission of instructor.

**MKTG 520 Distribution Management (4)** Location and distribution decisions for goods and services in profit and nonprofit organizations. Considers methods of optimizing the number and quality of institutions and activities employed in dealing with exchange, and space and time aspects of distribution. Relates distribution questions to the marketing mix and organizational objectives. Prerequisite: B A 501.

**MKTG 525 Strategic Retail Management (4)** Emphasis on strategic planning decisions faced by senior management in a wide range of retail industries. Taught exclusively by the case method. Prerequisite: B A 501.

**MKTG 530 Management of Sales Operations (4)** Management of personal selling activities within a marketing program. Setting objectives, determining sales strategies; recruiting, selection, and training of sales representatives; allocation of effort, supervision, compensation, and control. Emphasis on case studies. Prerequisite: B A 501.

**MKTG 540 Advertising and Promotion Management (4)** Management of advertising and promotional activities and their integration with other elements of the marketing mix. Topics include: understanding the communication process, analyzing markets, working with suppliers, establishing objectives, determining budgets, selecting media, measuring and evaluating effectiveness, using publicity and promotions. Legal, social, and economic consequences are considered. Prerequisite: B A 501.

**MKTG 552 Marketing Issues for New Ventures (4)** Examines the skills and tools entrepreneurs need for bootstrap marketing in their start-up firms. Students learn to identify target market segments, position their products, estimate demand, set prices, gain access to channels, and manage the issues of rapid growth. Prerequisite: B A 501.

**MKTG 555 Entrepreneurial Marketing and Management (4)** Focuses on role of managers in fostering profitable growth and entrepreneurial actions within ongoing organizations. Class sessions utilize current analytical and conceptual methods, case and field studies, management development exercises, and *Foodcorp, Inc.* which allows students to simulate management of multinational corporations. Prerequisite: B A 501. Offered: jointly with B POL 555.

**MKTG 560 Research for Marketing Decisions (4)** Methods and applications of marketing research incorporating analytical procedures and relevant concepts from behavioral and quantitative sciences. Deals with various aspects of research: problem definition, research design, questionnaire construction, sampling, and data analysis. Introduces promising new developments: multivariate techniques of data analysis, laboratory and field experimentation, and demand analysis in both business and public environments. Prerequisite: B A 501.

**MKTG 570 International Marketing (4)** Analysis of the marketing strategies and tactics of multinational corporations. Choice of entry strategies for foreign markets, analyzing international competition at home and abroad, and developing global marketing strategies. Prerequisite: B A 501; recommended: one I BUS course.

**MKTG 575 Strategic Market Management (4)** The marketing dimensions of strategic planning with emphasis on identifying market opportunities and implementing appropriate competitive-advantage strategies. Includes strategies to stimulate brand demand; defend ones market position; manage the behavior of competitors; manage the behavior of suppliers; and increase the market orientation of ones business. Prerequisite: B A 501.

**MKTG 579 Special Topics in Marketing (4, max. 12)** Marketing topics of current concern to faculty and students. Offered only when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings. Prerequisite: B A 501.

**MKTG 581 Doctoral Seminar in Consumer Behavior (4)** *Louie, Yalch* Survey of the field of consumer behavior introduces fundamental topics in consumer behavior including cognitive processes, emotion, and consumer satisfaction. Provides exposure to a variety of research methods including experiments, surveys, and phenomenological research.

**MKTG 582 Doctoral Seminar in Multivariate Analysis for Marketing Research (4)** *MacLachlan, Moinspour* Survey of methods useful for empirical evaluation of multivariate marketing phenomena and relationships. Includes an overview of measurement theory and practice; multidimensional scaling; conjoint analysis; cluster, factor, and discriminant analyses; multivariate analysis of variance; structural equation modeling; and other methods commonly encountered in academic marketing research.

**MKTG 583 Doctoral Seminar in Marketing Strategy (4)** *Jacobson* Study of factors influencing business performance and role of marketing in achieving competitive advantage. Analysis of prevailing, and emerging, theories underlying strategic thinking and competitive process. Examination of empirical research regarding measurement, level, and persistence of business success and implications of findings for theory and strategy development. Prerequisite: BA RM 580.

**MKTG 584 Doctoral Seminar in Marketing Systems (4)** *Gautschi, Ingene* Examines fundamental and institutional dynamics within marketing systems. Addresses market intermediation, including conditions under which institutions survive, flourish, or retreat and relevant forces on marketing systems including public policy, transportation, infrastructure,

information and communications systems, business cycles, levels of economic development, international trade. Prerequisite: B A 500 or permission of instructor.

**MKTG 591 Doctoral Seminar in Consumer Behavior Research Topics (4)** *Louie, Yalch* Investigates research topics of current interest in consumer behavior. Considers the processes used by consumers to acquire and evaluate marketing information including advertising, publicity, word of mouth, packaging, product description, price, and retail outlets, and examines ways the principles in social perception influence consumers' individual responses to marketing-related activities.

**MKTG 593 Doctoral Seminar in Marketing Models (4)** *Erickson, Ingene* Focuses on modeling research efforts in various areas of marketing. Discussion of mathematical and statistical modeling approaches which contribute to scientific development in the marketing area and ways in which modeling is used to characterize and summarize the nature of general marketing situations in complex environments.

**MKTG 599 Doctoral Seminar in Marketing (1, max. 12)** Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

**MKTG 600 Independent Study or Research (\* max. 10)**

## Operations Management

**OPMGT 402 Introduction to Logistics (4)** Logistics studies of the efficient delivery of goods and services. A total-cost approach recognizes this involves not only the obvious vehicle-routing issues but also shipment size and mix, warehouse location, product design, and customer services. Includes study of real companies' logistics problems. Prerequisite: OPMGT 301.

**OPMGT 443 Inventory and Supply Chain Management (4)** Use of material and supply chain management in manufacturing and service organizations to reduce inventory levels while providing adequate service to customers. Specific topics include forecasting, Just-in-Time production, deterministic and stochastic inventory models, and material requirements planning (MRP). Prerequisite: OPMGT 301.

**OPMGT 450 Introduction to Project Management (4)** Focuses on the management of complex projects and the tools and techniques which have been developed in the past 25 years to assist managers with such projects. The course covers all elements of project planning, scheduling and control as well as implementation and organizational issues. Prerequisite: OPMGT 301.

**OPMGT 490 Special Topics in Operations Management (1-6, max. 20)** Operations management topics of current concern to faculty and students. Potential topics are: logistics management, project scheduling, manufacturing strategy, site and location analysis, management of service operations. Prerequisite: OPMGT 301.

**OPMGT 499 Undergraduate Research (1-6, max. 9)**

## Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**OPMGT 502 Introduction to Operations Management (3)** Production of goods or services in any type of organization or institution. Managerial decision

making in operations problems, including application of quantitative analysis and use of computers. Inventory management, scheduling, facility location, management of service systems, and quality assurance. Prerequisite: B A 501, QMETH 501, or equivalent.

**OPMGT 535 Logistics and Physical Distribution Management (4)** Deals with management of the distribution process including all activities involved in physically moving raw materials and finished goods from point of origin to point of consumption. Topics include warehousing, locations, purchasing, and strategic planning in physical distribution organizations. Prerequisite: OPMGT 502 or B A 502 or equivalent and permission of graduate office.

**OPMGT 550 Project Management (4)** Management of complex projects, and tools and techniques (e.g., CPM and PERT) developed to aid the planning, scheduling, and control of projects. Includes work breakdown structures, precedence networks, Gantt charts, resource leveling and allocation, and the use of microcomputer programs. Prerequisite: B A 502 or OPMGT 502 or equivalent.

**OPMGT 570 Operations Strategy (4)** Strategic management of operations and manufacturing in domestic and international companies. Developing and implementing a coherent strategy based on continuous improvement of quality, productivity, products, processes, and customer services. Facilities, capacity, process/work-force planning, organization, people, systems integration, coordination between operations, marketing, engineering, and R&D. Prerequisite: B A 502 or OPMGT 502 or equivalent.

**OPMGT 575 Manufacturing Planning and Control (4)** Focuses on planning decisions for manufacturing firms with emphasis on Material Requirements Plan (MRP) system. Topics include inventory management, capacity planning, operations scheduling, assembly line balancing, cellular manufacturing, and Just-in-Time (JIT) techniques. Prerequisite: OPMGT 502, B A 502, or permission of instructor.

**OPMGT 579 Special Topics in Operations Management (4, max. 12)** Major topics in operations management and systems analysis. Emphasis on research and, where appropriate, application of quantitative analysis and computers. Topics vary, including workforce planning, project management, research and development management, quality assurance, technology planning and forecasting, systems analysis of complex organizations, and urban systems analysis. Prerequisite: B A 502.

**OPMGT 587 Advanced Topics in Inventory Management (4)** Survey of literature in inventory/production control with emphasis on current research. Topics include single-echelon deterministic and probabilistic models and multi-echelon stochastic models. Prerequisite: QMETH 592 and course in probability theory and in stochastic processes.

**OPMGT 590 Theory of Scheduling (4)** Considers scheduling problems in different production environments including assembly lines and flow shops as well as closed and open job shops. Discussion of optimization and heuristic techniques for sequencing, due-date assignment, release time determination, labor assignment, and lot sizing. Prerequisite: doctoral student or permission of instructor.

**OPMGT 599 Doctoral Seminar in Operations Management (1, max. 12)** Study and research in advanced topics of operations management. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. Credit/no credit only. Prerequisite: doctoral student status.

**OPMGT 600 Independent Study or Research (\* max. 10)**

## Organization and Environment

**O E 403 Commercial Law (5)** Principles of the law of contracts, agency, property, sales, negotiable instruments, and security transactions. Prerequisite: O E 200.

**O E 440 Organization Structure (3)** Concepts of formal organization structures, power, authority, and influence; delegation and decentralization, strategic planning, decision making; philosophy and values in management, the organization in the context of the environment and its impact on the organization's subsystems. Recommended: HRMOB 300.

**O E 490 Special Topics and Issues in Organization and Environment (1-6, max. 6)** Topics and issues of business organization and a changing environment. Content reflects interests of faculty members and students not otherwise covered in the curriculum.

**O E 499 Undergraduate Research (1-6, max. 9)** Selected problem areas or issues in consultation among faculty members and students. Prerequisite: permission of the undergraduate office.

### Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

**O E 510 Organization and Environment (3)** Business organization's political, social and legal environments. Critical managerial issues from historical, theoretical, and social/ethical perspectives. Corporate political power, corporate boards of directors, industrial power, social responsibility, business ethics, roles of the corporation in society, themes of change.

**O E 513 Business Ethics and Corporate Responsibility (4)** Business ethics and corporate social responsibility from philosophical, theoretical, and pragmatic perspectives. Ethical theories and the role of values in business. Ethics and social responsibility put into a framework useful for practicing managers.

**O E 514 Commercial Law (4)** Principles of the law of property sales, negotiable instruments, and security transactions.

**O E 550 Organization and Management (4)** Integrates management as practice, theory, and research. Concepts and values, alternative theories, organizational rationality, cooperative and coordinated systems, bureaucracy and classical organization theory, executive function, accountability and legitimacy; manager's role in matching environment, culture goals, strategy, structure, technology, and control systems.

**O E 560 Seminar in Organization Design (4)** Top managers can choose among alternative organizational forms. Each is dependent on the current stage in the organization's life cycle, the organization's strategy, and internal organization practices. Conditions that lead to effective organization design.

**O E 570 Seminar in Management of Technology and Innovation (4)** Critical issues relating to the management of technology and innovation. How to design innovative organizations in terms of strategy, structure, and process. The innovation process, creativity, management of professionals, technical and strategic leadership, entrepreneurship, intraentrepreneurship, and matrix management.

**O E 579 Special Topics in Organization and Environment (4, max. 12)** Topics of current concern to faculty members and students. Offered only when faculty members are available and there is sufficient student interest.

**O E 600 Independent Study or Research (\*)**

## Quantitative Methods

**QMETH 450 Spreadsheet Models for Managerial Decision Making (4)** Formulation and solution of business problems using operations research techniques in a spreadsheet environment. Techniques of linear and integer programming, dynamic programming, network optimization, queuing, and simulation. Applications from marketing, finance, and operations. Prerequisite: I S 300.

**QMETH 490 Special Problems in Quantitative Analysis (1-6, max. 20)** Specialized quantitative techniques useful for solving business problems. Topics from operation research, statistics, computer methods. Emphasis on application. Prerequisite: either ECON 311, QMETH 201, PSYCH 213, PSYCH 218, STAT 220, STAT 301, STAT 311, or STAT 390.

**QMETH 499 Undergraduate Research (1-6, max. 9)** Research in selected problems in business statistics, operations research, decision theory, and computer applications.

### Courses for Graduates Only

**QMETH 500 Statistical Data Analysis for Management (3)** Introduction to statistical techniques useful for aiding management decisions. Use of interactive computer methods in basic business problems. Random sequences, probability distributions, linear regression, and elementary time series analysis. Prerequisite: QMETH 300 or equivalent preparation in elementary calculus.

**QMETH 501 Decision Support Models (3)** Introduction to computer-based modeling techniques for management decision making. Linear programming, networks, decision analysis, and simulation. Formulation and interpretation. Prerequisite: QMETH 300 or equivalent preparation in elementary calculus.

**QMETH 520 Managerial Applications of Regression Models (4)** Data exploration and inference using regression models for business forecasting and management. Models include simple, multiple, logistic, and nonlinear regression, use of dummy variables, transformations, variable selection, and diagnostics. Prerequisite: QMETH 500 or B A 500.

**QMETH 528 Survey Sampling Applications (4)** Introduction to design and implementation of sample surveys with emphasis on business applications. Simple random, stratified, cluster, multistage sample methods. Probability sampling, optimal allocation of sampling units. Mail, telephone, interview methods. Estimation methods, Questionnaire design. Non-response. Prerequisite: QMETH 500 or B A 500 or equivalent or permission of instructor.

**QMETH 530 Forecasting Models in Business (4)** Introduction to time series analysis and forecasting. Topics include seasonal adjustment, decomposition, exponential smoothing, moving average, and autoregression as well as model identification, estimation, diagnostics, and adaptive forecasting illustrations using real data. Prerequisite: QMETH 500 or B A 500.

**QMETH 551 Linear and Integer Programming (4)** Advanced modeling in linear and integer programming. Linear programming includes formulations, simplex method and variations, duality theory, sensitivity and parametric analysis, quadratic and separable programming; integer programming includes formulations and algorithms (branch and bound and cutting planes). Application areas include production, scheduling, distribution, marketing, finance. Prerequisite: B A 501 or equivalent.

**QMETH 579 Special Topics in Quantitative Methods (4, max. 12)** Presentation of topics of current concern to students and faculty in operations research and applied business statistics. Potential topics include applications and extensions of mathematical programming, stochastic processes, discrete programming, networks models, and the application of statistical techniques.

**QMETH 580 Mathematical Programming (4)** Advanced survey of mathematical programming with applications to business problems. Includes linear, integer, stochastic, nonlinear, and dynamic programming and network optimization. Treatment includes formulation, optimality conditions, duality theory, solution algorithms. Applications to production, scheduling, marketing, finance, and equipment replacement. Prerequisite: B A 501 or equivalent and doctoral student or permission of instructor.

**QMETH 592 Stochastic Models: Queuing and Simulation (4)** Application of stochastic processes to business problems. Focuses on development and application of queuing theory and discrete event simulation. Prerequisite: stochastic processes, knowledge of high level programming language, and doctoral student or permission of instructor.

**QMETH 599 Doctoral Seminar in Operations Research (1, max. 12)** Study and research in advanced topics of operations research. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status. Credit/no credit only.

**QMETH 600 Independent Study or Research (\*)**

## Strategic Management

### Courses for Graduates Only

**ST MGT 591 Theories of the Firm and Strategic Management: Economic Models (4)** Reviews the economic theories that support strategies pursued by firms and explores the links between market processes, firm strategy, and firm performance. Topics include agency theory, transaction cost economics, resource dependence, population ecology, and neo-Austrian economics.

**ST MGT 592 Theories of the Firm and Strategic Management : Sociological Models (4)** Explores the sociology of organizations from multiple perspectives while introducing fundamental sociological questions and preparing students for conducting research in organizations. Emphasis on structural contingencies, institutions, resource dependence, population ecology, negotiated order and culture, organizational learning and decision making, organizational power and politics, networks, and inter-organizational relations.

**ST MGT 593 Contemporary Strategic Management Research (4)** Facilitates understanding of empirical foundations of theory development and testing in contemporary strategic management research. Focuses on evaluation of ways in which the empirical tradition has evolved in the strategic management area. Attention to evaluating research methodologies used in the field.

**ST MGT 594 The Social and Political Environment of the Firm (4)** Focuses on the social and political factors that help shape corporate strategy using stakeholder management as an integrating concept. Topics include corporate governance, corporate political activity, governmental regulation, comparative political economy, and normative aspects of strategic management, including ethics and corporate social responsibility.

# School of Dentistry

## Dean

Paul B. Robertson  
D322 Health Sciences



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School Web page:  
[www.dental.washington.edu](http://www.dental.washington.edu)

Established in 1945, the University of Washington School of Dentistry offers courses leading to a Doctor of Dental Surgery (D.D.S.) degree, and advanced education leading to a Master of Science in Dentistry degree and/or a certificate of proficiency in endodontics, oral medicine, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Residency training is available in oral and maxillofacial surgery and general practice. The Department of Oral Biology offers a Master of Science (M.S.), an M.S. non-thesis degree for dental hygiene educators, and a doctoral degree (Ph.D.). Postdoctoral study is available in various disciplines. The School also offers a baccalaureate degree completion program in dental hygiene.

Opportunities to earn other degrees concurrently (M.S. or Ph.D. in the School of Dentistry's Department of Oral Biology and other schools) may be arranged on an individual basis.

These educational programs are enriched by the School's strong commitment to research and the presence of a Regional Clinical Dental Research Center, a Comprehensive Center for Oral Health Research, a Dentist-Scientist program, and a fellowship research training program for predoctoral students. The mission of the Regional Clinical Dental Research Center is to foster clinically relevant research that will advance dentistry's knowledge base, improve patient care, and promote oral health. The Comprehensive Center for Oral Health Research is focused on children's dental health and is one of only six such programs to be funded nationally by the National Institute of Dental and Craniofacial Research. State-of-the-art clinical research facilities are available for faculty and student use.

*School of Dentistry Mission Statement:* "The School of Dentistry shares the University's overall mission to generate, disseminate, and preserve knowledge and serve the community. The School is an integral part of the Health Sciences Center and is an oral health-care center of excellence serving the people of the state of Washington and the Pacific Northwest. Through its exemplary educational, research, and service programs, the School prepares students to be competent oral health-care professionals. Its research programs fundamentally contribute to the understanding of basic biologic processes and behavioral, biomedical, and clinical aspects of oral health. The School values and seeks diversity in its students, staff, faculty, and patient populations. It fosters an environment of mutual respect where objectivity, imaginative inquiry, and the free exchange of ideas can flourish to facilitate personal development, professionalism, and a strong sense of self-worth." (July 1994)

The following departments participate in the curriculum for the School's programs: *Dental Public Health Sciences* is concerned with the social, legal, political, economic, and psychological aspects of dental health-care delivery as well as the epidemiology of oral diseases and the application of biostatistical methods in studying them. *Endodontics* offers training in the diagnosis and treatment of diseases and injuries of the

tooth pulp and periradicular tissues. *Oral and Maxillofacial Surgery* trains students in the procedures used for all types of operations in the oral cavity and all phases of dental pain control. *Oral Biology* encompasses the study of basic biological mechanisms in normal and diseased oral tissues and structures. *Oral Medicine* provides training in diagnostic techniques and nonsurgical treatments of oral disease. *Orthodontics* provides training in the prevention and correction of malocclusion of the teeth. *Pediatric Dentistry* provides students with a broad understanding of prevention, diagnosis, and treatment of most dental needs from infancy through adolescence with emphasis on the psychological and educational requirements of the patient and parent. *Periodontics* offers training relative to the periodontium and dental implants, with emphasis placed on diagnosis, prevention, treatment, and maintenance. *Prosthodontics* provides instruction in the fabrication and maintenance of removable, complete, and partial dentures, and dental implants. *Restorative Dentistry* offers training in the restoration or replacement of tooth structure and study of the form and function of the masticatory structures.

## Undergraduate Program



Department Web Page:  
[www.depts.washington.edu/dhyg](http://www.depts.washington.edu/dhyg)

Dental hygiene seeks to understand why some people get preventable oral diseases, and why others do not. Risk factors, such as poverty, ethnicity, and education, as well as environment, contribute to perpetuation of these diseases. The dental hygienist observes and defines dental diseases, assesses potential outcomes of interventions, and manages conditions that compromise oral health. As an applied discipline, dental hygiene links its theoretical foundation to behavioral and natural sciences. Using evidence-based science, the discipline seeks to facilitate holistic assessments of individuals and communities and to find solutions to oral health problems. Students in the discipline learn to transfer learning from clinical to community contexts as a means of improving the oral health status among people.

Adviser  
Reinhard (Ron) Hahn  
D583 Health Sciences, Box 357475  
(206) 543-5820  
[dhyg@u.washington.edu](mailto:dhyg@u.washington.edu)

## Bachelor of Science

The University of Washington Dental Hygiene Degree Completion Program provides postlicensure education for dental hygienists who have completed a prelicensure program and who are certified or licensed to work as dental hygienists. Completion of this education enables graduates to function professionally as dental hygienists in business, management, advanced clinical dental hygiene services, public health, research, education, or private enterprise, depending upon path selections. It also provides opportunity for dental hygienists to prepare for advancement into graduate or professional schools or other careers.

For information on the dental hygiene undergraduate program, see the undergraduate volume of the *General Catalog* or visit the *General Catalog* online at [www.washington.edu/students/genocat/](http://www.washington.edu/students/genocat/).

## Professional Programs

### Doctor of Dental Surgery

The Doctor of Dental Surgery (D.D.S.) curriculum provides opportunities to learn the fundamental principles significant to the entire body of dental knowledge. Students are expected to learn fundamentals of basic health sciences, to attain proficiency in clinical skills, to develop an understanding of professional and ethical principles, and to develop reasoning and critical decision-making skills that will enable implementation of the dental knowledge base. The first year is divided among lecture, laboratory, and preclinical activities in basic sciences, dental anatomy, occlusion, and dental materials. In the second year, students develop further preclinical skills, learn how basic science principles are applied to the clinical setting, and begin clinical patient treatment. In the third and fourth years, students concentrate on providing clinical treatment, attend lectures that refine technical and diagnostic skills, and participate in electives. Students are required to take one elective in each of the junior and senior years. Electives are chosen by students from courses offered by all departments, including opportunities in independent study, research, seminars on various topics, and specialty clinical topics.

The curriculum extends for 42 months or 14 quarters, including two summer quarters. The 12 academic year quarters are variable in length (ten weeks of instruction, one week of examination), while the two required summer quarters following years two and three are each nine weeks long. If needed, students may be allowed additional time to complete required course work.

### Admission

To be considered for admission to the predoctoral program, a student will need to have completed the required courses listed below, have taken the Dental Admission Test, and have attended a personal interview. The School does not select or give preference to a particular undergraduate major field; in fact, the Admissions Committee encourages diversity in majors. Courses in the social sciences and the humanities are also important and reviewed by the Committee.

The School of Dentistry is a state supported institution and participates in the student exchange program provided by the Western Interstate Commission for Higher Education (WICHE) which supports students from western states without dental schools. Although all applications are carefully reviewed, preference in admission is given to residents of Washington and WICHE states. Required courses are: general chemistry—2 quarters or 1 semester; organic chemistry—2 quarters or 1 semester; general biochemistry—2 quarters or 1 semester, general physics—3 quarters or 2 semesters; general biology or zoology—3 quarters or 2 semesters; general microbiology—2 quarters or 1 semester. Although a majority of students have baccalaureate degrees, students with outstanding academic qualifications may be considered for admission after only three years. The School enrolls a first-year class of 50-55 students. The School is committed to diversity within the dental school student body and the dental community.

*Transfer Applicants:* The School rarely, and only under exceptional circumstances, admits transfer students from other dental schools.

*Foreign Applicants:* The School does not provide a special program for foreign-trained dentists.

*Dental Readiness Program:* To achieve the School's mission of a diverse student body, the School has instituted the Dental Readiness Program. The goals of the Dental Readiness Program are (1) to correct academic deficiencies of specific applicants who have not met the University of Washington School of Dentistry

GPA or Dental Admission Test admission-eligibility criteria, (2) to assist specific applicants in gaining admission to dental school, and (3) to prepare students for successful completion of the predoctoral dental degree. If selected, entrants may be enrolled in some first-year dental courses, as well as study-skills seminars, learning-method assessment seminars, research activities, and other University courses that will strengthen academic background. Mentors and tutors will be provided as needed. During the program year, the entrant must be enrolled only in the approved curriculum, must successfully complete all the designated courses of the Dental Readiness Program, and receive no failing, deficient, or withdrawal grades, while attaining a 2.50 overall GPA. Entrants successfully meeting these criteria will be admitted to the four-year Doctor of Dental Surgery (D.D.S.) curriculum.

To increase diversity of students, the School participates in, and provides funding for, the Health Sciences Educational Enrichment and Transition Services (EETS) Office. In addition to advising and career counseling, this office works with Health Sciences schools to provide student development and support programs, networking opportunities, and summer research programs. The EETS Office activities include participation on several Health Sciences and campus-wide committees for purposes of collaborating and exchanging strategies on effective methods for recruiting and retaining a diverse student body; as well as promoting/celebrating diversity.

The School belongs to the American Association of Dental Schools Application Service (AADSAS). The School has established November 1 as its AADSAS priority filing deadline. Only those applications received in the AADSAS Washington, D.C. office by the priority filing date will be forwarded to the University of Washington for consideration by the Admissions Committee. Applications may be requested from the AADS Web site ([www.aads.jhu.edu/aadsas.html](http://www.aads.jhu.edu/aadsas.html)). Information concerning application status may be requested by email at [aadsas.status@aaads.jhu.edu](mailto:aadsas.status@aaads.jhu.edu), or by regular mail at 1625 Massachusetts Avenue NW, Washington, D.C. 20036-2212; (202) 667-1886.

Information regarding the Dental Admission Test should be requested from the American Dental Association, Dental Admissions Testing Program, 211 East Chicago Ave., Suite 1846, Chicago, IL 60611-2678, (312) 440-2689, [www.ada.org/prac/careers/dat-01.html](http://www.ada.org/prac/careers/dat-01.html).

For information on the University of Washington School of Dentistry application or admissions contact either Kathy Craig, Office of Student Admissions, School of Dentistry, University of Washington, Box 356365, Seattle, WA 98195-6365, (206) 543-5840, fax (206) 616-2612, [askuwsod@u.washington.edu](mailto:askuwsod@u.washington.edu), [www.dental.washington.edu](http://www.dental.washington.edu), or Debbie Prince, Pre dental Advising Office, University of Washington, 008 Communications, Box 353760, Seattle, WA 98195-3760, (206) 543-2598, [debbiepf@u.washington.edu](mailto:debbiepf@u.washington.edu).

Once the AADSAS application has been received, a preliminary screening determines if an applicant meets the Admissions Committee's criteria to receive a supplemental application and request for the following materials:

1. A supplementary application that includes a short personal statement
  2. A non-refundable application fee of \$35.
  3. Three letters of recommendation. Letters of recommendation should include one from a science instructor who can evaluate the applicant's academic and intellectual qualifications, a second from a dentist who is familiar with the applicant's knowledge of and motivation toward the dental profession, and the third (character reference) from someone who can indicate the applicant's contribution to fellow man, community, etc. If a pre dental committee exists on the applicant's campus, a combined recommendation from that committee may be used to replace all three recommendations.
  4. Dental Admission Test scores. Test must be taken by October 31 of the year prior to entry.
  5. Transcripts from all higher education institutions attended.
  6. A list of current and future courses.
  7. Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the *Essential Requirements of Dental Education at the University of Washington School of Dentistry* (to be sent with the supplemental application form).
  8. Conviction/criminal history information. Washington state law requires that all faculty, students, and staff disclose background information concerning crimes and offenses against vulnerable populations. A complete copy of the law is available from the School's Office of Student Services and will be forwarded upon request. Applications will not be considered until completed disclosure forms have been returned to Student Admissions.
- The application will be considered complete once all materials noted above (1-8) are returned. Upon receipt of the completed application, invitations for an interview are sent to applicants based on a preliminary screening of grades and DAT scores. The interview is an opportunity for an open and friendly discussion of the applicant's interests, background, and reasons for selecting dentistry as a profession. The interview allows the applicant to ask questions about the School, faculty, and student life, and is conducted by a member of the Admissions Committee. In addition to the interview, the applicant will have an opportunity to hear information about financial aid, meet with enrolled students, take a tour of the School, and meet one of the School's deans.
- Following the interview, the Admissions Committee, which is composed of faculty, students, and alumni, will make a decision concerning admission status. In their deliberations, the following seven areas are considered, with the first two areas receiving the most weight in assessing the applicant's merits as a candidate:
1. *Grades.* Overall grade-point average (GPA) and GPA of pre dental required science courses are reviewed. College grades are an important indicator of dental school performance and success. The Committee members review these grades for a strong, consistent GPA with very few withdrawals, incompletes, repeated courses, or non-graded options.
  2. *DAT (Dental Admission Test).* The test, sponsored by the American Dental Association, covers several areas: quantitative reasoning, survey of natural sciences (including biology, general, and organic chemistry), and perceptual ability (including form development, apertures, angles, cubes, and orthographic projections). At the University of Washington the scores are reviewed to identify an applicant's areas of strength. The test must be taken no later than October, one year prior to admission.
  3. *Level of Pre-professional Education.* The majority of applicants will have a baccalaureate degree by the time of entry. Admission may be offered to applicants without a baccalaureate degree but only to those applicants who have completed all pre dental requirements and have an extremely competitive academic record.
  4. *Dental Knowledge.* Knowledge of the field of dentistry through experience in a dental setting (dentist's office, clinic, etc.), introductory dental course work, and exploration of the dental literature are considered as admission factors. A qualified applicant will have a clear understanding of the profession and a demonstrated interest in the field.
  5. *Unique Life Experiences.* Research and teaching efforts, travel, and work experience are some of the life experiences that are considered important. Such experiences demonstrate the breadth and level of maturity of a candidate.
  6. *Personal Attributes.* In addition to motivation, the applicant's poise and communication skills are examined by the Admissions Committee. Personal attributes such as integrity, responsibility, leadership, initiative, community service, perseverance, and diversity of interests are important.
  7. *Contribution to Diversity.* Diversity in the student body contributes to the development of oral health care professionals prepared to address the needs of society.
- Although interviews begin in October, the earliest the Admissions Committee will notify applicants of its decision is December 1. The School uses a "rolling admission" format, so interviews and committee decisions will continue to be made between December and March. The Admissions Committee will make one of three decisions regarding all applications:
1. *Offer of Acceptance.* Admission application has been accepted. The applicant will have a specified time to reply to reserve enrollment in the entering first-year class. In addition, enrollment will be contingent on timely submission of the following requirements: required registration deposit, transcripts showing completion of pre dental courses, physician statement, registration for autumn quarter of the upcoming academic year, and completion of required immunizations.
  2. *Alternate Status.* Applicant is offered a position on the Alternate List. The applicant will have a specified time to reserve a position on this list which is maintained until the beginning of the school year.
  3. *Denial of Admission.* The Committee has considered the application but cannot offer a position or alternate status.
- Accepted applicants will receive follow-up letters and information. Letters detailing registration procedures and providing financial aid information will be sent in early summer. In late summer, accepted students will receive a packet of materials welcoming them to the School and describing the orientation program, also called Prep Weeks. Attendance is mandatory and will provide an opportunity for the newly enrolled student to learn about the upcoming curriculum, student rights and responsibilities, financial aid information, student organizations, and to begin course work. Prep Weeks begin approximately two weeks prior to the start of the School of Dentistry's autumn quarter. The accepted student also will participate in an off-campus student retreat.
- Western Interstate Commission for Higher Education (WICHE):* The School participates in the program administered by WICHE for students who reside in Western states not served by a dental school (Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, North Dakota, South Dakota, and Wyoming). Such students should seek requests for certification from the WICHE commission office in their state of residence. Students who enroll in the School under the WICHE program pay in-state tuition, the nonresident portion being paid by the member state that sponsors the student.

<i>Projected costs for 1999-2000</i>	<i>First Year</i>	<i>Second Year</i>	<i>Third Year</i>	<i>Fourth Year</i>	<i>Total</i>
Tuition (resident)	9,210	12,111	12,111	9,210	42,642
Tuition (nonresident)	23,256	30,633	30,633	23,256	107,778
Technology fee (\$40/quarter)	120	160	160	120	560
Supplies (includes issue, rental, nonrental, syllabi, clinic fees, models)	3,582	4,638	1,212	0	9,432
Textbooks	1,195	831	206	0	2,232
Misc.	237	356	124	561	1,278
Total Education Costs (resident)†	14,344	15,195	13,813	12,792	56,144
Total Education Costs (nonresident)‡	28,390	36,618	32,335	23,937	121,280

†Total Educational Costs do not include living and personal expenses. Nonrental instruments belong to the student, and should be considered a long-term investment and not part of the expendable educational costs.

‡Nonresident Total Educational Costs include Total Educational Costs plus the additional tuition for students with nonresident tuition status.

Information on loans and scholarships may be obtained from the Director of Financial Aid, D322 Health Sciences, Box 356365. Information relating to student life, including the Student Dress Code, Academic Regulations Manual, and Professional Ethics Code may be obtained from the Associate Dean for Student Services, D322 Health Sciences, Box 356365.

### Facilities

School clinics, teaching laboratories, and lecture halls are up-to-date, well maintained, and periodically renovated. Third- and fourth-year students are assigned a permanent clinical module for use in patient care.

### School Accreditation and Licensure

The School is fully accredited by the Commission on Dental Accreditation, the recognized accrediting body for dentistry and the related dental fields. For information, write to the Commission on Dental Accreditation, 211 East Chicago Ave., Chicago, IL 60611-2678. Admission to the practice of dentistry in any state is conditional upon meeting the requirements of the individual state dental licensure requirement. In order to practice in the State of Washington, the candidate for licensure must have a dental degree from a U.S. or Canadian dental school, and have successfully completed the American Dental Association National Board Examinations and the Western Regional Examining Board Examination. Additional information about licensure requirements should be requested from the Washington State Department of Health, Dental Quality Assurance Commission, PO Box 1099, Olympia WA 98504-1099, (360) 586-6898.

### Health Care and Immunization Policy

Accepted students are required to meet the University and Health Sciences immunization requirements. Information is forwarded in late summer.

## Graduate Programs

Through their respective departments, the graduate faculty members of the School offer programs leading to the degrees of Master of Science in Dentistry, Master of Science, and Doctor of Philosophy, as well as postgraduate certificate programs.

### Master of Science in Dentistry/ Postgraduate Certificates

Fields of study for the M.S.D. programs include endodontics, oral pathology, oral medicine, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Although students may enroll in a graduate certificate program only, students may elect to pursue an M.S.D. The programs are planned to prepare students to think independently, to evaluate their own services and the literature of the programs, and to develop their clinical skills to a level to permit successful clinical practice, teaching, or research in their chosen specialty. Emphasis is placed on the basic principles of diagnosis and treatment. The purpose of the programs is not only to train students in their respective specialties but also to encourage preparation for academic careers or for research. Research may be undertaken in basic or applied science. Opportunities for collaborative research are available with the cooperation of other colleges, schools, or departments of the University.

Applicants for admission to the M.S.D. and certificate programs must be graduates of a school of dentistry approved by the Commission on Dental Accreditation of the American Dental Association or a university dental school located outside the North American continent whose curriculum and admission requirements are similar to those of the UW School of Dentistry. Applications must be submitted to the appropriate department on or before the following deadline: October 1 for endodontics, oral medicine, oral surgery, orthodontics, pediatric dentistry, periodontics, and prosthodontics. A concurrent Application for Admission to the Graduate School also must be filed. International students must complete a preliminary evaluation process before the application deadline and must demonstrate competency in the English language, for which TOEFL scores are required. Applicants who have not received dental degrees from an institution within the United States will be required to supply Graduate Record Examination scores for admission to the University of Washington Graduate School (graduates of U.S. institutions are not required to submit GRE scores). Requests for information or application forms may be forwarded to the department of the specialty field, School of Dentistry, University of Washington, Seattle, WA 98195-6365, (206) 543-5840.

A minimum of eight consecutive full-time quarters of residence is required except in the periodontics and prosthodontics programs. Certificate training in periodontics requires a minimum of 12 consecutive full-time quarters of enrollment and may be pursued concurrently with other advanced degrees which may

extend the program length. The graduate prosthodontic program requires a minimum of 12 full-time quarters of didactic, clinical care, and research activities.

Postgraduate certificate programs are not administered by the Graduate School, and no thesis is required. The course content may vary somewhat from the M.S.D. program, although the same academic standards are applied in both programs. Tuition and fees are assessed at the graduate level for both programs.

### Master of Science, Doctor of Philosophy

Curriculums for the M.S. and Ph.D. programs are offered through the Department of Oral Biology.

Oral biology is concerned with the nature of the oral and paraoral tissues and with the applicability of basic scientific knowledge to oral tissues in health and disease. The courses and research programs in the department deal with the origin, growth and development, structure, and functions of oral tissues, as well as with the etiology and pathogenesis of oral diseases and malfunctions. By its nature, oral biology overlaps the basic medical sciences and clinical dental sciences.

The department contains well-equipped laboratories actively engaged in various aspects of research involving the following approaches: biochemical, including studies on protein synthesis and secretion and the structure of salivary macromolecules, as well as studies on the structural proteins of the cytoskeleton of oral epithelial and epidermal cells; pharmacological, including molecular mechanisms in the regulation of secretion; physiological, including ion fluxes and their control in secretory tissues; microbiological, including the molecular basis of bacterial colonization of oral surfaces, and the identification, taxonomy and pathogenicity of oral pathogens; pathological, including the growth and metastasis of oral tumors; tissue culture, including studies on factors regulating the growth and development of oral epithelial cells; and morphological, including studies on oral tissues at the light and electron microscopic levels.

Several programs are available through the Department of Oral Biology to accommodate students with different educational objectives.

A program of study and research leading to the Doctor of Philosophy degree is available for those students desiring extensive research training as well as in-depth course work in oral biology. In addition to the courses offered by this department, students in the Ph.D. program are expected to gain proficiency in one of the biomedical sciences.

A separate program of study and research leading to the Master of Science degree is available for those students who want less training than the Ph.D. program affords.

A non-thesis option exists in the Master of Science program for the purpose of training dental hygiene educators to instruct in certain basic and applied sciences as well as in the clinic.

The School offers a program leading to the degree of Master of Science in Dentistry in oral pathology. Students enroll in a series of advanced courses in general and oral pathology.

Clinical specialty training (e.g., endodontics, oral medicine, orthodontics, pediatric dentistry, periodontics) can also be obtained in conjunction with either the M.S. or Ph.D. programs.

Applicants for all programs must have either a baccalaureate or professional degree from a dental or medical school. Acceptance into the programs requires approval of both the Department of Oral Biology and the Graduate School. For information or application materials, contact the Graduate Program Adviser, Department of Oral Biology, B224 Health Sciences, Box 357132, University of Washington, Seattle, WA 98195-7132, (206) 543-5477.

United States Public Health Service traineeships in oral biology may be available to students who are U.S. citizens or permanent residents. These begin at \$26,256 at the postdoctoral level. An allowance for tuition and fees is normally included. Applicants may also seek support via the institutional or the individual Dentist-Scientist Awards from the National Institutes of Health, which provide up to five years of stipend support for dental graduates seeking a combined clinical specialty-Ph.D. degree course of study.

### Residency Training

Residency training programs are available in oral and maxillofacial surgery and the general practice of dentistry. Both programs provide for rotation through several of the University-affiliated hospitals. Each is a fully accredited program that grants a certificate upon successful completion of the training. Stipends are provided.

The Oral and Maxillofacial Surgery Program is four years in duration and provides broad exposure to all aspects of the practice of oral and maxillofacial surgery. Application, selection, and administration of this training program is provided through the Department of Oral and Maxillofacial Surgery. Further information can be obtained by contacting the Residency Program Coordinator, Department of Oral and Maxillofacial Surgery, Box 357134, School of Dentistry, University of Washington, Seattle, WA 98195-7134, (206) 543-7722.

The General Practice Residency is a one-year training program that emphasizes the general dentist's role in a hospital and the management of medically, physically, and mentally compromised patients. Application, selection, and administration of the General Practice Residency is provided through the Department of Restorative Dentistry. Further information can be obtained by contacting Dr. Barton S. Johnson, Division of Hospital Dentistry, Department of Restorative Dentistry, Box 357456, School of Dentistry, University of Washington, Seattle, WA 98195-7456, (206) 543-7496.

### Postdoctoral Fellowships

Postdoctoral training fellowships are available in behavioral or public-health research in dentistry in addition to those in oral biology. Programs vary in duration and many accommodate degree-seeking or research fellows pursuing an academic career. NIH-sponsored full tuition and a stipend for up to three years are provided for U.S. citizens, noncitizen nationals, and those foreign nationals with permanent-residency status in the United States. Members of ethnic minorities and women are especially invited to apply. Application, selection, and administration of the program are provided through the Departments of Dental Public Health Sciences and Oral Biology.

### Graduate Training in Dental Public Health

Opportunities exist for pursuing graduate degrees in public health which emphasize applications to research in dentistry. Master of Public Health (M.P.H.) programs in the Departments of Epidemiology and Health Services of the School of Public Health and Community Medicine can be pursued in conjunction with postdoctoral training in the School of Dentistry's Department of Dental Public Health Sciences. Didactic course work is taken in the School of Public Health and Community Medicine, augmented with independent study and thesis research on selected topics in the School of Dentistry. Similar opportunities exist for pursuing the Ph.D. in epidemiology or biostatistics with an emphasis on research in dentistry. Further information may be obtained from the Department of Dental Public Health Sciences, Box 357475, School of Dentistry, University of Washington, Seattle, WA 98195-7475, (206) 543-2034.

The Office of Continuing Dental Education, School of Dentistry, offers programs and courses throughout the year to provide dentists, auxiliary personnel, and others involved in health care with current scientific knowl-

edge and methodology of patient treatment. Utilizing local, national, and international experts, these programs provide a broad spectrum of information relevant to the needs of dental-health professionals. The instructional program consists of lectures, clinical courses, study clubs, extended clinical training, correspondence, and participation courses, some of which are offered in the new simulated-patient laboratory. Various programs are presented throughout the year in the Pacific Northwest, Alaska, Arizona, and Hawaii.

A list of courses offered may be obtained from the Office of Continuing Dental Education, Box 357137, University of Washington, School of Dentistry, Seattle, WA 98195-7137, (206) 543-5444.

## Dental Hygiene

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**D HYG 402 Global Perspectives in Oral Health (3)** Disease patterns and their impact on oral health care delivery systems. Cultural, demographic, economic, and political factors affecting the effectiveness of various systems. Offered: A.

**D HYG 403 Oral Health Educational Strategies (3)** Planning, preparing, and evaluating educational strategies for oral health promotion. Assessment of needs, development of objectives, creation of communication messages, review of behavioral and educational theories, mechanisms of evaluation. Offered: W.

**D HYG 404 Field Experience in Delivery of Oral Health Care (2-12, max. 12)** Focuses on healthcare delivery issues: environmental, social, educational, economic, or cultural. Students participate at approved health agencies to learn about societal, ethical, cultural, and client oral healthcare needs and demands. The 2-credit minimum includes 30 hours on-site, end-of-quarter seminar, written assignment, and weekly e-mail communication with faculty. Offered: AWSpS.

**D HYG 465 Theoretical and Scientific Basis for Dental Hygiene Practice (3)** Lecture-discussion on science, theory, and dental hygiene practice. Focuses on clinical-decision making processes and evidence-based learning in management of oral health problems. Includes experience at selected sites. UW library system and computer resources used to search and retrieve information for reports. Offered: A.

**D HYG 482 Local Anesthesia for Dental Hygienists (2)** Techniques of local anesthesia and initial management of emergencies in the dental office.

**D HYG 491 Issues in Professional Education (3)** Seminar and discussions on topics influencing dental education. Academic freedom, accreditation, interdisciplinary relationships, legislation, licensure, tenure.

**D HYG 492 Principles of Scientific Investigation for Oral Health Professionals (3) QSR** Introduction to principles of scientific investigation, biostatistics and their application to relevant literature. Offered: W.

**D HYG 493 Review of Literature for Oral Health Professionals (3) QSR** Application of modern methods of library search and critical analysis of relevant literature. Includes technical writing and oral reporting as a means of integrating knowledge and skills acquired in 465 and 492. Offered: Sp.

**D HYG 494 Principles of Teaching for Oral Health Professionals (3)** Application of principles of learning to teaching methods and techniques used in education, with opportunity for course planning, demonstration, and practice teaching. Offered: A.

**D HYG 497 Directed Studies for Oral Health Professionals (\* max. 14)** Based on student interest in special areas. Independent study and tutorial student-faculty relationships. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**D HYG 565 Theoretical and Scientific Basis for Dental Hygiene Practice (3)** Lecture-discussion on science, theory, and dental hygiene practice. Focuses on clinical decision making processes and evidence-based learning in management of oral health problems. Includes field experience at selected practice sites. UW library system and computer resources used to search and retrieve information essential to making oral and written reports. Offered: A.

**D HYG 594 Principles of Teaching for Oral Health Professionals (3)** Application of principles of learning to teaching methods and techniques used in education, with opportunity for course planning, demonstration, and practice teaching. Prerequisite: graduate program admission. Offered: A.

**D HYG 595 Internship (\* max. 12)** Clinical and/or didactic teaching experience or program administration. Teaching and administration responsibilities assigned according to student's previous experience, education needs, and interest. Seminar required. Prerequisite: D HYG 494 or D HYG 594 and permission of instructor. Offered: AWSpS.

## Dental Public Health Sciences

### Faculty

#### Chair

Timothy De Rouen

#### Professors

Chapko, Michael K. \* 1978, (Adjunct Research); MA, 1970, Hunter College; PhD, 1972, City University of New York; diffusion of health technologies, cost-effectiveness in health care.

Conrad, Douglas A. \* 1977; MHA, 1973, University of Washington; MBA, 1977, PhD, 1978, University of Chicago; managed care, corporate finance in managed care.

De Rouen, Timothy \* 1975; PhD, 1971, Virginia Polytechnic Institute and State University; applications of biostatistics to clinical epidemiology of oral and infectious diseases.

Domoto, Peter K. \* 1973, (Adjunct); DDS, 1964, University of California (San Francisco); MPH, 1975, University of Washington; pediatric dentistry, dental behavioral science.

Fales, Martha H. \* 1959, (Emeritus); PhD, 1978, University of Michigan; dental hygiene.

Grembowski, David \* 1981; MA, 1975, Washington State University; PhD, 1982, University of Washington; dental care demand, fluoridation, dental health services research.

Milgrom, Peter M. \* 1974; DDS, 1972, University of California (San Francisco); management of fearful and phobic dental patients, quality of dental care.

Weinstein, Philip \* 1972; PhD, 1971, University of Kentucky; dental behavioral science; dental fear and pain in children, adults, and early childhood cases.

### Associate Professors

Beaton, Randal D. \* 1976, (Adjunct Research); PhD, 1972, University of Washington; assessment and treatment of temporomandibular joint pain and dysfunction.

Cameron, Cheryl A. 1979; MEd, 1978, University of Kentucky; PhD, 1986, University of Washington; JD, 1994, Seattle University; dental hygiene, educational policy, academic and health law.

Critchlow, Cathy W. \* 1979; PhD, 1993, University of Washington; epidemiology of sexually transmitted diseases, virus-associated cancers, epidemiologic methods.

Leroux, Brian \* 1991; MSc, 1985, PhD, 1989, University of British Columbia (Canada); biostatistical methodology and its application to clinical trials and epidemiology.

Martin, Michael D. \* 1986, (Adjunct); DMD, 1979, University of Kentucky; MPH, 1989, PhD, 1993, University of Washington; dental education in oral health care of persons with disability.

Ramsay, Douglas S. \* 1983, (Adjunct); DMD, 1983, University of Pennsylvania; PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Wells, Norma J. 1960; MPH, 1966, University of California (Los Angeles); oral health promotion, dental caries, dental hygiene education.

### Assistant Professors

Coldwell, Susan E. \* 1994; MA, 1990, PhD, 1994, University of Pennsylvania; pain, anxiety, and taste preference.

Mancl, Lloyd A. \* 1986, (Research); MS, 1988, PhD, 1992, University of Washington; statistical methodology in periodontal disease and TMD research.

### Instructor

Drangsholt, Mark T. 1985, (Acting); DDS, 1984, MPH, 1992, University of Washington; epidemiology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**DPHS 449 P-Directed Studies in Dental Public Health Sciences (\*)** Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

**DPHS 510 Social and Historical Perspectives in Dentistry (2)** Examines dental care problems involving biological, behavioral, and community elements and has student develop hypotheses regarding nature and complexity of problem, set objectives, seek resources and information, and contribute to development of outcomes. Offered: A.

**DPHS 535 P-Scientific Literature in Clinical Decision Making (1)** Introduction to critical reading of individual articles in professional journals and integrating the findings of several articles. Use of the literature to assist the practicing dentist in making clinical decisions. Offered: Sp.

**DPHS 541 P-Ethics in Dentistry (1)** Seminar improving ethical reasoning skills and conveying ethical and legal standards of the profession. Credit/no credit only. Offered: Sp.

**DPHS 550 P-Directed Studies in Dental Public Health Sciences (\* max. 6)** Students and faculty members who have common academic interests can pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

**DPHS 568 Biostatistics in Dentistry (3)** Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or Permission of instructor. Offered: jointly with B10ST 510.

**DPHS 569 Clinical Epidemiology and Study Design in Dentistry (2)** An introduction to epidemiological methods as they relate to dental research. Topics covered include the estimation of dental disease occurrence at patient level and site level and the design and analysis of clinical trials with special emphasis on designs unique to dentistry, such as split-mouth designs. Credit/no credit only. Offered: S.

**DPHS 575 Behavioral Dental Research (1)** Survey of behavioral science research and methodology in dentistry and related fields. Emphasis in various quarters varies: literature review, research design, instrumentation, data analysis. Designed for advanced students who plan a research career. Credit/no credit only. Prerequisite: doctoral degree or permission of instructor. Offered: AWSp.

**DPHS 640 P-Professional Issues: Clinical Management of the Fearful and Phobic (1)** Introduction to assessment process and treatment strategies for successful management of anxious, fearful, or phobic patient, combined with clinical observation of diagnostic and treatment appointments of active patients. Offered: AWSpS.

**DPHS 660 Dental Fear Clinic (2)** Clinical instruction in the care of the severely anxious or phobic adult or child. Strategies from behavioral and cognitive psychology. Credit/no credit only. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: AWSpS.

## Dentistry

### Course Descriptions

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**DENT 520 P-Clinical Practice Management 1 (1)** Designed to provide the student with the knowledge required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, authorized treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines. Offered: S.

**DENT 521 P-Oral Pathology (3)** Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and

bones. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: A.

**DENT 522 P-Oral Pathology (3)** Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: W.

**DENT 523 Prevention and Management of Medical Emergencies in Dentistry (1)** Introduction to medical emergencies in the dental office, including cardiopulmonary resuscitation. Offered: A.

**DENT 534 P-Geriatric Dentistry (1, max. 2)** Special needs of older persons seeking dental care: oral health, psychology of aging, socioeconomic problems, effective communication, dental management, and special problems in home health care and in long-term care settings. Offered: WSp.

**DENT 537 P-Hospital Dentistry (1)** Introductory course presenting hospital procedures and protocol and specific patient types. Offered: Sp.

**DENT 545 Review of Medical Emergencies and Basic Life Support (1)** Review of medical emergency management in dentistry, including prevention and treatment. Review and update basic life support and airway management. Offered: S.

**DENT 550 P-Special Studies in Dentistry (\* max. 12)** Series of courses offered by the various departments from which students may elect study in areas of special interest to them. These courses include subject matter applicable to all phases of dentistry. Credit/no credit only. Offered: AWSpS.

**DENT 551 P-Clinical Practice Management 2 (1)** Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

**DENT 552 P-Clinical Practice Management 2 (1)** Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

**DENT 553 P-Clinical Practice Management 2 (1)** Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

**DENT 554 P-Clinical Practice Management 2 (1)** Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

**DENT 555 P-Clinical Practice Management 2 (1)**

Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary bio-hazardous materials guidelines.

**DENT 556 P-Clinical Practice Management 2 (1)**

Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary bio-hazardous materials guidelines.

**DENT 557 P-Clinical Practice Management 2 (1)**

Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary bio-hazardous materials guidelines.

**DENT 561 Elective in Forensic Odontology (1)**

Elective opportunity in forensic odontology. Offered: SpS.

**DENT 562 Elective Offering in Advanced Cardiac Life Support (2)**

Introduction to airway management (masking/intubation/oropharyngeal airways/nasopharyngeal airways/cricothyrotomy), 12-lead EKG recognition and diagnosis, cardiac physiology and pathophysiology, and pharmacologic action of several different medications. Students who pass AHA guidelines for completion of an ACLS course are awarded ACLS certification. Offered: W.

**DENT 563 Elements of Conscious Sedation (1-2)**

Details theory and techniques for rendering oral, inhalation, transmucosal, intramuscular, and intravenous forms of conscious sedation. Focuses on pharmacology and pharmacokinetics of nitrous oxide, benzodiazepines, narcotics, and barbiturates. Addresses usual applications, special considerations, legal issues, and proper record keeping. Emphasizes prevention and management of emergencies. Offered: A.

**DENT 565 Dental Photography (2)**

Provides student with sufficient knowledge and experience to select and use correct photographic equipment for photographing patients (facial and interoral), casts, instruments, x-rays, charts, and objects. Credit/no credit only. Offered: A.

**DENT 566 Physical Diagnosis (1)**

Seminar on performing complete physical examination including basic assessment of overall patient, vital signs, cardiac, pulmonary, abdominal, extremities, neurologic, and head/neck. Examination techniques include observation, auscultation, percussion. Writing findings and interpreting physical examinations. Offered: S.

**DENT 568- Internal Medicine for Dentistry ([1-3]-, max. 6)**

Review of major organ systems, including normal anatomy and physiology, common pathophysiological, medical interventions. Details modifications necessary for dental treatment and medical emergency management. Offered: AS.

**DENT 640 P-Extramural Clinics in Geriatric Dentistry (2)**

Extramural geriatric clinical experience, including choice of nursing home or community clinic, and brief didactic component. Credit/no credit only. Offered: AWSpS.

**DENT 645 P-Hospital Rotation (2)**

Clinical experience that puts into practice the material presented in 537. The student is involved in hospital procedures and protocol and in dental care of the hospital patient. Offered: AWSpS.

**DENT 650 P-Extramurals (\* max. 12)**

Extramural sites arranged to provide dental students, at varying levels of their education, with opportunities to treat a wide variety of patients in the delivery systems outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**DENT 655 Medical Emergency Management: Basic Life Support (1)**

Review of principles and practical applications for the management of medical emergencies in dental practice in conjunction with training and certification in Basic Life Support. Offered: S.

**DENT 657 Comprehensive Clinic (1-10, max. 10)**

Clinical comprehensive care for patients. Offered: S.

**DENT 659 Comprehensive Clinic (1-10, max. 10)**

Clinical comprehensive care for patients. Offered: S.

**DENT 660 Temporomandibular Joint Diagnosis and Treatment (2, max. 8)**

Seminar and clinic sequence for comprehensive examination, diagnosis, and treatment of patients with temporomandibular joint problems. Includes management of dysfunction and morphologic alterations in associated muscles and occlusion. Prerequisite: permission of instructor. Offered: AW.

**DENT 690 P-Extended Clinical Dentistry (1)**

Educational experiences in clinical dentistry. Available to students who have successfully completed the University of Washington Doctor of Dental Surgery curriculum and seek additional supervised experience in the delivery of oral health care services within three quarters of graduation and prior to licensure. Prerequisite: permission of instructor. Offered: AWSpS.

**DENT 700 Master's Thesis (\*)**

Offered: AWSpS.

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## Endodontics

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### Faculty

#### Chair

Gerald W. Harrington

#### Professors

Byers, Margaret R. \* 1972, (Adjunct Research); PhD, 1969, Harvard University; somatosensory receptor structure, cytochemistry, and pathologic reactions; neuroimmune interactions.

Guild, Robert E. 1951, (Emeritus); PhD, 1955, University of Washington.

Harrington, Gerald W. \* 1969; DDS, 1959, St Louis University; MSD, 1969, University of Washington; endodontics.

Natkin, Eugene \* 1962, (Emeritus); DDS, 1957, New York University; MSD, 1962, University of Washington; endodontics.

Oswald, Robert J. \* 1974, (Affiliate); DDS, 1969, Virginia Commonwealth University; endodontics.

Steiner, James C. \* 1992, (Clinical); DDS, 1956, Case Western Reserve University; MSD, 1966, University of Washington; normal sensory mechanisms of human dental pulp and pathologic alterations causing pain.

#### Associate Professor

Pitts, David Leroy \* 1977; DDS, 1972, Indiana University; MSD, 1977, University of Washington; endodontics.

### Assistant Professor

Sarram, Shahrzad 1989, (Clinical); DDS, 1992, MDS, 1995, University of Washington.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

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**ENDO 520 P-Introduction to Endodontics (2)**

Lecture course dealing with the differential diagnosis and the treatment of pulp pathosis and associated periapical pathosis. This course also deals with criteria and procedures for the evaluation of success and failure of endodontic treatment. Offered: Sp.

**ENDO 531 P-Endodontic Technique (4)**

Lecture-laboratory course in root canal therapy in terms of present-day concepts. Treatment of extracted teeth as practice for clinical cases. Offered: A.

**ENDO 534 P-Endodontic Clinical Procedures(1)**

Lecture course dealing with clinical procedures particular to endodontics, diagnosis and treatment of endodontic emergencies, and surgical management of endodontic problems. Offered: W.

**ENDO 535 P-Clinical Management of Endodontic Treatment Problems (1)**

Management of a variety of technical problems frequently encountered in the treatment of endodontic cases and the diagnosis and treatment of impact injuries to teeth. Offered: Sp.

**ENDO 545 Honors Endodontics (2, max. 4)**

Seminar discussions of advanced endodontic diagnosis and treatment planning issues as well as clinical sessions on treatment of calcified negotiable canals, alternate instrumentation procedures and anterior endodontic surgery. Offered: WSp.

**ENDO 547 Dental Practice Administration (2)**

Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: A.

**ENDO 548 Dental Practice Administration (2)**

Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: W.

**ENDO 549 Dental Practice Administration (2)**

Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: Sp.

**ENDO 550 P-Directed Studies in Endodontics (\* max. 6)**

See DPHS 449 for course description and prerequisite.

**ENDO 560 Advanced Endodontic Diagnosis and Treatment (2)**

Current concepts are presented and discussed relating to the diagnosis and treatment of pulpal and periapical pathosis. Criteria for evaluation of success or failure of root canal therapy are presented. Offered: W.

**ENDO 561 Anatomical Basis for Clinical Endodontics (2)**

Root canal anatomy of significance in clinical endodontics is discussed in a seminar format. Offered: A.

**ENDO 562 Anatomical Bases for Surgical Endodontics (2)**

Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship be-

tween periodontal and pulpal pathosis, including differential diagnosis and appropriate treatment planning, are discussed. Offered: Sp.

**ENDO 563 Radiographic Interpretation (2)** Various aspects of radiographic interpretation of particular relevance to endodontics, including interpretation of normal structures, acquired and developmental abnormalities, infections, sialoliths, dysplasias, cysts, malignant lesions, benign tumors, and various diseases other than tumors.

**ENDO 568 Endodontic Practice Management (1)** Essential elements for establishing and managing a successful specialty practice in Endodontics. Prerequisite: ENDO 562. Offered: A.

**ENDO 580 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 581 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 582 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 583 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 584 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 585 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 586 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 587 Endodontic Seminar (2)** Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

**ENDO 590 Treatment Planning Seminar (2, max. 16)** Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

**ENDO 593 Clinical Practice Teaching (1, max. 3)** Closely supervised experience in teaching clinical endodontics to the undergraduate dental student.

**ENDO 597 Endodontics Teaching Seminar (2)** Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Offered: W.

**ENDO 598 Endodontics Teaching Seminar (2)** Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Offered: Sp.

**ENDO 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program adviser.

**ENDO 630- P-Clinical Endodontics (1-, max. 7)** Student is required to complete endodontic treatment of anterior, premolar, and molar teeth. In addition to nonsurgical treatment of several endodontic cases, the student assists with a periapical surgery. Student must complete seven quarters of 630 and all course requirements before a grade is awarded.

**ENDO 660 Clinical Endodontics (4, max. 32)** Clinical diagnosis and treatment of pulpal pathosis and related sequelae.

## Oral and Maxillofacial Surgery

### Faculty

#### Chair

Owen Ross Beirne

#### Professors

Beirne, Owen Ross \* 1985; DMD, 1972, Harvard University; PhD, 1976, University of California (San Francisco); basic and clinical biology of bone tissue reconstruction.

Gehrig, John D. \* 1954, (Emeritus); DDS, 1946, MSD, 1951, University of Minnesota; oral and maxillofacial surgery, biological structure.

Kiyak, H. Asuman \* 1977; MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.

Myall, Robert W. \* 1979; BDentS, 1964, University of London (UK); MD, 1975, University of British Columbia (Canada); oral and maxillofacial surgery and biological structure.

Oda, Dolphine \* 1985; BDentS, 1975, University of Baghdad (Iraq); MSc, 1981, University of Manitoba (Canada); transformation and differentiation of cultured oral epithelial cells.

Worthington, Phillip 1976; MD, 1956, BDentS, 1962, University of Liverpool (UK); oral and maxillofacial surgery.

#### Associate Professors

Bloomquist, Dale S. \* 1972; DDS, 1969, University of Washington; oral and maxillofacial surgery.

Egbert, Mark A. 1986; DDS, 1981, University of Washington; oral and maxillofacial surgery.

Johnson, Barton S. \* 1991; DDS, 1985, MS, 1989, University of California (Los Angeles); hospital dentistry, medical compromise, oncology, sedation, pharmacology, molecular biology.

Kinney, Lisa A. 1996; DDS, 1982, Case Western Reserve University; oral and maxillofacial surgery.

Rothwell, Bruce R. 1980; DMD, 1973, University of Oregon; MSD, 1977, University of Washington; general dentistry, hospital-based dentistry, forensic dentistry.

#### Assistant Professors

Dawson, Kenneth \* 1993; BDentS, 1983, University of Sydney (Australia); MDSc, 1993, University of Melbourne (Australia); oral and maxillofacial surgery.

#### Instructor

Rubens, Brian C. 1990, (Acting); DDS, 1980, University of Washington; oral and maxillofacial surgery.

### Course Descriptions

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For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**O S 520 P-Local Anesthesia (2)** Pharmacology, physiology, anatomy, and techniques of local anesthesia for dental students.

**O S 530- Oral Surgery: Didactic (1-, max. 3)** Covers the scope of oral and maxillofacial surgery as prac-

ticed in the United States today. Introductory course for predoctoral dental students.

**O S 532 P-Sedation and Pain Control (2)** Techniques of sedation (oral, inhalational, intravenous) and pain control.

**O S 550 P-Directed Studies in Oral Surgery (\* max. 16)** See DPHS 449 for course description and prerequisite.

**O S 560 Dental Sedation (2)** For graduates of the various dental specialties on the theory, application, and techniques of dental sedation. All forms of sedation, including oral, intramuscular, intravenous, and inhalation, are covered. Clinical experience is provided in the second half of the quarter.

**O S 630- P-Oral Surgery Clinic (2-, max. 6)** Clinical experience in simple and complex dentoalveolar and pre-prosthetic surgery. A problem-based course using an auto-tutorial approach covering the extraction of teeth, impaction surgery, medications, surgical complications, treatment of infections, bone cysts, maxillary sinus complications, and salivary gland and mucosal pathology.

**O S 651 P-Harborview Clerkship (2-10, max. 10)** Six-week rotation at Harborview Medical Center, including intensive instruction in oral surgery procedures and observing and assisting oral and maxillofacial surgery in the operating room. Credit/no credit only. Prerequisite: permission of department Chairperson.

**O S 652 P-Smith Hospital, Texas, Rotation (2-12, max. 12)** Six-week rotation at John Peter Smith Hospital in Fort Worth, Texas, including intensive instruction in oral surgery procedures and observing and assisting oral and maxillofacial surgery in the operating room. Credit/no credit only. Prerequisite: permission of department Chairperson.

## Oral Biology

### Faculty

#### Chair

Kenneth Izutsu

#### Professors

Altman, Leonard \* 1974, (Clinical); MD, 1969, Harvard University; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins.

Byers, Margaret R. \* 1972, (Adjunct Research); PhD, 1969, Harvard University; somatosensory receptor structure, cytochemistry, and pathologic reactions; neuroimmune interactions.

Byers, Peter H. \* 1976, (Adjunct); MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion.

Dale-Crunk, Beverly A. \* 1972; PhD, 1968, University of Michigan; keratin biochemistry.

Eyre, David R. \* 1985, (Adjunct); PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Herring, Susan W. \* 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Izutsu, Kenneth \* 1971; PhD, 1970, University of Washington; salivary gland physiology and pathophysiology.

Keller, Patricia J. \* 1955, (Emeritus); PhD, 1953, Washington University; protein structure and function.

Lamont, Richard J. \* 1988; PhD, 1985, University of Aberdeen (UK); pathogenic mechanisms and taxonomy of oral bacteria.

Morton, Thomas H. \* 1975; DDS, 1972, Creighton University; MSD, 1975, University of Washington; oral pathology, oral medicine.

Robinovitch, Murray \* 1966; DDS, 1961, University of Minnesota; PhD, 1967, University of Washington; salivary biochemistry, salivary anti-HIV factors.

Tamarin, Arnold \* 1961, (Emeritus); DDS, 1951, University of Illinois; MSD, 1961, University of Washington; oral embryology and histology, electron microscopy.

Verdugo, Pedro \* 1974, (Adjunct); MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.

Watson, Eileen L. \* 1972; PhD, 1970, University of Utah; salivary gland pharmacology and regulation.

### Associate Professors

Bordin, Sandra \* 1981, (Adjunct Research); PhD, 1966, University of Ferrara (Italy); regulation of connective tissue repair by immune-inflammatory complement components.

Darveau, Richard P. \* 1989, (Adjunct Research); PhD, 1981, Washington State University; bacterial interactions with the innate host defense system.

Ramsay, Douglas S. \* 1983, (Adjunct); DMD, 1983, University of Pennsylvania; PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Wells, Norma J. 1960, (Adjunct); MPH, 1966, University of California (Los Angeles); oral health promotion, dental caries, dental hygiene education.

### Assistant Professors

Cangelosi, Gerard A. \* 1985, (Adjunct); PhD, 1984, University of California (Davis); molecular biology, environmental monitoring, clinical detection of pathogenic mycobacteria.

Jackson, Douglass L. \* 1996, (Adjunct); DMD, 1986, University of Pittsburgh; MS, 1989, University of Michigan; PhD, 1996, University of Minnesota; peripheral regulation of sensory neurons during tissue injury.

Park, Yoonsuk 1995, (Research); PhD, 1995, University of British Columbia (Canada); characterization of virulence genes of an oral pathogen, *Porphyromonas gingivalis*.

Presland, Richard B. 1989, (Research); PhD, 1987, University of Adelaide (Australia); molecular basis of epithelial cell differentiation.

## Course Descriptions

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**ORALB 449 Undergraduate Research Topics in Oral Biology (\*)** Individual research on topics selected in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 510- P-Development, Structure, and Function of Oral Tissues (3-)** Development, microscopic and submicroscopic structure, functional aspects of hard and soft oral tissues. Embryonic development of head and neck; morphodifferentiation of face and oral structures. Structure-function relationships in descriptions of development and histology-ultrastructure of oral tissues by integration of traditional oral histology and oral physiology topics. Offered: WSp.

**ORALB 520 P-Molecular Microbiology and Oral Diseases (3)** Lamont Applies students' background knowledge in basic sciences to an understanding of

the molecular bases of the interactions between microorganisms and oral tissues that lead to plaque formation and dental diseases. Principles of clinical asepsis and diagnosis of caries and periodontal diseases also covered. Offered: A.

**ORALB 540 P-Clinical Oral Pathology Conference (2)** Morton Seminar stressing basic science aspects and clinical findings of various oral lesions through exploration of etiology, pathogenesis, histopathology, and treatment modalities for oral pathology cases drawn from files of the Division of Oral Pathology. Offered: A.

**ORALB 550 P-Directed Studies in Oral Biology (\* max. 12)** Morton Selected readings and seminars on a topic chosen by individual arrangement in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 561- Oral Tissue Development, Structure, and Function (2-, max. 4)** Selected readings and discussions explore recent advances in cellular and molecular biology relevant to oral biology and medicine. Special emphasis on craniofacial and dental development, oral mucosal and periodontal tissues, salivary gland function, and olfaction and gustation. Credit/no credit only. Prerequisite: permission of instructor. Offered: WSp.

**ORALB 562 Supervised Teaching in Oral Biology (1-5, max. 10)** Directed and guided experience in selected topics in teaching techniques, teaching philosophy, and course design of courses given by the Department of Oral Biology. Students are required to participate in lecture and laboratory teaching under the supervision of the course director. Prerequisite: permission of instructor. Offered: AWPp.

**ORALB 565 Clinical Oral Pathology (1-3, max. 10)** Morton Presentation of interesting oral lesions from the dental school and the University of Washington Medical Center and the correlation of the clinical findings with the underlying morphologic and biochemical changes in the tissues. The relation of these oral lesions to systemic disease is stressed. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 566 Surgical Oral Pathology (2-4, max. 16)** Students are trained to interpret microscopic slides of lesions from the oral cavity and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 569 Advanced Oral Microbiology (2)** Lamont Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. A.

**ORALB 570 Seminar in Oral Pathology (1-3, max. 9)** Consists of in-depth studies of specific oral diseases through use of seminar and discussion. Students are required to present literature reviews and to act as discussion leaders. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 572 Oral Pathology (5)** Oda Survey of the diseases of the oral facial regions in lecture and laboratory sessions. Diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Correlations be-

tween clinical findings and histopathologic features. Attendance in the laboratory is required. Offered: AW.

**ORALB 574 Clinical Stomatology (3)** Morton Diseases of the oral cavity and jaw are presented as the practitioner encounters them-detailed clinical pictures, laboratory tests, radiographic findings, surgical exploration for the establishment of a therapeutic diagnosis. Offered: Sp.

**ORALB 575 Oral Biology Seminar (1-3, max. 10)** Presentation and discussion of current research problems by members of the staff, investigators from other departments in the University, visiting scientists, and trainees. Prerequisite: permission of instructor. Offered: AWPp.

**ORALB 576 Molecular Aspects of Epithelial Biology (2)** Dale In-depth discussion of cytoskeleton, cell junctions, influence of growth factors, retinoids, and other exogenous agents on differentiation and function of normal stratified epithelia. Prerequisite: BIOC 440 (or equivalent) or permission of instructor. Offered: alternate years; Sp; odd years.

**ORALB 577 Applied Therapeutics in Dentistry (2)** Watson Practical information about drugs included in practice of dentistry. Topics include evaluation of case histories, dental considerations pertaining to medical conditions and drug therapies, types of drugs and dosages used for common medical conditions, the pharmacology of drugs prescribed by the clinician, and the mechanisms involved in drug interactions. Offered: A; odd years.

**ORALB 578 Research Techniques in Oral Biology (2-4, max. 15)** Introduction to biochemical, analytical, or morphological techniques employed in biochemical cytology or molecular pathology as well as *in vitro* techniques of tissue and organ culture. Prerequisite: permission of instructor. Offered: AWPpS.

**ORALB 579 Molecular Biology (2)** Presland Applications of molecular biology and recombinant DNA methodologies to oral biology topics of interest in dental sciences. Credit/no credit only. Prerequisite: BIOCHEM 405 or BIOCHEM 406 or equivalent, and permission of instructor. Offered: even years; S.

**ORALB 581- Secretory Process in Exocrine Glands (1-3, max. 3-)** Izutsu Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: A.

**ORALB -582- Secretory Process in Exocrine Glands (-1-3, max. 3-)** Izutsu Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: W.

**ORALB -583 Secretory Process in Exocrine Glands (-1-3, max. 3)** Izutsu Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: Sp.

**ORALB 591 Advanced Topics in Oral Biology and Medicine I (1-2, max. 2)** Herring, Izutsu Review of current molecular and cellular advances in developmental biology relevant to head and neck embryology, tooth development and epithelial differentiation. Credit/no credit only. Offered: jointly with ORTHO 591A.

**ORALB 592 Advanced Topics in Oral Biology and Medicine II (1-2, max. 2)** Herring Review of current scientific literature relevant to cranioskeletal develop-

ment and growth, bone biology and orthodontic tooth movement. Credit/ no credit only. Offered: jointly with ORTHO 592 W.

**ORALB 593 Advanced Topics in Oral Biology and Medicine III (1-2, max. 2)** *Herring* Review of current scientific literature relevant to oral soft tissue structure and physiology, including mastication and swallowing, salivary glands, periodontium and dental pulp. Credit/no credit only Offered: jointly with ORTHO 593 Sp.

**ORALB 600 Independent Study or Research (\*)** Prerequisite: permission of instructor. Offered: AWSpS.

**ORALB 700 Master's Thesis (\*)** Offered: AWSpS.

**ORALB 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Oral Medicine

### Faculty

#### Chair

Edmond L. Truelove

#### Professors

Dworkin, Samuel F. \* 1974; DDS, 1958, PhD, 1969, New York University; dentistry and clinical psychology, pain, psychosomatic and illness-related behavior.

Hollender, Lars Gosta \* 1988; DDS, 1958, Royal Dental School (Sweden); PhD, 1964, University of Lund (Sweden); oral radiology.

Izutsu, Kenneth \* 1971; PhD, 1970, University of Washington; salivary gland physiology and pathophysiology.

Le Resche, Linda A. \* 1983, (Research); DSc, 1977, Johns Hopkins University; nonverbal behavior (facial expression) related to pain; pain epidemiology.

Morton, Thomas H. \* 1975; DDS, 1972, Creighton University; MSD, 1975, University of Washington; oral pathology, oral medicine.

Omnell, Karl-Ake \* 1981; DDS, 1950, Royal Dental School (Sweden); DO, 1957, University of Lund (Sweden); oral radiology.

Truelove, Edmond L. \* 1972; DDS, 1967, MSD, 1971, Indiana University; oral medicine, orofacial pain, stomatitis, and salivary gland disorders.

#### Associate Professors

Chasteen, Joseph E. 1989; DDS, 1967, MA, 1976, University of Michigan; dental informatics and multimedia instructional programs.

Epstein, Joel B. 1983, (Research); DMD, 1976, University of Saskatchewan (Canada); MSD, 1979, University of Washington.

Martin, Michael D. \* 1986; DMD, 1979, University of Kentucky; MPH, 1989, PhD, 1993, University of Washington; dental education in oral health care of persons with disability.

Moore, Rodney A. 1987, (Research); DDS, 1973, Ohio State University; PhD, 1991, Royal Dental College (Denmark); illness behavior.

Persson, Rigmor E. 1988, (Research); DDS, 1969, University of Lund (Sweden); MSD, 1989, University of Washington; oral health, geriatric and medically compromised patients, general dentistry.

Schubert, Mark M. \* 1974; DDS, 1974, MSD, 1981, University of Washington; oral medicine/oral oncology.

Sommers, Earl E. \* 1972, (Clinical); DDS, 1971, Indiana University; diagnosis/management of orofacial pain, stomatitis, and salivary gland disorders.

Stiefel, Doris \* 1972, (Emeritus); DDS, 1954, University of Washington; dental education in oral health care of persons with disability.

#### Assistant Professors

Jackson, Douglass L. \* 1996; DMD, 1986, University of Pittsburgh; MS, 1989, University of Michigan; PhD, 1996, University of Minnesota; peripheral regulation of sensory neurons during tissue injury.

Massoth, Donna L. 1984, (Research); DDS, 1983, University of California (Los Angeles); MSD, 1985, PhD, 1992, University of Washington; chronic pain, illness behavior, somitization.

Wilson, Leanne 1982, (Affiliate); PhD, 1988, University of Washington; clinical and developmental psychology, behavioral patterns associated with illness and chronic pain.

#### Instructor

Drangsholt, Mark T. 1985, (Acting); DDS, 1984, MPH, 1992, University of Washington; epidemiology.

#### Lecturers

Gandara, Beatrice 1979; DDS, 1978, University of Southern California; MSD, 1985, University of Washington.

Govin, Glenn M. 1999; DDS, 1985, University of Texas (San Antonio); MPH, 1992, University of Texas (Houston); dental education in oral health care of persons with disabilities.

Griffith, Mickaella V. 1979; DDS, University of Tehran (Iran).

## Course Descriptions

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For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ORALM 404 Considerations in Care of the Patient With a Disability (\* max. 6)** Role of auxiliaries in dental treatment of the special patient, including psychosocial issues, communication techniques, wheelchair transfers; dental prevention, medical and dental management of specific disabilities; drug therapy, sedation, and anesthesia. Offered: AWSpS.

**ORALM 460 Clinical Management of Patients With Disabilities (\* max. 10)** Participation in chair/bedside dental treatment of a broad range of disabled populations, including homebound and institutionalized patients. Offered: AWSpS.

**ORALM 525 P-Detection and Management of Systemic and Oral Disease I (1)** Clinical presentation of diseases of oral cavity and appropriate treatment conditions. Offered: A.

**ORALM 526 P-Detection and Management of Systemic and Oral Disease II (2)** Clinical presentation of diseases of oral cavity and appropriate treatment conditions. Offered: W.

**ORALM 527 P-Detection and Management of Systemic and Oral Disease III (1)** Clinical presentation of diseases of oral cavity and appropriate treatment conditions. Offered: Sp.

**ORALM 528 Problem Oriented Case Planning (2)** Basic concepts of treatment planning. Offered: S.

**ORALM 529 Physical Diagnosis (1)** Techniques and methods for examination and analysis of patient needs. Offered: S.

**ORALM 530 Normal and Abnormal Growth and Development: Dental Education in Care of the Disabled (3)** Introduction to acquired and developmental disabilities and dental management considerations of patients with disabilities. Offered: S.

**ORALM 531 P-Acute and Chronic Orofacial Pain (1)** Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: A.

**ORALM 532 P-Acute and Chronic Orofacial Pain (1)** Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: W.

**ORALM 533 P-Acute and Chronic Orofacial Pain (2)** Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: Sp.

**ORALM 540 P-Oral Medicine Senior Seminar (2)** Clinical conference devoted to case presentations of patients with dental treatment needs and complicating medical problems. Offered: AW.

**ORALM 545- P-Clinical Conference in Oral Medicine (1-, max. 2)** Clinical pathologic conference utilizing interdisciplinary approach to patient care and emphasizing basic science application. Offered: AW.

**ORALM 550 P-Directed Studies in Oral Diagnosis (\* max. 12)** See DPHS 449 for course description and prerequisite. Offered: AWSpS.

**ORALM 564 Dental Care of the Disabled I (\* max. 10)** Advanced topics in rehabilitation dentistry including psychosocial issues; characteristics and needs of patients with specific disabilities; patient management and use of portable equipment; drug therapy, sedation and anesthesia; dental prevention, and emergency procedures. Seminars and self-directed study. Prerequisite: permission of instructor. Offered: AWSpS.

**ORALM 565 Oral Medicine Clinical Conference (\* max. 16)** Clinical conference in which diagnostic data concerning patients seen in the oral medicine clinic are presented for evaluation. When possible, the patient is present with laboratory findings, radiographs, and the results of special tests. Offered: AWSpS.

**ORALM 567 Behavioral Management of Acute and Chronic Orofacial Pain (2)** Overview of psychosomatic concepts, as related to acute and chronic pain. Behavioral management strategies for acute and chronic pain integrated into clinical care provided by primary dentist. Review biofeedbacks, relaxation, hypnosis, placebos, and related psychophysiological approaches. Open to graduate students, postdoctoral fellows, residents in dentistry, medicine, psychology. Offered: AWSpS.

**ORALM 570- Oral Medicine and Therapy (2-, max. 6)** Lecture directed toward the presentation and discussion of oral diseases and oral manifestations of systemic disease. Primarily the clinical manifestations' relationship to generalized disease processes and patient management with in-depth discussions of therapy. Offered: AWSpS.

**ORALM 576 Oral Medicine Literature Review (1)** Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease. Offered: AWSpS.

**ORALM 578 Dental Care of the Disabled Literature Review (1, max. 3)** Review of the current scientific literature pertaining to disability issues, including research, clinical management, resources, and legislation pertaining to oral health of persons with disabilities. Credit/no credit only. Offered: AWSpS.

**ORALM 580 Current Concepts in Oral Radiology (2)** Lecture/seminar covering current concepts in oral radiology including technical factors, radiation risks, observer characteristics and variation, radiographic localization, interpretation, and overview of current extraoral techniques. Offered: AWSpS.

**ORALM 581 Advanced Seminars in Oral Radiology (2, max. 8)** Explores aspects of oral and maxillofacial radiology and related fields. Offered: AWSpS.

**ORALM 584 Dental Care of the Disabled III (\* max. 10)** Field practice in community outreach to facilities and agencies serving disabled populations. Includes observation, dental screenings, patient education and in-service training of direct care staff. Prerequisite: ORALM 404 or ORALM 664. Offered: AWSpS.

**ORALM 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**ORALM 601 Oral Medicine Research Seminar (1, max. 10)** Presentation and discussion of current research problems by graduate students, faculty, and investigators from other departments in the university. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**ORALM 630- P-Clinical Diagnosis and Oral Medicine ([1/2]-, max. 5)** Opportunity for examining, performing x-ray survey, and planning treatment for less-involved patients. Students also participate in rendering diagnosis and emergency treatment. Offered: AWSpS.

**ORALM 640- Advanced Clinical Diagnosis and Oral Medicine ([1/2]-, max. 3)** Advanced instruction in diagnosis and in the examination and handling of patients. Students are in block assignment and perform radiographic surveys, oral diagnosis, and treatment plans for prospective patients. Offered: AWSpS.

**ORALM 650 P-Oral Medicine Clinical Elective (1-6, max. 6)** Opportunities for students to work in various clinical activities at local hospitals or other sites outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**ORALM 660 Rotations in Medical Disciplines (1-4, max. 24)** Clinic, oriented to the hospital practice of oral medicine, deals with examination and nonsurgical therapy of hospital patients. The conditions treated include primary oral diseases, oral manifestations of systemic diseases, and oral defects resulting from medical treatment of serious systemic disease. Credit/no credit only. Offered: AWSpS.

**ORALM 663 Introduction to Educational Methods in Dentistry (2)** Principles of teaching and learning, their applications in dental education. Basic principles include learning theory and cognitive processing, identifying prerequisite knowledge of learners, determining objectives of outcomes of learning, selecting appropriate methods and materials, using evaluation procedures. Increases understanding of instruction process to provide a sound foundation for teaching. Offered: AWSpS.

**ORALM 664 Dental Care of the Disabled II (\* max. 10)** Practicum in chair/bedside delivery of dental care to different disabled populations. Includes rotations to institutions, long-term care facilities, and homebound service, using mobile equipment. Prerequisite: ORALM 564 and permission of instructor. Offered: AWSpS.

**ORALM 665 Clinical Oral Medicine (\* max. 33)** Clinic involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student diagnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling. Offered: AWSpS.

**ORALM 670 Clinical Oral Medicine Teaching (1-4, max. 16)** Clinic designed to give the student experience and instruction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and special diagnostic procedures is emphasized. Offered: AWSpS.

## Orthodontics

### Faculty

#### Chair

Gregory J. King

#### Professors

Herring, Susan W. \* 1990; PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

King, Gregory J. \* 1996; DMD, 1969, Tufts University; MDS, 1976, Harvard University; bone remodeling, bone cells, mineral metabolism, bone paracrine/endocrine mechanisms.

Little, Robert M. \* 1974; DDS, 1966, Northwestern University; MSD, 1970, PhD, 1974, University of Washington; orthodontics.

Moffett, Benjamin C. \* 1964, (Emeritus); PhD, 1952, New York University; anatomy.

Moore, Alton W. 1980, (Emeritus); DDS, 1941, University of California (San Francisco); MS, 1948, University of Illinois; orthodontics.

Newell, Laura L. \* 1957, (Adjunct); PhD, 1967, University of Washington; primatology growth and development, human biology, evolutionary aspects of dermatoglyphics.

#### Associate Professors

Bollen, Anne-Marie 1990; DDS, 1984, University of Brussels (Belgium); MSD, 1986, PhD, 1990, University of Michigan; orthopaedics.

Joondeph, Donald R. \* 1971; DDS, 1967, MS, 1969, Northwestern University; orthodontics.

Ramsay, Douglas S. \* 1983; DMD, 1983, University of Pennsylvania; PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

#### Assistant Professor

Ma, Tsun \* 1988, (Adjunct); DMD, 1978, Washington University; MS, 1985, University of Michigan; MDS, 1995, University of Pittsburgh; maxillofacial prosthetics.

## Course Descriptions

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For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**ORTHO 449 Directed Studies in Orthodontics (\*)** See DPHS 449 for course description and prerequisite. Credit/no credit only. Offered: AWSpS.

**ORTHO 520 P-Craniofacial Growth and Development in Orthodontic Diagnosis and Treatment (4)** Basic principles of pre- and postnatal growth and development integrated with the recognition, analysis, and treatment planning of problems encountered in dental and skeletal malocclusions. Offered: Sp.

**ORTHO 522 P-Beginning Adjunctive Orthodontics (2)** Lecture/laboratory instruction in indications for, and techniques of, simple orthodontic tipping, rotational and extrusive movements, as well as orthodontic study model fabrication. Prerequisite: ORTHO 520. Offered: S.

**ORTHO 550 P-Directed Studies in Orthodontics (\* max. 6)** See DPHS 449 for course description and prerequisite. Offered: AWSpS.

**ORTHO 551 Review of Selected Literature in Orthodontics (1)** Students select a topic for review, review appropriate literature, and prepare written critique. Offered: AWSp.

**ORTHO 552 Journal Club (1)** Predoctoral students join graduate students in review of current orthodontic literature. Offered: AWSp.

**ORTHO 560 Orthodontics Seminar (1-5, max. 25)** Methods of diagnosis, analysis, and treatment planning of malocclusion; analysis of methods and theoretical principles used in the treatment of malocclusion. The student presents a detailed case analysis and plan of treatment for each clinical patient supervised. Offered: AWSpS.

**ORTHO 562 Orthodontic Theory (2)** Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

**ORTHO 563 Orthodontic Theory (2)** Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

**ORTHO 564 Orthodontic Theory (2)** Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

**ORTHO 565 Orthodontic Theory (2)** Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

**ORTHO 566 Orthodontic Theory (2)** Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

**ORTHO 570 Roentgenographic Cephalometry (2)** Basic principles, history, and techniques of roentgenographic cephalometry. Offered: AS.

**ORTHO 575 Post-Retention Seminar (1, max. 2)** Each student is required to locate three or more former orthodontic patients who qualify as at least ten years postretention. Complete orthodontic records must be obtained, analyzed, and discussed in the seminar. Instructor critiques the presentation and offers similar or contrasting cases for comparison. Offered: WSp.

**ORTHO 580 Orofacial Biology (\* max. 8)** Three-quarter sequence pertaining to craniofacial anatomy, development, and function. Summer quarter is combined lecture/laboratory on clinical and functional

anatomy and may be taken separately. Autumn and winter quarters are lecture/seminars on development, growth, and function. Outside reading assignments by the students are discussed and critiqued during sessions. Offered: AWS.

**ORTHO 582 Adult Orthodontics Seminar (2)** Seminar for orthodontic, periodontic, and restorative dentistry graduate students in comprehensive, integrated diagnosis and treatment planning of the dental problems of the adult patient. Offered: AWSpS.

**ORTHO 585 Surgical Orthodontic Diagnosis and Treatment Planning (3)** Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, and treatment planning for patients with major facial deformities. Offered: AWSpS.

**ORTHO 584 Clinical Management of Cleft Lip and Palate and Craniofacial Anomalies (2)** Management of these complex patients involves members of a dedicated, highly specialized multidisciplinary team. Insight gained into specific evaluation and treatment modalities of each discipline through lectures, seminars, assigned readings. Integrated approach to management is illustrated by attendance at craniofacial staffing and clinics. Prerequisite: graduate students in orthodontics. Offered: AW.

**ORTHO 587- Management of Debilitated Dentitions (1-, max. 2)** Integrated diagnosis and treatment planning for patients with edentulous spaces, emphasizing use of osseointegrated implants. Offered: AW.

**ORTHO 589 Applied Psychology in Orthodontics and Pediatric Dentistry (1)** Application of psychological theories, research, and intervention strategies to orthodontics and pediatric dentistry. Topics include the principles of behavior change, patient compliance with therapeutic regimens, and motivations for orthodontic treatment. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: A.

**ORTHO 590 Scientific Methodology in Dental Research (2)** Review of the scientific method. Evaluation of dental literature. Discussion of proposed master's degree research projects. Formulation and discussion of hypothetical research projects related to orthodontics. Offered: W.

**ORTHO 597 Preclinical Technique (1)** Techniques of construction and manipulation of the edgewise arch mechanism. Offered: AWS

**ORTHO 598 Archwire Formation (1)** Principles of wire bending and the use of orthodontic pliers. Offered: AS

**ORTHO 599 Biomechanics (1)** Principles of biologic reactions to application of orthodontic forces. Credit/no credit only. Offered: S.

**ORTHO 600 Independent Study or Research (\*)** Managing the experimental protocol. Data collection and analysis. Preparation and writing of a thesis or publishable manuscript. Prerequisite: permission of instructor. Offered: SpS.

**ORTHO 630- P-Orthodontic Clinic (1-, max. 6)** Direct clinical application of principles of orthodontic diagnosis and treatment planning for simple orthodontic appliances to modify tooth position in preparation for definitive restorative and/or periodontal therapy. Prerequisite: ORTHO 522. Offered: ASpS.

**ORTHO 660 P-Clinical Orthodontics (1-6, max. 24)** Clinical application of the techniques in the treatment of malocclusion. Offered: AWSpS.

**ORTHO 682 Adult Orthodontics Clinic (1)** Clinic for orthodontic graduate students in the treatment of the dental problems of the adult patient. Offered: AWSpS.

## Pediatric Dentistry

### Faculty

#### Chair

Peter K. Domoto

#### Professors

Domoto, Peter K. \* 1973; DDS, 1964, University of California (San Francisco); MPH, 1975, University of Washington; pediatric dentistry, dental behavioral science.

Weinstein, Philip \* 1972, (Adjunct); PhD, 1971, University of Kentucky; dental behavioral science; dental fear and pain in children, adults, and early childhood cases.

#### Associate Professors

Davis, John M. \* 1967; DDS, 1961, MSD, 1967, University of Washington; pediatric dentistry.

Leggott, Penelope J. \* 1993; BDentS, 1969, University of Bristol (UK); MSc, 1980, University of Illinois; pediatric dentistry.

Peterson, Devereaux \* 1982; DMD, 1975, MSD, 1977, PhD, 1980, University of Pittsburgh; computer-based instructional programs.

Ramsay, Douglas S. \* 1983; DMD, 1983, University of Pennsylvania; PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

#### Assistant Professor

Coldwell, Susan E. \* 1994, (Adjunct); MA, 1990, PhD, 1994, University of Pennsylvania; pain, anxiety, and taste preference.

#### Lecturer

Williams, Bryan J. 1991; DDS, 1974, Western Ontario University (Canada); MSD, 1979, University of Washington; pediatric dentistry, orthodontics.

## Course Descriptions

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**PEDO 520 P-Pediatric Dentistry (4)** Introduction to clinical pediatric dentistry, including behavior management, oral diagnosis, preventive dentistry, dental anomalies, radiography, anesthesia, restorative procedures, pulpal therapy, interceptive orthodontics, and traumatic dental injuries of the child patient. Offered: S.

**PEDO 523 P-Communication Skills I (1)** Introductory communication skills with emphasis on interviewing, presented in seminar format. Credit/no credit only. Offered: A.

**PEDO 524 P-Communication Skills II (1)** Continuation of basic communication skills. Credit/no credit only. Offered: A.

**PEDO 525 P-Management of Pediatric Patient Behavior (1)** Introduction to selected theories of child development and application in dental setting; pediatric cognitive, affective, and social development and introduction to problematic child behaviors; use of

social systems approach to overview child psychosocial development for the dentist. Credit/no credit only. Offered: W.

**PEDO 550 P-Directed Studies in Pediatric Dentistry (\* max. 6)** See DPHS 449 for course description and prerequisite. Offered: S.

**PEDO 560 Fundamentals of Pediatric Dentistry (1)** Preclinical laboratory, lecture course covering fundamentals of primary care in pediatric dentistry, including behavior management, dental emergencies, prevention, diagnosis and treatment planning, and infection control. Offered: S.

**PEDO 570 Pediatric Dentistry Seminar I (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

**PEDO 571 Pediatric Dentistry Seminar II (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

**PEDO 572 Pediatric Dentistry Seminar III (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: W.

**PEDO 573 Pediatric Dentistry Seminar IV (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

**PEDO 574 Pediatric Dentistry Seminar V (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

**PEDO 575 Pediatric Dentistry Seminar VI (2)** Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

**PEDO 576 Pediatric Dentistry Seminar VII (2)**

Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: W.

**PEDO 577 Pediatric Dentistry Seminar VIII (2)**

Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

**PEDO 580 Developmental Disabilities Seminar (1)**

Multidisciplinary approach to managing children with developmental disabilities. Offered: S.

**PEDO 581 Developmental Disabilities Seminar (1)**

Multidisciplinary approach to managing children with developmental disabilities. Offered: A.

**PEDO 582 Developmental Disabilities Seminar (1)**

Multidisciplinary approach to managing children with developmental disabilities. Offered: W.

**PEDO 583 Developmental Disabilities Seminar (1)**

Multidisciplinary approach to managing children with developmental disabilities. Offered: Sp.

**PEDO 600 Independent Study or Research (\*)**

Prerequisite: permission of instructor. Offered: AW.

**PEDO 630- P-Clinical Pediatric Dentistry (1-, max. 7)**

Educational experiences in comprehensive clinical pediatric dentistry. Students register third and fourth years for 24 sessions in the pediatric dentistry clinic, a 3-day rotation at a community clinic, computer assisted clinical simulations, behavioral change projects, and a written analysis of videotaped patient/student clinic encounters. Offered: AWSpS.

**PEDO 650 P-Pediatric Dentistry Extramurals (1-6, max. 6)**

Clinical extramurals in the field of children's dentistry. Prerequisite: permission of instructor. Offered: AWSpS.

**PEDO 660 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

**PEDO 661 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: A.

**PEDO 662 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: W.

**PEDO 663 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

**PEDO 664 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

**PEDO 667 P-Clinical Pediatric Dentistry (1-3, max. 3)**

Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

**PEDO 669 Supervised Clinical Teaching (1-3, max. 4)**

Graduate pediatric dental students provide clinical instruction for predoctoral dental students by supervising clinical sessions. Offered: AWSpS.

**PEDO 670 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: S.

**PEDO 671 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

**PEDO 672 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

**PEDO 673 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

**PEDO 675 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

**PEDO 676 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

**PEDO 677 Hospital Pediatric Dentistry (1-3, max. 3)**

Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

**PEDO 679 Care of the Disabled Pediatric Patient (1)**

Clinical experiences in the management of disabled patients. Offered: S.

**PEDO 680 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: S.

**PEDO 681 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: A.

**PEDO 682 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: W.

**PEDO 683 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: Sp.

**PEDO 685 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: A.

**PEDO 686 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: W.

**PEDO 687 Pediatric Dentistry under General Anesthesia (1-4, max. 4)**

Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: Sp.

**PEDO 691 Craniofacial Anomalies Clinic (1-4, max. 4)**

Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: W.

**PEDO 693 Craniofacial Anomalies Clinic (1-4, max. 4)**

Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: S.

**PEDO 694 Craniofacial Anomalies Clinic (1-4, max. 4)**

Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: A.

**PEDO 695 Craniofacial Anomalies Clinic (1-4, max. 4)**

Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: W.

**PEDO 699 Pediatric Orthodontic Clinic (1-4, max. 4)**

Clinical orthodontic care for pediatric patients. Offered: AWSpS.

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## Periodontics

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### Faculty

#### Chair

Murray Robinovitch

#### Professors

Ammons, William F. \* 1970, (Emeritus); DDS, 1959, University of Texas (Houston); MSD, 1970, University of Washington; periodontics.

Dale-Crunk, Beverly A. \* 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry.

Johnson, Robert H. \* 1981; DDS, 1962, McGill University (Canada); MSD, 1964, Indiana University; periodontics and oral medicine.

Lukehart, Sheila A. \* 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); infectious diseases.

Page, Roy C. \* 1967; DDS, 1957, University of Maryland; PhD, 1967, University of Washington; connective-tissue pathology, chronic inflammation, immunopathology, periodontal disease.

Persson, Gosta Rutger \* 1985; DDS, 1967, PhD, 1978, University of Lund (Sweden); diagnosis of periodontal diseases and the consecutive process of clinical decision making.

Robertson, Paul B. \* 1992; DDS, 1966, MS, 1972, University of Alabama; host-bacterial interactions in the etiology and pathogenesis of the periodontal diseases.

Robinovitch, Murray \* 1966; DDS, 1961, University of Minnesota; PhD, 1967, University of Washington; salivary biochemistry, salivary anti-HIV factors.

#### Associate Professors

Bordin, Sandra \* 1981, (Research); PhD, 1966, University of Ferrara (Italy); regulation of connective tissue repair by immune-inflammatory complement components.

Darveau, Richard P. \* 1989, (Research); PhD, 1981, Washington State University; bacterial interactions with the innate host defense system.

O'Neal, Robert B. \* 1995; DMD, 1971, University of South Carolina; MEd, 1971, Wayne State University; periodontics.

## Assistant Professor

Roberts, Frank A. 1996; DDS, 1990, University of Tennessee; PhD, 1996, University of Alabama; immunological and biochemical regulatory mechanisms of inflammatory periodontal disease progression.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**PERIO 449 Directed Studies in Periodontics (\*)** See DPHS 449 for course description and prerequisite.

**PERIO 525- P-Prevention/Periodontics (2-)** Overview of preventive dentistry, introduction to periodontal therapy. Offered: W.

**PERIO -526 P-Prevention/Periodontics (-2)** Overview of preventive dentistry, introduction to periodontal therapy. Offered: Sp.

**PERIO 527 P-Introduction to Periodontics (1)** Epidemiology, natural history, etiology, and histopathology of various periodontal diseases. Offered: S.

**PERIO 530 P-Principles of Periodontics (2)** Diagnosis of periodontal diseases and development of a treatment plan including maintenance program, rationale for non-surgical, surgical, and antibacterial management of periodontal diseases. Discussion of principles of various periodontal procedures. Prerequisite: PERIO 525-526 and PERIO 527. Offered: A.

**PERIO 531 P-Principles of Periodontics (2)** Diagnosis of periodontal diseases and development of a treatment plan including maintenance program, rationale for non-surgical, surgical, and antibacterial management of periodontal diseases. Discussion of principles of various periodontal procedures. Prerequisite: PERIO 525-526 and PERIO 527. Offered: W.

**PERIO 542 Advanced Periodontics (1)** Designed to improve the understanding of sequencing of patient care and providing periodontal therapy into the perspective of a comprehensive care system. Offered: Sp.

**PERIO 550 P-Directed Studies in Periodontics (\* max. 6)** See DPHS 449 for course description and prerequisite.

**PERIO 561- Periodontal Case Management (2-, max. 8)** Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics. Offered: AWSp.

**PERIO 566 Practice Management (1)** Aspects of setting up and administering a private periodontal practice. Financing, insurance, office design, equipment, employees, professional forms, marketing strategies, and patient management. Prerequisite: PERIO 561. Offered: S.

**PERIO 567 Oral Medicine Case Studies (1, max. 3)** Weekly seminar discussing series of unknown oral and perioral conditions. Discussion of history taking, differential diagnoses, relevant tests, therapeutic approaches, and outcomes. Offered: AWSp.

**PERIO 574 Periodontal Microbiology (2)** Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. Offered: jointly with ORALB 569; A.

## PERIO 575 Immunologic Aspects of Oral Diseases

(2) Lecture course designed to acquaint students with basic concepts of immunology and immunopathology. Topics include cellular immunology, antibody structure and function, complement system, immunopathologic mechanisms, tumor immunology and immunologic manifestations in mucocutaneous oral lesions as well as immunology of caries and periodontal disease. Offered: W.

**PERIO 576 The Molecular and Cellular Biology of the Periodontium (2)** Nucleic acid, protein, and carbohydrate biochemistry reviewed. Roles of collagens and proteoglycans in gingival tissues and the organization of oral epithelia discussed. Structures of human and animal periodontal lesions compared. Cellular and molecular inflammatory and immunological mechanisms in periodontal disease discussed. History, classification, and epidemiology of periodontal diseases described. Offered: Sp.

**PERIO 577 Review of Literature (2, max. 16)** Concise review of the scientific periodontal literature with specific focus on studies of periodontal diagnosis, wound healing, periodontal regeneration, microbiology, and implant procedures. Offered: AWSpS.

**PERIO 582- Periodontic Treatment Planning Seminar (1-, max. 12)** Weekly seminar involved with the presentation, discussion, and tentative solution of moderate to complex problems in diagnosis and treatment. Offered: AWSpS.

**PERIO 585- Periodontal Therapy Seminar (1-, max. 12)** Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease. Offered: AWSpS.

**PERIO 586- Longitudinal Evaluation of Periodontal Therapy (1-, max. 9)** Close examination of case progress from initial therapy to most recent maintenance visits to determine efficacy of method, demands upon patient, and temporal effect of therapy and survival. Preparation and delivery of a lecture on a therapeutic modality. Offered: AWSp.

**PERIO 592- Prescription Surgery (1-)** Clinical course in periodontal surgery in which surgical procedures are performed on prescription basis for patients undergoing therapy in the undergraduate dental clinic. Exposes student to a wider spectrum of patients and to stimulate an environment in which the student can encounter the problems in communication and patient management that occur in the private sector.

**PERIO 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program adviser.

**PERIO 620 P-Introduction to Clinical Periodontics (1)** Clinical periodontics, with emphasis on examination and assessment.

**PERIO 630- P-Periodontics (1-)** Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 527. Offered: A.

**PERIO -631- P-Periodontics (-1-)** Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 527. Offered: W.

**PERIO -632 P-Periodontics (-1)** Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 527. Offered: Sp.

## PERIO 640- P-Advanced Clinical Periodontics

(1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: A.

**PERIO -641- P-Advanced Clinical Periodontics (-1-)** Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: W.

**PERIO -642 P-Advanced Clinical Periodontics (-1)** Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: Sp.

**PERIO 659 P-Periodontics Extended Learning (\* max. 4)** Supplemental work in periodontics to correct an area of student deficiency. Credit/no credit only.

**PERIO 660- Clinical Periodontics ([2-6]-, max. 60)** Clinical experience in diagnosis and treatment of periodontal disease.

**PERIO 663 Pre-Prosthodontics Clinical Periodontics (\*)** Clinical diagnosis and treatment of periodontal disease for nonperiodontics student. Prerequisite: permission of department chairperson.

**PERIO 665 Clinical Practice Teaching (\*)** Supervised experience in teaching clinical periodontics to undergraduate dental students.

**PERIO 685 Hospital Periodontics (1)** Preparation in periodontics to practice in hospital situations, including experience in operation of nitrous oxide analgesia, general anesthesia, intravenous premedication, treating of out- and inpatients.

## Prosthodontics

### Faculty

#### Chair

L. Brian Toolson

#### Professors

Bolender, Charles L. \* 1959; DDS, 1956, MS, 1957, University of Iowa; removable prosthodontics.

Brudvik, James S. \* 1979, (Emeritus); DDS, 1957, University of Minnesota; removable prosthodontics.

Frank, Richard P. \* 1971; DDS, 1962, University of Iowa; MSD, 1968, University of Washington; removable prosthodontics.

Smith, Dale E. \* 1972, (Emeritus); DDS, 1952, University of Pittsburgh; MSD, 1962, University of Washington; removable prosthodontics.

#### Associate Professors

Faine, Mary P. 1982; MS, 1975, University of Washington; nutrition.

Rubenstein, Jeffrey E. \* 1989; DMD, 1975, Tufts University; MS, 1980, University of Texas (Houston); maxillofacial and implant prosthodontics.

Toolson, L. Brian \* 1970; DDS, 1967, MSD, 1977, University of Washington; removable prosthodontics.

#### Assistant Professor

Ma, Tsun \* 1988; DMD, 1978, Washington University; MS, 1985, University of Michigan; MDS, 1995, University of Pittsburgh; maxillofacial prosthetics.

#### Lecturer

Phillips, Sandra L. 1988; MPA, 1985, University of Washington.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**PROS 510 P-Introduction to Dental Nutrition (3)** Basic principles of normal human nutrition, including nutrient requirements at various ages, assessment of nutritional status, nutritive values of foods, with special emphasis on the role of diet in development and maintenance of oral tissues. Offered: S.

**PROS 520 P-Introduction to Complete Dentures-Lecture (3)** Didactic course in the treatment of completely edentulous patients. Instruction is provided in diagnostic procedures, complete denture construction, and maintenance care. Offered: A.

**PROS 521 P-Management of Immediate Denture Patients (1)** Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture). Offered: S.

**PROS 523 P-Removable Partial Denture Design (2)** Lectures in the basic principles of removable partial denture design. Practical drawings and more advanced designs are discussed in seminars. Certain technical aspects of design procedures are done in the classroom. Offered: W.

**PROS 525 P-Removable Partial Denture Clinical Preparatory Course (4)** Lecture-laboratory course dealing with those procedures the dentist must perform in order to fabricate a physiologically acceptable removable partial denture. The student gains experience via clinically simulated laboratory exercises prior to beginning prosthodontic treatment of a partially edentulous patient. Offered: S.

**PROS 542 P-Special Topics in Prosthodontics (1)** Lecture describing and illustrating the following topics: implant procedure, management of difficult patients, maxillofacial prosthesis, quality-control problems in private practice, and other special topics. Offered: W.

**PROS 560 Complete and Immediate Dentures (2)** Lecture/seminar devoted to the diagnosis and treatment of the completely edentulous patient and the immediate denture patient, with emphasis on management of patients with difficulties in treatment. Offered: A.

**PROS 562 Removable Partial Dentures (2)** Lecture/seminar concentrating on factors peculiar to fabrication of removable partial dentures, with emphasis on management of combined fixed and removable therapy. Offered: W.

**PROS 563 Maxillofacial Prosthetics I (1)** Introductory lecture/seminar series with emphasis on diagnosis and prosthodontic rehabilitative treatment of patients who have experienced trauma or have congenital or acquired defects in the oral region. Offered: S.

**PROS 564 Maxillofacial Prosthetics II (1)** Introductory lecture series focusing on the prosthodontic rehabilitation of patients with loss and compromise of

facial anatomy, i.e., ocular, orbital, nasal, auricular, combination intraoral/extraoral, and other related facial deformities.

**PROS 571 Review of Literature Seminar (1, max. 12)** Continuous weekly seminar devoted to the review of prosthodontic and related literature.

**PROS 572 Special Topics Related to Prosthodontics (1)** Lecture-seminar series focusing on relating principles of basic science to clinical application in prosthodontics. A wide and varied range of topics including surgery, psychology, speech, pharmacology, practice management, physiology, temporomandibular/myofascial joint dysfunction.

**PROS 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program adviser.

**PROS 620- P-Clinical Complete Dentures (1/3, max. 3)** Basic principles of complete denture fabrication and of diagnosis and treatment of completely edentulous patient. In second quarter student completes denture patient care, provides follow-up treatment, and participates in four competency examinations. Offered: AW.

**PROS 630- P-Clinical Prosthodontics (1-, max. 3)** Clinical course involving the diagnosis and management of completely and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. Follow-up care provided for patients previously treated.

**PROS 640- P-Clinical Prosthodontic Maintenance (1-, max. 3)** Clinic involving additional patient treatment with complete, partial, or intermediate dentures, plus indirect relines, managing adjustment chair, peer review, recall clinic, and follow-up care for patients previously treated. Offered: AWSp.

**PROS 650 P-Extramurals in Prosthodontics (\* max. 12)** Elective clinical experiences or clinical practice teaching. Credit/no credit only. Prerequisite: permission of instructor.

**PROS 660 Clinical Prosthodontics (2, max. 6)** Practical application of material covered in 560 and 562.

**PROS 665- Clinical Practice Teaching (1-, max. 4)** Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

## Restorative Dentistry

### Faculty

#### Chair

Bruce R. Rothwell

#### Professors

Canfield, Robert C. \* 1967, (Emeritus); DDS, 1951, University of Washington; restorative dentistry.

Hamilton, A. Ian \* 1968, (Emeritus); DDS, 1936, University of Toronto (Canada); MA, 1958, University of Washington; PhD, 1968, University of London (UK); restorative dentistry.

Hodson, Jean Turnbaugh \* 1952, (Emeritus); MS, 1958, University of Washington; restorative dentistry.

Johnson, Glen H. \* 1980; DDS, 1978, University of Washington; MS, 1983, University of Michigan; instruction, clinical trials and laboratory research with dental bio-materials.

Morrison, Kenneth N. \* 1948, (Emeritus); DDS, 1943, University of Toronto (Canada); MSD, 1952, University of Washington; restorative dentistry.

Nicholls, Jack I. \* 1965; PhD, 1965, Purdue University; dental materials.

Warnick, Myron E. \* 1956; DDS, 1955, University of Alberta (Canada); restorative dentistry, fixed prosthodontics.

Weaver, James D. 1970, (Clinical Emeritus); DDS, 1965, Ohio State University; restorative dentistry, implants.

Yuodelis, Ralph A. \* 1963, (Emeritus); DDS, 1955, University of Alberta (Canada); MSD, 1964, University of Washington; restorative dentistry, prosthodontics, periodontics, implants.

#### Associate Professors

Bales, David J. 1983; DDS, 1957, University of Washington; MSD, 1972, Indiana University; restorative dentistry.

Chasteen, Joseph E. 1989, (Adjunct); DDS, 1967, MA, 1976, University of Michigan; dental informatics and multi-media instructional programs.

Johnson, Barton S. \* 1991; DDS, 1985, MS, 1989, University of California (Los Angeles); hospital dentistry, medical compromise, oncology, sedation, pharmacology, molecular biology.

Lepe, Xavier \* 1993; DDS, 1980, University of Guadalajara (Mexico); MS, 1987, Loyola University (Chicago); restorative dentistry, dental materials.

Ostlund, Lyle E. 1972, (Emeritus); DMD, 1947, University of Oregon; PhD, 1993, Johns Hopkins University; restorative dentistry.

Powell, Laurri Virginia 1986; DMD, 1982, University of Mississippi; restorative dentistry.

Rothwell, Bruce R. 1980; DMD, 1973, University of Oregon; MSD, 1977, University of Washington; general dentistry, hospital-based dentistry, forensic dentistry.

#### Assistant Professors

Aw, Tar C. 1995; DDS, 1990, Northwestern University; MS, 1995, University of Michigan; restorative dentistry, operative dentistry, dental materials, computers.

Libman, Warren J. 1990, (Affiliate); DDS, 1986, McGill University (Canada); MSD, 1990, University of Washington; restorative dentistry, fixed prosthodontics.

Ma, Tsun \* 1988, (Adjunct); DMD, 1978, Washington University; MS, 1985, University of Michigan; MDS, 1995, University of Pittsburgh; maxillofacial prosthetics.

Morgan, John P. 1997, (Clinical); DDS, 1997, State University of New York (Buffalo); restorative dentistry, hospital-based dentistry.

Schwedhelm, E. Ricardo 1994, (Clinical); DDS, 1978, Universidad Tecnológica de Mexico (Mexico); MSD, 1996, Indiana University; fixed prosthodontics, restorative dentistry, implants, removable prosthodontics.

Verhoef, Douglas R. 1998, (Clinical); DDS, 1973, University of Washington; fixed prosthodontics, restorative dentistry.

#### Senior Lecturer

McCoy, Richard B. 1992; DDS, 1961, University of Washington; MS, 1973, Loma Linda University; restorative dentistry.

#### Lecturers

Anderson, J. Martin 1966; DDS, 1965, University of Washington; restorative dentistry, gold foil, operative dentistry.

Stoddard, James W. 1965; DDS, 1961, University of Washington; restorative dentistry, operative dentistry.

Strand, Harvey A. 1967, (Emeritus); DDS, 1957, University of Washington; restorative dentistry.

Townsend, John D. 1977; DDS, 1967, McGill University (Canada); MSD, 1973, University of Washington; restorative dentistry, fixed prosthodontics, periodontics.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**RES D 449 Directed Studies in Restorative Dentistry (\*)** See DPHS 449 for course description and prerequisite. Offered: AWSpS.

**RES D 510- P-Dental Materials Science ([1/2]-, max. 3)** Basic concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Clinical use of restorative dental materials also presented. Offered: WSp.

**RES D 511 P-Applied Dental Materials (3)** Lecture/laboratory emphasizing proper use of restorative dental through simulated clinical projects. Student self-evaluation also emphasized. Offered: Sp.

**RES D 515 P-Dental Anatomy (3)** Lecture and laboratory on the morphology and nomenclature of individual teeth of the adult human dentition. Introduction to tooth histology and function and the influence of tooth anatomy on clinical dental procedures. Offered: A.

**RES D 516 P-Introduction to Occlusion (3)** Lecture/laboratory in the functional determinants of occlusal morphology. Preparation and waxing techniques for developing opposing quadrants by the additive waxing technique. Offered: W.

**RES D 517 P-Functional Analysis of Occlusion (3)** Clinical and laboratory experiences in examination and charting of patient's occlusion, record-taking for analysis of occlusion on a dental articulator, and preclinical diagnostic correction of problems of occlusion on articulated clinical casts. Provides basic background or technique information relative to laboratory and clinical experiences. Offered: Sp.

**RES D 519 P-Operative Dentistry (1)** Lecture series introducing operative dentistry. Nomenclature, cavity classification, instrumentation, pulp protection, and principles of cavity preparation. Offered: Sp.

**RES D 520 P-Introduction to Operative Dentistry Technique (3)** Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for one-surface restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: A.

**RES D 521 P-Introduction to Operative Dentistry Technique (3)** Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for multiple-surface direct filling restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: W.

**RES D 522 P-Introduction to Operative Dentistry Technique (3)** Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for proper coverage cast gold and foundation buildup restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: Sp.

**RES D 525 P-Fixed Prosthodontics (3)** Serves as introduction to area of restorative dentistry dealing with indirect partial restorations and complete coverage restorations. Preclinical experience provided in tooth preparation, provisional restoration, and fabrication for various crown designs. Projects emphasize the various designs of single-tooth preparation/restoration. Offered: A.

**RES D 526 P-Fixed Prosthodontics (3)** Serves as introduction to area of fixed prosthodontics dealing with multiple-unit restorations. Preclinical experience provided with multiple tooth preparations and provisional restoration. Fabrication for various crown designs, singly and in conjunction with various pontic and connector types, to serve as fixed partial denture prostheses. Projects emphasize multiple-tooth preparation/restoration and implant-supported restorations. Offered: W.

**RES D 527 P-Fixed Prosthodontics (3)** Serves as introduction to area of fixed prosthodontics dealing with esthetic veneer indirect restorations. Preclinical experience provided in tooth preparation and restoration, fabrication for various esthetic veneer crown designs, singly and in conjunction with various pontic types to serve as fixed partial denture prostheses. Projects emphasize anterior single- and multiple-tooth preparation/restoration, provisional prosthesis, and esthetic veneer restorations. Offered: Sp.

**RES D 530 P-Restorative Dentistry (2)** Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Offered: A.

**RES D 531 P-Restorative Dentistry (2)** Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Offered: W.

**RES D 532 P-Restorative Dentistry (2)** Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Offered: Sp.

**RES D 540 P-Advanced Restorative Dentistry (2)** Broadens base of restorative procedures. Introduction of new techniques and preparation for state board examination. Offered: A.

**RES D 541 P-Advanced Restorative Dentistry (2)** Broadens base of restorative procedures. Introduction of new techniques and preparation for state board examination. Offered: W.

**RES D 542 P-New Developments in Dental Materials (1)** Dental materials recently introduced to dental profession reviewed, compared to current materials, and clinically demonstrated. Offered: Sp.

**RES D 550 P-Directed Studies in Restorative Dentistry (\* max. 6)** See DPHS 449 for course description and prerequisite. Offered: AWSpS.

**RES D 570 Review of Literature Seminar (1, max. 6)** Continuous weekly seminar devoted to a review of restorative and related literature, and discussion of teaching methods, philosophy of teaching and treatment. Offered: AWSpS.

**RES D 580- Restorative Treatment Planning Seminar (1-, max. 8)** Continuous weekly seminar to discuss controversial treatment problems and difficult diagnostic cases selected for graduate students. Offered: AWSp.

**RES D 581- Comprehensive Treatment Planning (2-, max. 4)** Seminar devoted to the diagnosis and treatment of comprehensive dental cases with special emphasis given to the relationship of periodontics to restorative dentistry. Offered: Sp.

**RES D 585 Advanced Dental Materials Science (2)** Advanced concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Emphasis also on research design, testing methods, and proper selection of dental materials for clinical practice. Offered: W.

**RES D 588 Masticatory Functional Analysis and Occlusal Adjustment (2)** Lecture/seminar and clinical sessions in the study of the physiology of occlusion. Pertinent literature reviewed and discussed from the multidisciplinary viewpoint. The clinical sessions include training in masticatory functional analysis and treatment of occlusally related diseases. Offered: A.

**RES D 589 Review of Literature in Occlusion (2)** Seminar to review pertinent literature in occlusion. Offered: S.

**RES D 590- Fundamentals of Fixed Prosthodontics (2-, max. 4)** Lecture/laboratory/clinical sessions in the study of gnathological principles and procedures as they pertain to the treatment of comprehensive cases assigned to the students. Use and application of several fully adjustable articulators. Offered: AW.

**RES D 600 Independent Study or Research (\*)** Prerequisite: permission of graduate program adviser. Offered: AWSpS.

**RES D 620 P-Introduction to Clinical Restorative Dentistry (1)** Orientation to restorative clinical operations, administrative procedures associated with patient management and completion of initial treatment plans. Emphasizes problem-based learning, treatment outcomes, the sequence of clinical treatment, and the diagnosis and management of caries-susceptible patients. Offered: S.

**RES D 630- P-Clinical Restorative Dentistry ([1-3]-, max. 9)** Clinical training in fundamental restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

**RES D 640- P-Advanced Clinical Restorative Dentistry ([1-3]-, max. 12)** Clinical training in restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

**RES D 650 Restorative Dentistry Clinical Elective (1-6, max. 12)** Elective offering in clinical areas related to discipline. Offered: AWSpS.

**RES D 659 P-Restorative Dentistry Extended Learning (\* max. 4)** Supplemental work in restorative dentistry to correct an area of student deficiency. Credit/no credit only. Offered: S.

**RES D 660- Oral Rehabilitation ([2-6]-, max. 32)** Clinical course to provide experience in diagnosis and treatment of patients requiring restorative procedures from single restorations to complex oral rehabilitative methods. Special emphasis is directed toward the integration of periodontics and occlusion as they relate to restorative dentistry. Offered: AWSpS.

# College of Education

## Dean

Allen D. Glenn  
222 Miller

## Associate Deans

Sheila Lowenbraun  
Richard S. Neel



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/College\\_Education.html](http://www.washington.edu/students/genocat/academic/College_Education.html)



College Web page:  
[www.educ.washington.edu/COE/](http://www.educ.washington.edu/COE/)

The College of Education is a graduate and professional school dedicated to the improvement of education through the research and study of important educational problems. The College has four broad curricular areas: Curriculum and Instruction, Educational Leadership and Policy Studies, Educational Psychology, and Special Education. Degrees conferred are M.Ed., Ph.D., Ed.D., and M.I.T. Certificates can be earned in teaching (elementary, secondary, and special education), school administration (principals, program administrators, and superintendents), school counseling, and school psychology.

The College is committed to the preparation of caring, knowledgeable, and reflective practitioners grounded in the best practices and dedicated to meeting the needs of all students.

## Special Offices and Services

The College of Education maintains a number of special offices to assist in the fulfillment of its goals. Among these are the Office of Teacher Education, the Office of Student Services, and the Office of Minority Recruitment and Retention. In addition, the College of Education maintains formal relationships with a number of school districts in the area to provide research and field experience opportunities for students in the various programs. Individuals interested in teacher certification or in graduate degree programs should contact the Office of Student Services, 206 Miller.

## Professional Certification

The College of Education is authorized by the State Board of Education to offer professional certificate programs in education for administrators, educational staff associates, and teachers. Academic counselors are available to help with pre-program counseling, long-range planning, applications, registration, referrals to other campus resources, general program advising, and continuing/professional certificate requirements.

## Administrator Certificates

Administrator Certificate preparation programs for superintendents, principals, and program administrators are offered in the College of Education. Information concerning admission and requirements for these programs is available from the Area of Educational Leadership and Policy Studies, M209 Miller.

## Educational Staff Associate Certificates

Educational Staff Associate Certificate preparation programs are offered for the school counselor, school psychologist, school speech language pathologist or audiologist (SLP), occupational therapist, and school social worker. Information concerning requirements and admission may be obtained as follows: school counselor and school psychologist—College of Education Office of Student Services, 206 Miller, or Area of Educational Psychology, 312 Miller, Box 353600, University of Washington, Seattle, Washington 98195-3600; school speech language pathologist or audiologist—Department of Speech and Hearing Sciences, 203 Eagleson, Box 354875, University of Washington, Seattle, Washington 98195-4875; occupational therapist—Department of Rehabilitation Medicine, CC902 University of Washington Medical Center, Box 356490, Seattle, Washington 98195-6490; school social worker—School of Social Work, Box 354900, University of Washington, Seattle, Washington 98195-4900.

## Teaching Certificates

The College of Education is authorized by the State Board of Education to prepare and recommend individuals for Initial/Residency and Continuing/Professional Teaching Certificates. The Teacher Education Program is accredited by the National Association of State Directors of Teacher Education and Certification. Graduates are qualified for certification in all states party to the Interstate Certification Compact and in other states as well.

## Residency Teaching Certification Program

The College of Education offers residency teaching certification for individuals desiring careers as elementary or middle/secondary school teachers, or as special education teachers working with students with severe disabilities or infants, toddlers, and preschool children with disabilities. Candidates may also select a teacher education/special education option which provides initial certification in elementary education with course work in special education. All programs are offered at the master's level. For additional information contact the Office of Student Services, 206 Miller.

An undergraduate or postbaccalaureate program leading to certification in music education, grades K-12, is offered through the School of Music. For additional information contact the School of Music Advising Office, 116 Music, Box 353450, University of Washington, Seattle, WA 98195-3450.

## Professional Teaching Certificates

For information on the OSPI guidelines and where programs exist, contact any Educational Service District or the Office of Professional Licensing and Certification, OSPI, Box 47200, Old Capitol Building, Olympia, Washington 98504. For information about Professional Teacher Certificate programs at the University, contact the Office of Teacher Education at (206) 543-1754.

## Endorsements on Teaching Certificates

Teachers holding an initial/residency or continuing/professional teaching certificate may add endorsements to their certificates which will qualify them to teach additional subjects. For information on endorsement requirements through the University of Washington, contact the Office of Teacher Education, 211 Miller, Seattle, WA 98195-3600.

## Graduate Degree Programs

Graduate Program Coordinator  
206 Miller, Box 353600  
(206) 543-7833  
[edinfo@u.washington.edu](mailto:edinfo@u.washington.edu)

The College of Education currently offers four advanced degrees: Master in Teaching, Master of Education, Doctor of Education, and Doctor of Philosophy. The M.I.T. degree will be awarded to elementary and secondary certification students at the completion of their program. Graduate students may specialize their degree studies in teacher preparation, curriculum and instruction, educational psychology including cognitive studies, educational leadership and policy studies, or special education. A focus on higher education leadership leading to Master of Education or Doctor of Education degrees is offered through the Evening Degree Program. Questions regarding graduate study in education should be directed to the Office of Student Services, 206 Miller, Box 353600, College of Education, University of Washington, Seattle, Washington 98195-3600.

## Master in Teaching

The Master in Teaching (M.I.T.) degree program results in a Washington residency teaching certificate for elementary or secondary (specific subjects) school teaching. The program is an integrated sequence of full-time, daytime course work and field experiences spanning five quarters. One quarter is devoted to full-time placement in a school. Field experiences are in schools in the Seattle/Puget Sound area chosen to provide a variety of situations in regard to level, school population, and location.

## Master of Education

The Master of Education (M.Ed.) degree requires a minimum of 45 credits, including at least 15 credits in a specialized area of study in education; 9 credits related to, but outside of, the specialization, some course work outside education; 9 thesis credits or, for the non-thesis option, 9 credits in a field study or other approved project; and a final examination.

## Doctor of Education

The Doctor of Education (Ed.D.) degree is designed to prepare professionals whose primary interest is to deal directly with problems of educational practice. The program of study leading to the Ed.D., as a professional degree, focuses on the utilization of research and practitioners' knowledge, rather than on the production of research knowledge. Those who aspire to positions as master teachers, curriculum designers, or learning resource specialists, for example, would appropriately seek the Doctor of Education degree.

This professional degree requires at least two years of resident study, a program of specialized study with credit in education and related fields, sufficient preparation in research methodology to interpret research findings for use in practice, an internship and leadership training, a General Examination, a dissertation on a problem of educational practice, and a Final Examination.

## Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) in education is a research degree. It offers preparation for a career of research on issues fundamental to education—issues that range from fairly narrow questions about human learning to macroquestions regarding the form of societies' educational institutions. The scope of the Ph.D. degree in education is broad. It is possible to pursue a degree organized around traditional study areas such as educational psychology, curriculum and instruction, special education, or educational leadership and policy making. A student may develop a course of study that integrates various elements of more than

one study area (e.g., multiethnic education and literacy). One of the study options in the Ph.D. program is school psychology, which prepares students for the professional practice of psychology with school-age children, as well as for research.

Degree requirements include a minimum of two years of resident study, a program of specialized study with credits both in education and in other academic units, preparation in research methodology adequate to design and assess research in the field of specialization, sufficient study in cognate fields inside and outside of education to ensure that the candidate can place the specialized research in a broader context, a General Examination, a research dissertation, and a Final Examination.

## Accreditation

The College of Education has the following formal accreditation: American Psychological Association (APA) and National Association of School Psychologists (NASP) for the Ph.D. programs in school psychology, Washington State Board of Education for Initial/Residency and Continuing/Professional teaching certificates and Initial/Residency certification for school psychology and school counseling, National Association of State Directors of Teacher Education and Certification, National Council for Accreditation of Teacher Education (pending), and University Council for Educational Administration (UCEA) for the administrator preparation programs. Graduates qualify for certification in all states party to the Interstate Certification Compact.

## Admission Requirements

Applicants to the Master of Education and Master in Teaching degree programs must hold a baccalaureate degree from an accredited institution. Admission decisions are based on the applicant's grade-point average, Graduate Record Examination general test scores, goal statement, and other prerequisites stipulated by the area of specialization within the College. Application deadlines vary by program.

Consideration for admission to either doctoral program requires a master's degree or equivalent preparation in a field appropriate to the area of specialization, usually a 3.50 GPA in the master's program, a sample of scholarly writing, goal statement, and other prerequisites stipulated by the individual program of study. Graduate Record Examination general test scores are required.

Although admission is competitive, admitted students have exhibited a wide range of performance on traditional criteria such as GPA and GRE scores. The College values diversity and encourages all interested persons to seek additional information and apply. For more information contact the Office of Student Services, 206 Miller, Box 353600.

## Financial Aid

The College of Education offers a limited number of awards with varying stipends for graduate students in education. Primary consideration is given to doctoral students with a background of successful teaching or administrative experience. Specific information on the various types of remunerative appointments for graduate students in education, amounts of stipends, and application procedures may be obtained from the College of Education, Office of Student Services, 206 Miller, Box 353600, Seattle, Washington 98195-3600. The annual application deadline is March 1.

## Special Research and Service Facilities

Within the College of Education opportunities exist for students to gain research and service experience.

**The Center for Multicultural Education** focuses on research projects and activities designed to improve practices related to equity issues, intergroup relations, and the achievement of students of color.

**The Clinical Training Laboratory**, operating under the aegis of Educational Psychology, offers observation rooms equipped with video recorders where trainees and clients can be observed and taped through one-way mirrors.

The world-renowned **Experimental Education Unit** offers an interdisciplinary approach to research, training, and service, providing integrated classes for 150-200 young children, toddlers, and infants with disabilities and their typically developing peers, and services for their families.

**The Multidisciplinary Learning Disabilities Center** conducts research on preventing and treating reading and writing disabilities and on the biological basis of learning disabilities. The center disseminates its findings to teachers through its Teacher Training Project.

**The National Center for the Study of Teaching and Policy**, a consortium of five universities headed by the University of Washington, conducts a wide range of studies aimed at local, state, and national policy strategies to promote teacher excellence.

**The Institute for the Study of Educational Policy** promotes interdisciplinary studies that bring together research and practice for the benefit of children and youth, educators, policy makers, and the larger community. The institute includes (a) **The Center for Educational Renewal**, which responds to a growing nationwide interest in the renewal of schools and teacher education by creating partnerships, promoting innovative programs and policies for the education of educators, and reforming leadership and governance structures; (b) **The Center for Effective Schools**, which is committed to engaging in research and service activities designed to promote instructionally effective schools through collaboration and self-evaluation; (c) **The Center for the Study and Teaching of At-Risk Students**, which was established to foster interprofessional projects to encourage students to stay in school; and (d) **The School Law Division**, which deals with the improvement of professional practices of school administrators, including superintendents, principals, and program directors. Additionally, the institute conducts policy research pursuant to grants and contracts with school districts, state and federal agencies, and other educational organizations.

## Faculty

### Professors

Abbott, Robert D. \* 1975; PhD, 1970, University of Washington; measurement, statistics and research design.

Affleck, James Q. \* 1967, (Emeritus); MA, 1963, San Francisco State; EdD, 1968, Columbia University; special education/inclusion.

Anderson, Robert A. \* 1965, (Emeritus); PhD, 1964, University of Minnesota; educational administration.

Banks, James A. \* 1969; MA, 1967, PhD, 1969, Michigan State University; social studies, multiethnic education.

Berninger, Virginia Wise \* 1986; PhD, 1981, Johns Hopkins University; educational psychology.

Billingsley, Felix F. \* 1977; PhD, 1974, University of Washington; special education (severely handicapped).

Bolton, Dale Leroy \* 1965, (Emeritus); PhD, 1958, University of Wisconsin; educational administration.

Boroughs, Homer Jr. 1946, (Emeritus); MA, 1947, PhD, 1949, University of Washington; history and philosophy of education.

Brammer, Lawrence M. \* 1963, (Emeritus); PhD, 1950, Stanford University; counseling, adult development.

Brown, Frances A. 1953, (Emeritus); MA, 1950, Columbia University; business education.

Burgess, Charles O. \* 1964, (Emeritus); PhD, 1962, University of Wisconsin; history of education.

Butterfield, Earl C. \* 1981, (Emeritus); PhD, 1963, George Peabody College; cognitive development, metacognition.

Dohner, Charles W. \* 1967; PhD, 1966, Ohio State University; program evaluation, administration, faculty development.

Doi, James I. \* 1979, (Emeritus); PhD, 1952, University of Chicago; finance and management of colleges and universities.

Driscoll, John P. \* 1967, (Emeritus); PhD, 1957, Pennsylvania State University; educational communications.

Edgar, Eugene Bayard \* 1972; PhD, 1972, George Peabody College; special education.

Evans, Ellis D. \* 1964, (Emeritus); EdD, 1964, Indiana University; human development and cognition.

Forster, Jerald R. \* 1966; PhD, 1966, University of Minnesota; counseling.

Foster, Clifford D. \* 1959, (Emeritus); PhD, 1957, University of Washington; curriculum and instruction.

Freehill, Maurice F. \* 1962, (Emeritus); EdD, 1948, Stanford University; school psychology/human development and cognition.

Gay, Geneva \* 1989; PhD, 1972, University of Texas (Austin); general curriculum theory, multicultural education, and educating African American students.

Gehrke, Nathalie J. \* 1979; PhD, 1976, Arizona State University; curriculum.

Glenn, Allen D. \* 1989; PhD, 1970, University of Michigan; teacher education, social studies education, and instructional computing.

Goodlad, John I. \* 1983, (Emeritus); PhD, 1949, University of Chicago; EdD, 1982, Eastern Michigan University; education reform, curriculum theory.

Haring, Norris Grover \* 1965, (Emeritus); EdD, 1956, Syracuse University; special education (early childhood).

Hill, Paul T. \* 1993, (Adjunct Research); PhD, 1972, Ohio State University; education policy and reform.

Hunkins, Francis Peter \* 1966; PhD, 1966, Kent State University; curriculum.

James, William H. 1979, (Research); PhD, 1989, University of Massachusetts; motivation, cross-cultural factors, and substance abuse issues.

Jarolimek, John \* 1962, (Emeritus); PhD, 1955, University of Minnesota; social studies.

Jenkins, Joseph R. \* 1978; PhD, 1967, University of Minnesota; special education (mildly handicapped).

Kaltsounis, Theodore \* 1967; PhD, 1961, University of Illinois; social studies.

Kerr, Donna H. \* 1973; PhD, 1973, Columbia University; philosophy and education.

Kerr, Stephen T. \* 1985; PhD, 1975, University of Washington; information technology and telecommunications.

Klockars, Alan J. \* 1963; PhD, 1967, University of Washington; measurement, statistics and research design.

Knapp, Michael S. \* 1990; PhD, 1981, Stanford University; public policy in education; policy research; sociology of education.

Lovitt, Thomas C. \* 1966, (Emeritus); EdD, 1966, University of Kansas; special education (mildly handicapped).

Lowenbraun, Sheila \* 1968; PhD, 1969, Columbia University; special education (hearing impaired).

- Madsen, David L. \* 1962, (Emeritus); PhD, 1961, University of Chicago; history of education.
- McCartin, Rosemarie E. \* 1969, (Emeritus); PhD, 1964, University of Southern California; school psychology/human development and cognition.
- McCutchen, Deborah Elaine \* 1986; PhD, 1985, University of Pittsburgh; cognitive processes underlying reading and writing skills.
- Meacham, Merle L. \* 1964, (Emeritus); MS, 1956, University of Washington; school psychology.
- Mizokawa, Donald T. \* 1973; PhD, 1974, Indiana University; human development and cognition.
- Morishima, James K. \* 1960, (Emeritus); PhD, 1967, University of Washington; human development and cognition.
- Morris, Arval \* 1955, (Adjunct); JD, 1955, University of Colorado (Boulder); LLM, 1958, Yale University; LLD, 1972, Colorado College; constitutional law, jurisprudence, education law, civil rights.
- Neel, Richard S. \* 1972; PhD, 1972, University of Southern California; special education, behavior disorders, learning disabilities.
- Olstad, Roger G. \* 1964, (Emeritus); PhD, 1963, University of Minnesota; science education, teacher education.
- Olswang, Steven G. \* 1975; JD, 1971, University of Illinois; PhD, 1977, University of Washington; higher education administration and policy, law, faculty government, collective bargaining.
- Parker, Walter C. \* 1985; PhD, 1982, University of Washington; social studies.
- Peckham, Percy D. \* 1968, (Emeritus); PhD, 1968, University of Colorado (Denver); measurement, statistics and research design.
- Reitan, Henry M. 1967, (Emeritus); PhD, 1950, University of North Dakota; educational leadership and policy studies, higher education.
- Robinson, Nancy M. \* 1969, (Adjunct); PhD, 1958, Stanford University; developmental psychology, giftedness.
- Ryckman, David B. \* 1969; EdD, 1966, University of Illinois; special education (mildly handicapped).
- Sax, Gilbert \* 1965, (Emeritus); PhD, 1958, University of Southern California; measurement, statistics and research design.
- Sebesta, Sam L. \* 1963, (Emeritus); EdD, 1963, Stanford University; reading/language arts, children's literature.
- Sirotnik, Kenneth A. \* 1985; PhD, 1969, University of California (Los Angeles); measurement, statistics, research design and evaluation, educational change and school renewal.
- Standal, Timothy \* 1976; PhD, 1976, University of Minnesota; reading/language arts.
- Stowitschek, Joseph James \* 1986, (Research); EdD, 1973, Utah State University; vocational and social development, service policies regarding disabled youth.
- Strayer, George D. 1949, (Emeritus); MA, 1928, PhD, 1934, Columbia University; educational administration.
- Thompson, Marie D. \* 1979, (Emeritus); PhD, 1970, University of Washington; special education (hearing impaired).
- Tostberg, Robert E. \* 1962, (Emeritus); PhD, 1960, University of Wisconsin; philosophy of education.
- Valencia, Sheila Denise W. \* 1987; PhD, 1978, University of Colorado (Boulder); reading remediation, comprehension, instruction and assessment.
- White, Owen R. \* 1973; PhD, 1971, University of Oregon; special education (severely handicapped).
- Williams, Donald T. \* 1969, (Emeritus); PhD, 1963, Stanford University; higher education.
- Williams, Richard C. \* 1990, (Emeritus); PhD, 1966, University of Minnesota; career socialization of school principals; the process of school reform.
- Wineburg, Samuel S. \* 1989; PhD, 1990, Stanford University; educational psychology, cognitive psychology of school subjects, historical cognition.
- Winn, William David \* 1985; PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

### Associate Professors

- Beadie, Nancy Elizabeth \* 1993; PhD, 1989, Syracuse University; history of education.
- Beal, Jack L. \* 1973, (Emeritus); MS, 1962, University of Kansas; PhD, 1972, University of Nebraska; secondary mathematics education.
- Brown, Robert Lewis \* 1965, (Emeritus); EdD, 1961, University of Arkansas; school psychology.
- Cohen, Marilyn 1987, (Research); PhD, 1971, University of Washington; childhood development, telecommunications technology and research.
- Dimmitt, Norma M. 1969, (Emeritus); MEd, 1963, University of Washington; EdD, 1970, Stanford University; curriculum and instruction, teacher education.
- Frerichs, Alberta J. 1955, (Emeritus); MEd, 1951, University of Nebraska; business education.
- Frey, Karin S. \* 1983, (Research); PhD, 1978, University of Washington; educational psychology, relationships between social cognitions and behaviors.
- Gray, Carol A. \* 1971, (Emeritus); PhD, 1971, University of Washington; educational psychology, human development and cognition, school psychology.
- Hansen-Krening, Nancy M. \* 1974; PhD, 1974, University of Oregon; reading/language arts, multiethnic literature.
- Jones, Diane Carlson \* 1996; MA, 1969, University of Texas (Austin); MA, 1977, PhD, 1980, Wayne State University; development of social-cognitive/emotional competencies and peer relations, especially friendships.
- Kelly, Samuel E. 1970, (Emeritus); MA, 1960, Marshall University; PhD, 1971, University of Washington; educational leadership and policy study, higher education.
- Kerdeman, Deborah \* 1990; MA, 1988, PhD, 1991, Stanford University; philosophy of education, philosophy of social inquiry, and hermeneutics.
- Nelson, Mary Lee \* 1990; PhD, 1989, University of Oregon; counseling, interpersonal theory, process research, supervision, gender issues.
- Nolen, Patricia A. \* 1970, (Emeritus); PhD, 1970, University of Washington; school psychology/human development and cognition.
- Nolen, Susan B. \* 1990; PhD, 1986, Purdue University; development of students' achievement motivation and learning strategies.
- Ostrander, Kenneth H. \* 1968; EdD, 1968, University of Tennessee; educational administration.
- Schwartz, Ilene Sharon \* 1991; PhD, 1989, University of Kansas; early childhood, classroom-based interventions, and applied behavior analysis.
- Smith, John P. \* 1969, (Emeritus); EdD, 1969, Stanford University; science education.
- Sulzbacher, Stephen 1976, (Adjunct); MA, 1964, Hollins College (Virginia); PhD, 1971, University of Washington; psychiatry and behavioral sciences.
- Taylor, Catherine S. \* 1991; MS, 1978, PhD, 1986, University of Kansas; educational psychology.
- Thalberg, Stanton P. \* 1965, (Emeritus); PhD, 1964, University of Iowa; school psychology.
- Valadez, James R. \* 1996; PhD, 1990, University of California (Santa Barbara); sociology of education, social and cultural influences that shape student education/career decisions.

### Assistant Professors

- Antony, James Soto \* 1995; PhD, 1996, University of California (Los Angeles); aspirations and success of professional occupations, post-secondary faculty careers.
- Bashey, Husain Ismail 1968; MA, 1955, Bombay University (India); MA, 1960, MacMurray College; PhD, 1975, University of Oregon; counseling.
- Bell, Philip L. \* 1998; PhD, 1998, University of California (Berkeley); cognition and learning, science education, argumentation, design for learning technologies.
- Cheney, Douglas A. \* 1989; PhD, 1992, University of Washington; education, treatment and support of students with behavioral/learning disabilities.
- Dutro, Elizabeth M. 1999, (Acting); PhD, 1999, University of Michigan; reading/language arts.
- Herrenkohl, Leslie R. \* 1996; PhD, 1995, Clarkson University; cognitive and social processes of students in preschool and elementary school settings.
- Kazemi, Elham \* 1999; PhD, 1999, University of California (Los Angeles); mathematics education, elementary.
- Kimball, Kathleen L. \* 1987; EdD, 1993, University of Washington; educational leadership and policy studies.
- Mazza, James J. \* 1996; MS, 1990, PhD, 1993, University of Wisconsin; educational psychology/child and adolescent mental health.
- Plecki, Margaret L. \* 1994; MS, 1976, University of Illinois; PhD, 1991, University of California (Berkeley); school finance, economics of education, policy analysis, school choice, study of education reform.
- Portin, Bradley S. \* 1995; MEd, 1987, Seattle Pacific University; DPhil, 1995, Oxford University (UK); school administration/educational leadership.
- Rodriguez, Patricia 1999, (Acting); PhD, 1999, University of North Carolina; special education (early childhood).
- Sandall, Susan R. \* 1996; PhD, 1986, University of Washington; special education (early childhood).
- Stage, Scott A. \* 1995; MS, 1988, PhD, 1991, Florida State University; educational psychology.
- Stevens, Reed R. \* 1998; PhD, 1999, University of California (Berkeley); ethnography research on cognition, learning, social interaction, and technology use.
- Taylor, Edward Jr. \* 1990; MA, 1983, Gonzaga University; PhD, 1994, University of Washington; leadership, critical theory and discourse concerning race in education and society.
- Troia, Gary A. 1999; PhD, 1999, University of Maryland; special education (mild handicapped).
- Walker, Cindy M. 1998; PhD, 1998, University of Illinois; educational psychology, applied psychometrics, statistical analysis.
- Windschitl, Mark A. \* 1996; MS, 1993, PhD, 1995, Iowa State University; area of curriculum and instruction, use of technology in learning environments, constructivism.

### Senior Lecturer

- Bamburg, Jerry D. \* 1985; EdD, 1989, University of Washington; educational reform, organizational change.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

## Education Curriculum and Instruction

**EDC&I 324 Physical Education and Health in the Schools (2)** Techniques and procedures for teaching physical education and health in elementary and secondary schools. For students in Teacher Education Program. Credit/no credit only.

**EDC&I 424 Multiethnic Curriculum and Instruction (3)** Primarily for preservice and in-service teachers who have little or no previous exposure to issues related to ethnicity and schooling. Designed to help teachers better understand the school's role in the ethnic education of students and acquire the insights, understandings, and skills needed to design and implement curricular and instructional strategies that reflect ethnic diversity.

**EDC&I 425 Instructional Strategies for Minority Students (3)** Designed to equip educators with appropriate skills in effective teaching of culturally and socioeconomically different students. Attention is directed to understanding how these students differ from mainstream youth and what the implications are for instructional strategies in the classroom.

**EDC&I 434 Introduction to Computers in the Classroom (3)** Overview of the uses of computers in education. Uses of computers in instruction, classroom management (gradebooks, utilities), evaluation of software, overview of programming, and word processing. Prior experience not required.

**EDC&I 436 Design and Authoring of CAI (3)** Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with T C 436.

**EDC&I 437 Uses of Computer Application Packages in Schools (3)** Introduction to the instructional and management uses of application programs. Topics may include: databases, spreadsheets, word processing, graphics packages, graphing utilities, telecommunication, desktop publishing. Emphasis is on K-12 setting. Prerequisite: EDC&I 434.

**EDC&I 440 Gender and Education (5) I&S** Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with WOMEN 415.

**EDC&I 453 Teaching the Bilingual-Bicultural Student (3)** Educational needs of bilingual students: research findings, special programs, materials, and methodologies that bilingual-bicultural education can provide to meet those needs. Cultural combinations of bilingual populations in American culture; historical, social, and linguistic factors affecting their K-12 education.

**EDC&I 455 The Language Arts: Language and Learning (3)** The teaching of language arts requires research-based knowledge of language learning and its influence on listening, speaking, reading, writing, and nonverbal communication. Emphasizes techniques for building both a solid literacy curriculum and sound instructional practices.

**EDC&I 456 Workshop in Instructional Improvement: Language Arts (1-6, max. 15)** Individual or group study projects on the improvement of instruction in language arts.

**EDC&I 457 Methods in Teaching English as a Second Language (3)** Prepares preservice and in-service teachers to teach English as a second language and to meet the educational and linguistic needs of students who have little or no English language skills. Emphasis on a survey of first- and second-language acquisition research and its educational implications, as well as instructional strategies consistent with the audiolingual, cognitive, and creative construction approaches to second-language learning. Includes diagnostic-prescriptive strategies for classroom application.

**EDC&I 459 Workshop in Instructional Improvement: Reading (1-6, max. 15)** Projects on the improvement of instruction in reading. For experienced teachers and students in Teacher Education Program.

**EDC&I 460 Early Literacy Instruction (3)** Theory, research, and practice in early literacy acquisition including emergent literacy, phonemic awareness, word identification, comprehension, invented spelling, and writing. Emphasis on classroom instruction strategies for first and second language learners. Offered: A.

**EDC&I 461 Materials for Teaching Reading: Children's and Young Adult's Literature (3)** Designed to provide acquaintance with materials used in the teaching of reading. Trade books and materials from content areas are examined.

**EDC&I 462 Reading Comprehension Instruction in Elementary and Secondary School (3)** Research-based practices for explicit teaching of reading comprehension of both fiction and content-area texts including issues of reading strategies, text difficulty, teacher modeling, guided reading, discussion, assessment, and adaptations for struggling students. Offered: Sp.

**EDC&I 464 Educating Native-American Youth (3)** Assists students in understanding the North American Indian child from cultural, socioeconomic, and psychological points of view. Provides opportunities for the student to apply knowledge and skills gained in other courses to prepare programs and learning aids relevant to the educational situation of the Indian child.

**EDC&I 465 Social Studies Education: Elementary School Programs and Practices (3)** Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and middle school teachers and students in Teacher Education Program.

**EDC&I 466 Social Studies Education: Secondary School Programs and Practices (3)** Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for middle, junior, and senior high school teachers. For experienced teachers and students in Teacher Education Program.

**EDC&I 469 Teaching African American Students and Culture (3)** Examination of sociocultural and pedagogical factors that influence African American students' learning styles, opportunities, and outcomes; exploration of ways to reform teaching techniques to better accommodate cultural styles and experiences to improve the educational achievement of African American students.

**EDC&I 470 Science Education: Elementary School Programs and Practices (3)** Designed for classroom teachers with reference to the teaching and learning of science from kindergarten through grade 6. Emphasis is placed on objectives, methods, and materials as related to the concepts and processes of science.

**EDC&I 471 Science Education: Secondary School Programs and Practices (3)** Survey of the status and potential role of science in education; trends and their implications for the teaching of both biological and physical sciences in the junior and senior high schools; representative curricula and related teaching procedures; the psychology of concept formation and problem solving; and organization of science programs.

**EDC&I 472 Environmental Education for Teachers (3)** Status, selected problems, and role of environmental education in program of elementary, middle, and junior high schools. Opportunity to examine and receive instruction in use of existing environmental education instructional materials. Instruction is in the spirit of inquiry/discovery.

**EDC&I 473 Workshop in Instructional Improvement: Science (1-6, max. 15)** Individual or group study projects on the improvement of instruction in science.

**EDC&I 474 Multi-Ethnic Studies: Methods, Content, and Materials (3)** Designed to help preservice and in-service teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, African Americans, Asian Americans, Puerto Rican Americans, and White ethnic groups.

**EDC&I 475 Improvement of Teaching: Elementary School Mathematics (3)** Designed for elementary teachers. Emphasis is placed on the contributions of research to the improvement of the teaching of mathematics in the elementary school. For experienced teachers.

**EDC&I 478 Special Topics in Mathematics for Teachers (2-9, max. 9) NW** Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered: jointly with MATH 497.

**EDC&I 479 Workshop in Instructional Improvement: Mathematics (1-6, max. 15)** Individual or group study projects for the improvement of instruction in mathematics.

**EDC&I 480 Introduction to Graduate Study in Educational Technology (3)** Introduction to the theoretical and practical aspects of educational technology. Introduces the history, conceptual orientation, and research of the field. The practical application of theory and research through the procedures of instructional design and development are also examined.

**EDC&I 481 Introduction to Instructional Design (3)** Students design a unit of instruction that relies upon a technology for its delivery. Steps in the design process discussed and practiced, and principles that guide selection of methods and materials applied.

**EDC&I 485 Workshop in Instructional Improvement: Educational Communication and Technology (2-6, max. 6)** Individual or group study projects on the improvement of instruction through use of educational communication and technology.

**EDC&I 488 Educational Technology and Learning in Alternative Settings (3)** How educational technology can be used to encourage learning in nonschool environments, such as museums, radio and television broadcasts, parks and recreation

centers, and distance education programs. Students investigate one of these areas and prepare a project.

**EDC&I 494 Workshop in Improvement of Curriculum (1-6, max. 15)** Stresses the application of procedures for curriculum development, maintenance, and evaluation. Opportunities furnished to develop and perfect strategies for program development with occasions given to utilize the strategies in master plan and materials preparation for simulated or real school situations. Specific focus of workshop is determined by instructor or by arrangement with district.

**EDC&I 495 Workshop in Improvement of Teaching: Selected Topics, Issues, or Problems (1-6, max. 15)** Individual or group projects to help teachers adapt instruction to selected topics, issues, or problems and to identify the approaches and instructional resources that provide the soundest learning experiences.

**EDC&I 496 Workshop in Instructional Improvement (2-6, max. 6)** Individual or group study projects on the improvement of instruction with attention to designing instructional plans.

**EDC&I 499 Undergraduate Research (2-5, max. 5)** Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

**EDC&I 500 Field Study (1-10, max. 10)** Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Curriculum and Instruction in the College of Education.

**EDC&I 505 Seminar in Curriculum and Instruction (1-3, max. 15)** Seminar on advanced topics in curriculum and instruction. Critical examination of current research and practice. Content varies, check quarterly Time Schedule for topics to be covered. Prerequisite: permission of instructor.

**EDC&I 510 History of Educational Technology (3)** Examines the role of technology in education through history. Early systems of instruction, advent of textbooks, models for school architecture, instructional devices and teaching machines, mediated and distance learning. Focuses on the interplay between designed educational approaches and contexts in which they were implemented, and consequent success for failure.

**EDC&I 511 Current Issues in Technology and Education (3)** Examines current genres of learning technology, novel approaches for integrating technology into curriculum and instruction, and recent theoretical perspectives that inform future work in educational technology. Prerequisite: EDC&I 510 or instructor permission.

**EDC&I 512- Survey of Educational Technology Research (2, max. 4)** Critically examines active research projects in educational technology. Critiques of research practice. Corequisite: EDC&I 511 and EDC&I 580.

**EDC&I 524 Seminar in Teacher Education (3, max. 6)** Focus on recent research, issues, and proposals for future development in teacher education, certification, and continuing professional growth. Alternate year offering focuses on either preservice or inservice issues. Prerequisite: permission of instructor.

**EDC&I 530 Approaches to Literacy Instruction (3)** Designed to aid experienced teachers who possess background in the teaching of literacy, this course presents a variety of approaches and actual analysis of approaches. Prerequisite: teaching experience and a basic course in the teaching of reading.

**EDC&I 531 Seminar: Critical Review of Literacy Materials (3)** Students formulate and apply criteria for assessing materials, with emphasis on linguistic, cultural, and psychological factors; instruction effectiveness, interest level; and educational objectives. Prerequisite: teaching experience and one basic course in the teaching of reading.

**EDC&I 532 Seminar in Literacy Research (3, max. 9)** Primary focus on those aspects of the literacy process that are of concern in a developmental literacy program. Emphasis on research design, evaluation of research, and research findings, dealing with factors influencing literacy ability, problems in skill development, recreational reading, and writing. Prerequisite: permission of instructor.

**EDC&I 533 Seminar: Conducting Research in Reading (3, max. 6)** Students design and conduct original research studies in the field of reading. Emphasis on research rationale, choice of productive research types, and reporting of research results and implications. Prerequisite: EDC&I 532.

**EDC&I 534 Seminar in the Reading of Literature (3)** Reading of literature and its effect on reading skills, language development, social values, and literary judgment of children and adolescents. Emphasis on analysis of research in these areas and on the development of action research designed to study response to literature. Prerequisite: one 400- or 500-level education curriculum and instruction course in reading or language arts or one graduate course in literature for children or young adults.

**EDC&I 541 Seminar in Bilingual Education: Organization and Structure (4)** Study of the structure and organization of bilingual programs. Includes study of the developmental and organizational factors affecting bilingual education. Assists graduate students in reviewing the historical antecedents in bilingual education and in developing a personal philosophy about bilingual education.

**EDC&I 542 Seminar in Bilingual Education: Instructional Foundations and Issues (4)** Study of the theoretical foundations and instructional implications of psychology and linguistics as they apply to bilingual education. Assists graduate students in exploring learning styles of bilingual children and in becoming familiar with the crucial issues in bilingual education.

**EDC&I 543 Seminar in Bilingual Education: Instructional Strategies (4)** Study of instructional factors affecting bilingual education. Particular emphasis is given to research related to the variables involved in teaching in a bilingual environment. Assists graduate students in exploring instructional methodologies and formats as they apply to bilingual education and in becoming familiar with the current issues in bilingual education.

**EDC&I 550 Educational Technology Research (3)** Analysis, critique, and practical experience with research studies of all types (experimental, ethnographic, evaluation) concerning questions of interest to educational technologists. Prerequisite: EDC&I 480, a research methods course, or permission of instructor.

**EDC&I 552 Management of Educational Technology Programs (3)** Factors contributing to effective management of programs incorporating educational technology and microcomputers. Manager's role as agent of instructional change and processes leading to successful adoption and long-term implementation of a new instructional system. Prerequisite: EDC&I 480 or permission of instructor.

**EDC&I 553 Seminar on Instructional Systems Development (3)** Critical analysis of processes involved in the development of instructional systems. Prerequisite: EDC&I 481 or permission of instructor.

**EDC&I 555 Educational Futures (3)** Concept of alternative futures stressing manageability of the future. Attention is given to current and future events that can or might impact education. Basic future studies methods are considered with opportunities to apply such methods within educational arena. Prerequisite: prior graduate course work or experience in education.

**EDC&I 556 Elementary School Curriculum (3)** Study of elementary school curriculum, its design, rationale, and delivery. Current trends and issues affecting elementary school curriculum analyzed.

**EDC&I 558 Secondary School Curriculum (3)** Systematic analysis of current curriculum practices, with particular emphasis on the social and historical forces affecting secondary-school curriculum.

**EDC&I 559 Principles and Procedures of Curriculum Development (3)** Intensive study of basic principles and procedures utilized in development of curricula. Participants have opportunities to apply such procedures in class activities. Attention given to curriculum foundations.

**EDC&I 561 Seminar in Language Arts (3)** Study of language with special attention to research pertaining to the social context of language in the classroom. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite: EDC&I 455.

**EDC&I 562 Seminar in Reading and Language Arts: Secondary Emphasis (3)** Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite: permission of instructor.

**EDC&I 563 Current Issues in Literacy Education (1-3, max. 6)** Discussion of problems and issues of current interest and importance in language arts education. Prerequisite: EDC&I 561.

**EDC&I 565 Seminar in Social Studies Education: Elementary Emphasis (3)** Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 465 or equivalent.

**EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3)** Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 466 or equivalent.

**EDC&I 567 Current Issues in Social Studies Education (1-3, max. 6)** Discussion of problems and issues of current interest and importance in social studies education.

**EDC&I 569 Educating Ethnic Minority Youths (4)** Intensive analysis and review of the research and curricular programs related to the social, psychological, and political factors that influence the school experiences of ethnic minority youths. Special attention given to instructional and curricular programs for African-American, American-Indian, Mexican-American, Puerto Rican-American, and Asian-American students. Prerequisite: graduate standing or permission of instructor.

**EDC&I 570 Seminar in Science Education: Elementary Emphasis (3)** Investigation of curriculum and instruction in science at elementary-school levels, with particular emphasis on current literature and research. Prerequisite: EDC&I 470 or equivalent.

**EDC&I 571 Seminar in Science Education: Secondary Emphasis (3)** Investigation of curriculum and instruction in science at secondary-school levels, with particular emphasis on current literature and research. Prerequisite: EDC&I 471 or equivalent.

**EDC&I 572 Current Issues in Science Education (1, max. 6)** Discussion of topics and problems of current interest and importance in science education. Prerequisite: graduate standing.

**EDC&I 573 School Reform and Multicultural Education (3)** Similarities and differences among the visions, goals, and strategies of proposals for school reform and multicultural education are analyzed; implications for practice in curriculum and instruction are deduced from these analyses. Prerequisite: one course in multicultural education or permission of instructor.

**EDC&I 574 Race, Gender, and Knowledge Construction: Curriculum Considerations (3)** Using historical and contemporary perspectives, considers ways in which knowledge related to race and gender has been and is constructed and the implications of ways in which knowledge is constructed for curriculum reform and teaching. Prerequisite: one course in ethnic studies, multicultural education, or women studies or permission of instructor.

**EDC&I 575 Seminar in Mathematics Education: Elementary Emphasis (3)** Investigation of curriculum and instruction in mathematics at the elementary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

**EDC&I 576 Seminar in Mathematics Education: Secondary Emphasis (3)** Investigation of curriculum and instruction in mathematics at the secondary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

**EDC&I 577 Current Issues in Mathematics Education (1, max. 6)** Discussion of problems and issues of current interest and importance in mathematics education. Prerequisite: graduate standing.

**EDC&I 578- Qualitative Methods of Educational Research (5-)** Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics. Offered: jointly with EDPSY 586.

**EDC&I -579 Qualitative Methods of Educational Research (-5)** Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics. Offered: jointly with EDPSY 587.

**EDC&I 580 Technology in Context (3)** Focuses on development of appropriate methods and concepts for research on technology in schools, workplaces, and other naturalistic settings. Fieldwork exercises and reading exemplary studies from multiple disciplinary perspectives. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, or permission of instructor.

**EDC&I 581 Cognitive Systems Design (3)** Covers the design of applied technology-based learning systems, informed by current views of learning, technology, and cognition. Emphasizes synthesizing students' knowledge of technology, learning and research in collaborative settings. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, or permission of instructor.

**EDC&I 582 Design Experimentation and Implementation in Context (3)** Introduces theoretical, methodological, and practical issues involved with studying the designed use of learning technologies in real world settings. Focuses on engaging in empirical study of the designed system through partnerships involving education researchers, educators, and technologists. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, EDC&I 581, or permission of instructor.

**EDC&I 583 Message Design (3)** Research and theory on design of instructional messages in various modalities (visual, auditory), and in various formats (pictorial, verbal, graphic). Prerequisite: EDC&I 480 or permission of instructor.

**EDC&I 584 Instructional Graphics for Microcomputers (3)** Study of current research on instructional uses of computer graphics. Development, selection, and application of design principles for graphically-based instructional and training programs. Prerequisite: EDC&I 436, EDC&I 481.

**EDC&I 585 Technology and the Culture of Education (3)** Social impact of technology on education in the United States and elsewhere: social, political, and cultural factors affecting educational communication and technology; roles and relationships among instructors and learners; appropriate technology in developing countries; technology's long-term influence on thought and values. Prerequisite: EDC&I 480 or permission of instructor.

**EDC&I 586 Current Issues for Computers in the Classroom (1, max. 6)** Addresses many of the current topics in computer-related education. Issues and research related to computer uses in curriculum, instruction, and management of instruction.

**EDC&I 587 Design and Application of Interactive and Immersive Instructional Systems (3)** Theoretical and empirical questions involved in design of interactive instructional systems using such technologies as virtual reality and CAI. Specific problems inherent in design of complex learning environments: immersion, control, structure, sequence of experiences, navigation, learner guidance. Educational uses of systems. Prerequisite: EDC&I 481 or EDC&I 583, EDC&I 436, or permission of instructor.

**EDC&I 588 Seminar: Computers in Education (3)** Provides opportunity for graduate students to analyze, discuss, and design research in areas of computers in education. Includes historical development of research in this area as well as a platform for the development of research proposals and refinement of ongoing research. Prerequisite: EDC&I 434 or EDC&I 436.

**EDC&I 589 Current Issues in Educational Communications (1, max. 9)** Discussion of problems and issues of current interest and importance in the field of educational communications. Serves also as a forum for discussion of doctoral research. Designed for master's and doctoral candidates in educational communications. Credit/no credit only. Prerequisite: graduate standing.

**EDC&I 590 Seminar in Elementary Education (3)** Exploration of the philosophy, history, purposes, curriculum, methods, and school organization of elementary education. Prerequisite: elementary-school teaching experience, EDC&I 556.

**EDC&I 591 Seminar in Curriculum Research (3)** Analysis of past and current empirical, historical, ethnographic research, and philosophical analysis of the curriculum field. Studies considered include research in curriculum development, the curriculum plan, contextual characteristics, and factors related to curriculum participants. Group and individual analyses focus on theory generation and practical applications of research. Prerequisite: EDC&I 559 or permission of instructor.

**EDC&I 592 Seminar in Secondary Education (3)** Research and study of secondary education. Primary focus on factors involving change in secondary-school curriculum and organization. Prerequisite: EDC&I 558.

**EDC&I 593 Seminar in Curriculum: Theory and Practice (3)** Investigation of curriculum theory and practice. Consideration is given to theoretical writings that address the relationships between various curricular variables. Theoretical positions are related

to curricular practices and innovations. Prerequisite: EDC&I 559.

**EDC&I 594 Seminar in Curriculum: Issues, Systems, Models (3)** Emphasis on the current approaches to curriculum and curriculum innovation. Attention is given to major educational issues that affect curricular activity. Prerequisite: EDC&I 559.

**EDC&I 595 Seminar in Analysis of Teaching (3)** Investigation of the ways in which classroom teaching has been analyzed from a variety of disciplinary perspectives. Focus on methods, findings, and implications of research on teaching. Prerequisite: teaching experience.

**EDC&I 597 Curriculum Evaluation Seminar (3, max. 6)** Focuses on the evaluators' roles, evaluation theory and models, and selected curricular evaluations. Examples are drawn from the several disciplines commonly offered in the elementary and secondary schools. Students are expected to identify an evaluation problem and to develop an evaluation design that can be implemented as a practical solution to the problem. Prerequisite: EDC&I 559 and permission of instructor.

**EDC&I 599 Independent Studies in Education (\*)** Independent studies or readings of specialized aspects of education. Prerequisite: permission of instructor.

**EDC&I 600 Independent Study or Research (\*)** Prerequisite: permission of instructor.

**EDC&I 601 Internship (1-10, max. 10)** Credit/no credit only. Prerequisite: graduate standing and permission based on approval of proposal submitted during quarter preceding the internship.

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## Educational Leadership and Policy Studies

**EDLPS 479 Crucial Issues in Education (3)** Selected educational issues, policies, and contexts. Evolution of the American education enterprise, legal issues, professionalism, finance, and other vital educational concerns.

**EDLPS 496 Workshop: Education Programs and Problems (1-6, max. 12)** Study of such topics as planning, development, supervision, organization, operation, or evaluation of current or emerging programs or problems in education.

**EDLPS 499 Undergraduate Research (\*)** Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

**EDLPS 501 Introduction: Leadership Beyond the Classroom (3-6, max. 6)** First course in principal certification program; explores Washington state laws, legal principles, context of public schools, multicultural issues, changing population. Essential skills of leadership: communication, human relations, strategies for shared decision making, and dealing with conflict. (Open only to students admitted to the EDLPS Principal/Program Administrator Preparation Program.)

**EDLPS 502- Leadership Core ([3-6, max. 6]-)** Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic

year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

**EDLPS -503- Leadership Core (-[3-6, max. 6]-)**

Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

**EDLPS -504 Leadership Core (-[3-6, max. 6])**

Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

**EDLPS 505 Transition to Leadership (3-6, max. 6)**

Development and administration of systems for selection, evaluation and clinical supervision of certificated and classified personnel. Focuses on leadership models and transition to a leadership role, including opening a school or program and dealing with student/school crises. (Only for students admitted to the EDLPS Principal/Program Administrator Program.)

**EDLPS 507 Reflective Seminar (1-6, max. 6)**

Integration of theory and internship experience; group process laboratory and peer feedback and review of written work, oral presentations, and journals. Reading and discussion of crucial issues. (Only for students admitted to the EDLPS Principal/Program Administrator Preparation Program.) Credit/no credit only.

**EDLPS 510 School Finance (3)**

Financial practices and problems in districts and schools considered, including state and federal support plans, school plant planning, school business management, resource allocation, and budgeting and educational accountability.

**EDLPS 514 Washington School Law (3)**

Overview of Washington State specific legal provisions affecting the operations and management of public schools, including school organization and operations, school finance, separation of church and state, school employment, student conduct, discipline and rights, equity, intergovernmental agreements, and student health and safety.

**EDLPS 516 Special Education and the Law (3)**

Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis upon procedural and substantive rights of children with disabling conditions. Offered: jointly with EDSPE 504; W.

**EDLPS 518 Reflective seminar: The Superintendency (1-6, max. 6)**

Integration of theory and internship experience. Readings and discussion of crucial issues, presentations by local school superintendents: district budgeting processes, personnel, staff relations and collective bargaining, superintendent-board relations, bond issues, facilities planning, superintendent as instructional leader. Credit/no credit only.

**EDLPS 519 Special Topics in Educational Leadership (1-6, max. 15)**

Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues of particular concern to K-12 administrators and other educators in leadership roles in districts and schools. Topics vary; check Time Schedule for topic(s) to be covered.

**EDLPS 520 Education as a Moral Endeavor (3)**

An exploration of fundamental questions that have faced educational leaders in the past and most likely will continue to face them in the future. Foundational studies in history, philosophy, and sociology provide the basis for discussion and writing about these fundamental questions. Credit/no credit only.

**EDLPS 521 Philosophy of Education (3)**

Philosophy of education considered as a study of the conceptual basis for educational policy and practice. Emphasis on relationships between enduring educational problems and fundamental philosophic issues; concepts that feature centrally in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice.

**EDLPS 522 Contemporary Philosophies of Education (3)**

Intensive study of the writings of selected contemporary philosophers of education.

**EDLPS 523 Analysis of Educational Concepts (3)**

Selected concepts central to conduct and understanding of education.

**EDLPS 524 Seminar in Philosophy of Education (3, max. 6)**

Philosophical examination of ways in which education might be studied. Uses and limits of conventional scientific approaches in education inquiry. Consideration of alternatives.

**EDLPS 525 Educational Inquiry (3)**

General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowledge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

**EDLPS 526 Educational Inquiry (3)**

General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowledge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

**EDLPS 530 History of Education (3)**

Historical survey of education. Emphasis on relationship between idea and practice. Topics include education and colonialism, formation of state school systems, progressive education, equal educational opportunity, changes in textbooks and curricula, education and social structure, and education in the history of cultures.

**EDLPS 531 History of American Higher Education (3)**

Examination of the historical development of the American higher education enterprise, including pre-colonial origins. Includes attention to the colonial colleges, the rise of new institutions in the nineteenth century, and the further development of American colleges and universities in the twentieth century. Leaders in these developments are identified.

**EDLPS 535 Historical Inquiry in Education Research (3, max. 6)**

Methods and critique of historical research in education. Examination of landmark

works in education history and historiography. Hands-on experience framing historical questions, finding historical sources, using historical evidence, substantiating historical claims, and addressing issues in the history of education.

**EDLPS 536 Historical Analysis of Educational Issues (3)**

Analysis and interpretation of the history of education in its broadest sense: the transfer of culture across generations. Examination of the problems of evidence and interpretation with which the authors of exemplary works in the history of education struggled.

**EDLPS 540 Sociology of Education (3)**

Examination of education and educational institutions by using the major conceptual tools of sociology. Emphasis on sociological thought and findings that have particular bearing on the understandings and judgments of educators.

**EDLPS 541 Topics in Comparative Education (3, max. 6)**

International efforts in education, including the role of the United States in overseas programs. Analysis of the relation of education and society in foreign areas, stressing social change and conflict. Regions of the world considered in the course vary from one offering to another.

**EDLPS 542 Seminar in Educational Sociology (3)**

Application of sociological principles to school problems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

**EDLPS 543 Seminar: Research in Educational Sociology (3)**

Theory, concept, and method of sociological inquiry as applied to problems in education.

**EDLPS 549 Special Topics in Educational Studies (1-6, max. 15)**

Readings, lectures, and discussions pertaining to significant and enduring ideas in the philosophy, history and sociology of education. Specific topics are critically examined in light of contemporary problems in education. Topics vary; check Time Schedule for topic(s) to be covered.

**EDLPS 550 The Dynamics of Educational Organizations (3)**

Exploration of the literature in organizational theory and leadership, the assumptions that underlie the development of various approaches to organizational theory and how these approaches are applied, and an acquaintance with different conceptual frames that can be used to determine how to improve and change organizations. Credit/no credit only.

**EDLPS 552 Organizational Change in Education (3)**

Change and innovation in educational organizations. Theoretical approaches include sociopsychological, rational planning, political perspectives, and those associated with notion of organized anarchies. Specific topics related to change and innovation (e.g., roles of beliefs, symbols and norms, diffusion of innovations, and research issues).

**EDLPS 560 Perspectives on Policy and Policy Making in Education (3)**

This course introduces a variety of theoretical perspectives that can be used to analyze policy content, processes and outcomes. Includes a consideration of the power and limits of policy and a discussion of the many ways people in different positions in organizations can influence policy. Credit/no credit only.

**EDLPS 561 Education Policies and Leadership in Political Context (3)**

Systematic consideration of the structure and function of educational policies and problems of research in political context.

**EDLPS 563 Education, The Workforce, and Public Policy (3, max. 6)**

Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimina-

tion issues, and the role of education and training in economic development. Offered: jointly with PB AF 571.

**EDLPS 564 Seminar in Economics of Education (3)** Current problems in school finance, including costs, ability to support schools, and financial implications of educational principles. The economics of public education. Problems of federal, state, and local school support. Financing capital outlay, research, and public relations.

**EDLPS 565 Power and Politics in Organizational Leadership and Decisionmaking (3)** Focuses on conceptual frameworks that can be used to analyze power-influence processes in complex organizations and research methods that are well-suited to the study of these processes. Opportunities to design studies of power relations and political processes are provided.

**EDLPS 566 Education Policy Serving Disenfranchised Groups (3)** This seminar examines programs and policies aimed at ameliorating conditions that face disenfranchised groups in contemporary K-12 schooling. Seminar members critically analyze the assumptions, design, and likely impact of these programs and policies on institutions and individuals. Designed for advanced doctoral students. Others admitted with permission of instructor.

**EDLPS 567 Education Policy and the Improvement of Teaching and Learning (3)** Examines connections between policies and classroom practice, in P-12 and higher education settings. Of particular concern is the capacity of policy to improve the quality of curriculum and instruction. Students design and critique policies, drawing on research and feedback from policymakers.

**EDLPS 568 Policy Evaluation in Education (3)** Examination of methods for evaluating educational policies across the educational continuum. Students design and conduct a policy evaluation which draws on the policy evaluation literature. Examination of the uses of policy evaluation information in shaping organization-decision making is also included.

**EDLPS 579 Special Topics in Organizational and Policy Analysis (1-6, max. 15)** Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to the analysis of educational organizations, policies, and policy making. Topics vary; check Time Schedule for topic(s) to be covered.

**EDLPS 580 The American College and University (3)** Introduction to contemporary United States higher education, with special emphasis on emerging trends, roles of the several kinds of institutions, the composition and character of student bodies and faculty, and the state coordination of colleges and universities.

**EDLPS 583 Higher Education and the Law (3)** Legal implications of university operations and an explanation of the legal and constitutional rights of students, faculty, and staff within the university. Special attention given to faculty employment and termination decisions; student protections, including due process; and university liabilities.

**EDLPS 584 Academic Governance and Collective Bargaining in Higher Education (3)** Explores the concept and operation of collective bargaining in higher education: its origin; the reasons for its growing popularity as a governance mechanism; the legal framework within which it operates; the rights, powers, and duties subsumed under its operation; and its relationship to the traditional form of faculty governance mechanisms.

**EDLPS 585 Resource Allocation in Higher Education (3)** After attention to the basic tools of economic analysis, focus is on application of those tools to

specific topics in higher education (e.g., access, budgeting, finance and policies, and funding alternatives).

**EDLPS 589 The Community College (3)** Intensive study of the community college—its history and present and future status. Curriculum, instruction, financial, and governance issues are also discussed.

**EDLPS 590 Student Populations and Experiences in Higher Education (3)** Examines foundational literature dealing with students in higher education. Primary focus is on how students change during college, how they make choices and decisions, what roles institutional climate and structure play in the students' experiences, and what impact college has on students.

**EDLPS 598 Special Topics in Higher Education (1-6, max. 15)** Readings, lectures, and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to education in community colleges, four-year colleges and universities. Topics vary; check for topic(s) to be covered.

**EDLPS 599 Independent Studies in Education (1-10, max. 10)** Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which with permission of the instructor, must be filed with the Office of Leadership and Policy Studies in the College of Education. Prerequisite: permission of instructor.

**EDLPS 600 Independent Study or Research (\*)** Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which with permission of the instructor, must be filed with the Office of Leadership and Policy Studies in the College of Education. Credit/no credit only. Prerequisite: permission of instructor.

**EDLPS 601 Internship (1-4, max. 12)** Name of faculty member responsible for supervising the student should be indicated on program of studies. Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

## Educational Psychology

**EDPSY 304 Educational Psychology (5)** Human learning in the educational setting. Cognition, development, learning, motivation, affective processes, and socialization. Emphasis on skills in influencing classroom learning and discipline. Open to students in the Music Education program or by permission of instructor. Offered: Sp.

**EDPSY 449 Laboratory in Educational Psychology (2-6, max. 6)** Special studies for counselors, teachers, administrators, and others concerned with student personnel and psychological services in schools and colleges. The course focuses on special topics that have either local or contemporary significance.

**EDPSY 471 Neuropsychology of School Learning and Behavioral Problems (5)** The microstructure, macrostructure, and structural and functional development of the brain are reviewed with a focus on the educational relevance of developmental neuropsychology. Four areas are covered: Hemispheric differences and integration; neurological soft signs, attention deficit, and hyperactivity; language, reading, and learning disabilities; and medical syndromes. Credit/no credit only. Offered: Sp.

**EDPSY 490 Basic Educational Statistics (3)** Measures of central tendency and variability, point and interval estimation, linear correlation, hypothesis testing. Offered: AWSp.

**EDPSY 495 Introduction to Educational Measurement (3)** Practical understanding of test reliability, validity, and derived scores as they apply to external educational assessments; concepts of criterion and norm-referenced testing; review of group administered norm-referenced and criterion-referenced tests and/or testing programs; test interpretation; issues and ethics in large scale assessment. Prerequisite: EDPSY 490. Offered: W.

**EDPSY 499 Undergraduate Research (\*)** Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program. Offered: AWSp.

**EDPSY 500 Field Study (\*)** Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education. Offered: AWSp.

**EDPSY 501 Human Learning and Educational Practice (3)** Systematic examination of current research about human learning in educational settings, including the study of behavioral, information processing, social construction, and the developmental perspectives on learning. Offered: AWSp.

**EDPSY 502 Developmental Foundations of Early Learning (3)** Perceptual-motor, language, and overall cognitive development in children from birth through primary-school age. Emphasis on Piagetian and Vygotskian approaches to development with a special focus on the connections between learning and development. Field-based course projects may be required. Prerequisite: EDPSY 501 or permission. Offered: Sp.

**EDPSY 503 Theories of Intelligence (3)** Reading and discussion of theoretical and research papers from the extensive literature on Piagetian, psychometric, and information processing conceptions of intelligence. A historical approach to the topic is followed by analysis of current writings on intelligence and its measurement. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology. Offered: alternate years; W.

**EDPSY 506 Instructional Theory (3)** Sources, current state, and utility of prescriptive instructional theories with emphasis upon theories having a potential for guiding the design of instruction. Prerequisite: EDPSY 501 or equivalent. Offered: Sp.

**EDPSY 507 Reading, Writing, and Arithmetic: Educational Assessment and Consultation (5)** Students administer and interpret tests of reading, writing, arithmetic, and related developmental skills; integrate test, observational, interview, and portfolio information in staffings and written reports; and consult with teachers regarding educational interventions. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

**EDPSY 508 Clinical Supervision-Practicum (2-6, max. 12)** Practicum in supervising counseling, group counseling, diagnostic activities, and remedial academic therapy. Prerequisite: advanced graduate standing. Offered: AWSp.

**EDPSY 509 Educational Issues in Human Development (5)** Human development theories and models. Educational implications of theory, methodology, and application. Current research complements the historical antecedents of current practice. Age range covered varies as function of current issues in professional literature. Prerequisite: 15 credits in educational psychology or psychology. Offered: alternate years; W.

**EDPSY 510 Cognition in the Context of the School Curriculum (3)** Contemporary issues and trends in human learning, with a focus on reasoning within subject-matter areas such as mathematics, history, and science. Prerequisite: EDPSY 501 or equivalent. Offered: alternate years.

**EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6)** Designed for graduate students in educational psychology. Applications of theoretical constructs to particular problems encountered in school counseling, practice.

**EDPSY 512 Classroom Assessment Strategies (3)** Development and evaluation of traditional, observational, essay, performance-based, portfolio assessments and grading models as they are used in classroom assessment; some review of current research on classroom-based assessment; classroom assessment ethics.

**EDPSY 513 Instrument Development (3)** Instrument development techniques including construct development, test and item specifications, item writing, planning for reliability and validity studies; ethics in test administration and interpretation. Intended for doctoral or masters students to develop instruments for their own research. Prerequisite: EDPSY 490 or equivalent.

**EDPSY 518 Assessment and Diagnosis of Reading Disabilities (3)** *McCutchen, Valencia* Techniques for individual assessment of students with reading difficulties (K-12) including formal assessment using standard assessment tools and informal diagnostic teaching. Appropriate for classroom teachers, reading specialists, and school psychologists. Includes conducting and analyzing case studies. Prerequisite: EDC&I 460, EDC&I 462, other reading courses, or permission of instructor. Offered: Sp.

**EDPSY 519 Communication and Language in Young Exceptional Children (3)** Review and discussion of theories of language acquisition as they relate to communication and language in young children. Review of research of language environments that relate to early literacy and education and how to use this information to modify environments for special needs children. Offered: jointly with EDSPE 521; A.

**EDPSY 520 Psychology of Reading (3)** Reviews current empirical research on cognitive processes in reading, including word and sub-word processes, syntax and comprehension, reading and perception, word recognition, concept development and meaning in reading, psychology of reading interests and skills. Prerequisite: EDPSY 501 or equivalent.

**EDPSY 521 Psychology of Writing (3)** Examines writing as a cognitive process and reviews current empirical research on writing, emphasizing primarily studies from a psychological perspective. Explores both developmental differences and individual differences in writing skills, together with instructional implications. Prerequisite: EDPSY 501 or equivalent.

**EDPSY 522 Reading Disability Clinic (3-5)** Supervised practicum in diagnosis and remediation of reading disabilities. Prerequisite: EDTEP 532, EDTEP 533 or equivalent; EDC&I 460 or permission of instructor.

**EDPSY 524 Problem Solving and Critical Thinking in Education (3)** Study of the classic and contemporary research literature concerned with human problem solving and critical thinking with emphasis upon applications to educational practice and further research. Prerequisite: EDPSY 501 or equivalent.

**EDPSY 526 Seminar on Metacognition (3)** Students read and discuss theoretical and research papers from the extensive literature on metacognition. Focuses on defining the concept of

metacognition, establishing its range of applicability to educational matters, and becoming familiar with excellent examples of metacognitive research. Prerequisite: graduate status in education or psychology and permission of instructor. Offered: alternate years; Sp.

**EDPSY 527 Transfer of Teaching (3)** Students read and discuss a representative sample of theoretical and research papers from extensive literature on teaching to promote transfer of what students learn to non-teaching environments. Historical approach to the topic is followed by analysis of current writings on transfer. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology. Offered: alternate years; Sp.

**EDPSY 528 Achievement Motivation in Education (3)** Critical review of current research and major theories of achievement motivation in schools and other educational settings. Emphasis on the relationship of theories to the contexts and practice of education. Prerequisite: EDPSY 501 or permission of instructor. Offered: W.

**EDPSY 531 Socialization of School-Age Children (3)** Study of personal social development and behavior from preschool ages through adolescence. Developmental theory and research are reviewed on the socialization influences of parents and peers and on such topics as aggression, emotional regulation, and social cognition. Prerequisite: EDPSY 501 or equivalent. Offered: W.

**EDPSY 532 Adolescence and Youth (3)** Developmental processes and patterns examined with major theoretical and current research themes from behavioral sciences as applied to middle school and senior high students. Educational issues, social problems associated with adolescence in Western culture. Prerequisite: EDPSY 501 or equivalent.

**EDPSY 533 Current Research in Adolescence (3)** Contemporary trends and patterns of adolescent research are examined with emphasis upon theoretical foundations, contrasting methodologies, and implications for further research. Exemplary studies and integrative reviews of research on adolescence are featured. Prerequisite: EDPSY 532 and EDPSY 591 or equivalents.

**EDPSY 534 School Problems of Adolescence (3)** Study of the classic, contemporary, and emerging school problems of school age youth with emphasis upon problem solving strategies for educators and associated youth service personnel. Includes problems of academic achievement, interpersonal relations, and social deviancy in the schools. Prerequisite: EDPSY 532 or equivalent.

**EDPSY 535 Education and the Highly Capable Learner (3)** Examination of major issues and problems in study and nurturance of highly capable children and youth in the educational setting. Emphasis placed on contributions of theory and research to educational problem solving for multiple aspects of advanced human capacity. Prerequisite: EDPSY 501 or equivalent.

**EDPSY 536 Learning Variables of Minority Children: Instructional Implications (3)** Provides students with data base regarding (1) four variables (language/dialect, cognitive style, locus of control, and motivational systems) that affect learning among minority students, and (2) teaching strategies appropriate for these cultural socioeconomic variables. No credit given for students who have completed EDC&I 425. Offered: ASP.

**EDPSY 540 School Psychological Assessment (5)** Study of assessment of human intelligence with supervised training in the administration, scoring, and interpretation of individual intelligence tests with emphasis on Stanford-Binet and Wechsler scales. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

**EDPSY 541 Group Tests in Counseling (5)** Emphasis on the utilization of objective measures in counseling. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

**EDPSY 542 Career Development (3)** Emphasis on vocational development theory and research. Psychological, social, and economic determinants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite: graduate standing or permission of instructor.

**EDPSY 543 Facilitating Career Development (3)** Theory and practice in exploring, self-identified strengths, interests, resources, and other considerations when developing career plans. Emphasizes career development in the schools. Offered: Sp.

**EDPSY 544 Counseling (5)** Emphasis on the theory and practice of counseling.

**EDPSY 545 Prepracticum (3)** Competency-based skills training for beginning counseling and school psychology students. Attending, listening, focusing, and intervening behaviors for use with adults and children. Introduction to theories of helping. Prerequisite: enrolled in school counseling or school psychology or permission of instructor. Offered: A.

**EDPSY 546 Counseling Practicum (3)** Supervised practice in counseling. Prerequisite: EDPSY 545. Offered: WSp.

**EDPSY 548 Educational Implications of Personality Theory (5)** Study of personality development and personality theories with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisite: 15 credits of psychology or educational psychology. Offered: A.

**EDPSY 549 Seminar in Consultation Methods (3)** Theory and practice of process consultation in educational settings. Field practice in teams with clients. Offered: W.

**EDPSY 550 Family Counseling (3)** Introduction to family counseling theory and practice, emphasizing family dynamics and communication analysis. Prerequisite: permission of instructor. Offered: W.

**EDPSY 551 Group and Behavioral Intervention (3)** Introduction to competency-based skills for beginning school psychology students. Includes basic processes of group management skills with children including group process in social skills training, problem-solving techniques, behavioral principles, and parent training. Prerequisite: EDPSY 545 or course in counseling techniques or permission of instructor. Offered: Sp.

**EDPSY 552 Multicultural Issues in School Counseling and School Psychology (3)** Examination of multicultural issues as they relate to the delivery of services provided by school counselors and school psychologists. Theoretical and applied aspects emphasized and case study format utilized.

**EDPSY 555 Seminar in Counseling Specialty (1-2, max. 6)** Oriented toward the role of a counselor as a professional worker. Credit/no credit only. Offered: ASP.

**EDPSY 561 Group Process Laboratory (3)** Explores the theoretical concepts of group process with a special emphasis in how to conduct group process in school and agency settings. Offered: A.

**EDPSY 562 Group Counseling in Schools (3)** Provides students with the opportunity to co-facilitate groups in elementary, middle, and secondary schools, supplemented by weekly didactic presentations of counseling and guidance models. Prerequisite: EDPSY 561 or permission of instructor. Offered: W.

**EDPSY 564 Practicum in School Psychology (1-6, max. 6)** Practicum in assessment and consultation, emphasizing diagnosis of behavior and learning disabilities, and focusing on techniques acquired in 507 and 540. Offered: W.

**EDPSY 566 Case Study Seminar (1-6, max. 6)** Integrating theoretical concepts with practice/service issues. Cases selected for discussion represent a wide range of problems found in schools. Activities include group supervision and peer review. Offered: AWSp.

**EDPSY 568 Seminar in Professional Issues and Ethics (2)** Professional ethics codes and cases, history of counseling or school psychology, legal problems, credentialing issues, conditions of practice, continuing education, publishing, and presenting research papers. Credit/no credit only. Offered: W.

**EDPSY 569 Seminar in Counseling Psychology Research (2)** Methodological and professional issues related to research in counseling and psychological services. Counseling psychology research literature with focus on content and methods. Prerequisite: EDPSY 591 or equivalent. Offered: A.

**EDPSY 570 Introduction to School Psychology (2, max. 4)** Current issues in professional psychology practice and research. Limited to graduate students in school psychology. Offered: A.

**EDPSY 571 Educational Applications of Neuropsychology: Assessment and Intervention (5)** Students observe and administer neuropsychological tests and plan and carry out educational interventions for children with neuropsychological disorders. Content focuses on various neuropsychological disorders for which school psychologists can provide assessment and consultation. Prerequisite: EDPSY 540 or equivalent course in individual testing, and EDPSY 471 or permission of the instructor.

**EDPSY 572 Social-Emotional Assessment (3)** Techniques in social-emotional assessment of school-aged children. Diagnostic systems including DSM IV presented in conjunction with assessment techniques. Emphasis on integrative method for understanding social emotional assessment batteries and reliability and validity of their test score interpretation. Prerequisite: school psychology or counseling student or permission of instructor. Offered: A.

**EDPSY 573 Psychological Assessment of Preschool Children (3)** Students learn to give and interpret tests of intellectual development to assess language, play, and social/emotional functioning, and to write psychological assessment reports for infants, toddlers, and preschoolers. Credit/no credit only. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: Sp.

**EDPSY 575 Structural Equation Modeling (3)** Theory and data analysis using linear structural equation models. Application to data in educational research. Prerequisite: EDPSY 594 or equivalent. Offered: alternate years.

**EDPSY 576 Hierarchical Linear Models (3)** Theory and data analysis for research models where random factors are nested, such as multi-level data, growth curve analysis, and meta-analysis. Prerequisite: EDPSY 593 or equivalent. Offered: alternate years.

**EDPSY 580 Seminar: The Emergence of Educational Psychology (3)** Examination of documents by selected contributors to the field of educational psychology. Special focus on period from mid-nineteenth century to the later twentieth century. Prerequisite: graduate standing. Offered: A.

**EDPSY 581 Seminar in Educational Psychology (1-5, max. 15)** Advanced seminar on selected topics in educational psychology. A critical appraisal of current research. Prerequisite: advanced degree work in educational psychology. Offered: AWSp.

**EDPSY 582 Seminar in Development and Socialization (3, max. 15)** Advanced seminar on selected topics concerned with human development and socialization processes. Emphasis placed upon empirical research and its theoretical underpinnings in such areas as cognitive development, moral development and education, self-concept development, and related concerns.

**EDPSY 583 Seminar in Learning and Thinking (3, max. 15)** Seminar in the psychology of learning language and language learning. Each seminar is offered with predesignated emphasis in one of the following topics: linguistics, phonology, pragmatics, psycholinguistics, semantics.

**EDPSY 584 Seminar in Quantitative Methods (3, max. 15)** Seminar on such topics as measurement techniques, research design, psychometrics, and statistics.

**EDPSY 586- Qualitative Methods of Educational Research (5-)** Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics. Offered: jointly with EDC&I 578; AW.

**EDPSY 587- Qualitative Methods of Educational Research (5-)** Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics. Offered: jointly with EDC&I 579; AW.

**EDPSY 588 Survey Research Methodology and Theory (3)** Survey research, research, theory, and methodology. Probability theory, sampling, human subjects considerations, instrumentation, and analysis techniques. Review and critique by students of theoretical issues in survey research and development of a survey instrument. Prerequisite: EDPSY 490 or equivalent. Offered: A.

**EDPSY 589 Scholarly Writing in Education and Psychology (3)** Introduction to the demands and expectations for technical writing in education and psychology, including aspects of the culture of scholarship. Designed for competent writers. Does not address basic grammar and composition. Credit/no credit only. Prerequisite: doctoral standing, and permission of instructor. Offered: W.

**EDPSY 590 Computer Utilization in Educational Research (3)** Computer utilization in solution of research problems, data reduction to forms amenable to computer solution, appropriate framing of problems for solutions by computer. Using an interactive system, editors, and program packages. Prerequisite: EDPSY 490. Offered: A.

**EDPSY 591 Methods of Educational Research (3)** Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisite: EDPSY 490. Offered: AWSp.

**EDPSY 592 Advanced Educational Measurements (3)** Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and item analysis and standards for educational and psychological tests. Prerequisite: EDPSY 490. Offered: Sp.

**EDPSY 593 Experimental Design and Analysis (5)** Experimental design with emphasis on the analysis of variance. Prerequisite: EDPSY 490 or equivalent. Offered: W.

**EDPSY 594 Advanced Correlational Techniques (5)** Multivariate analysis, including regression and multiple correlation; matrix algebra; factor analysis. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

**EDPSY 595 Item Response Theory Models of Testing (3)** In depth exploration of IRT models and their roles in the development of large scale educational and psychological tests. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 594. Offered: A.

**EDPSY 596 Program Evaluation (3)** Advanced course in evaluation research emphasizing nontraditional designs, especially those that impose severe ecological constraints on the evaluators. Prerequisite: EDPSY 593, EDPSY 594, EDC&I 597, or permission of instructor.

**EDPSY 597 Technical Requirements of Large Scale Tests (3)** Theoretical and practical understanding of the quantitative aspects of large-scale tests, including: scaling, norms development, and the development of derived and interpretive scores, evidence for validity and reliability. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 595.

**EDPSY 599 Independent Studies in Education (\*)** Independent studies or readings of specialized aspects of education. Offered: AWSp.

**EDPSY 600 Independent Study or Research (\*)** Prerequisite: permission of instructor. required. Offered: AWSp.

**EDPSY 601 Internship (3-10, max. 10)** Offered: AWSp.

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## Special Education

**EDSPE 404 Exceptional Children (3)** *Edgar, Rodriquez* Children with disabilities studied from the point of view of education. Offered: AWS.

**EDSPE 414 Introduction to Early Childhood Special Education (3)** *Schwartz* Provides students with a comprehensive overview of major aspects of the field of early childhood special education. Theoretical foundations and program development and implementation are presented in an approach that integrates theory, research, and practice. Offered: AS.

**EDSPE 419 Interventions for Families of Children with Disabilities (3)** *Rodriquez* Upper-division course for professionals and paraprofessionals working with families of children with disabilities. Offered: SpS.

**EDSPE 420 Classroom Management of the Physical Problems of Individuals With Severe or Profound Disabilities (3)** *Kartin* Overview of physical management of pupils with severe or profound disabilities in educational settings. Principles of normal motor development, positioning, and handling are applied to the development of classroom strategies. Effects of abnormal motor development on educational programming. Offered: WS.

**EDSPE 496 Workshop in Special Education (1-10, max. 15)** Demonstration, observation, and/or participation with groups of disabled children in laboratory or controlled classroom settings. Offered: AWSpS.

**EDSPE 499 Undergraduate Research (2-5, max. 5)** Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program. Offered: AWSpS.

**EDSPE 500 Field Study (1-6, max. 6)** Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor. Offered: A/WSpS.

**EDSPE 504 Special Education and the Law (3)** *Brown* Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis on procedural and substantive rights of children with disabling conditions. Offered: jointly with EDLPS 516; W.

**EDSPE 505 Curriculum Development of Students with Moderate to Severe Disabilities (3)** Addresses issues and practices in the development of appropriate curricula for students with moderate to severe or profound disabilities. Includes curriculum models, methods for the selection of appropriate skills for inclusion in Individualized Education Plans, and establishing priorities for instruction. Offered: W.

**EDSPE 507 Instructional Methods for Students with Moderate to Severe Disabilities (3)** *Billingsley* Details a systematic instructional process for the education of students with moderate to severe or profound disabilities. Includes instructional methods and materials designed to promote the development of skills that are required in school, home, and community settings, and to reduce challenging behaviors. Offered: A.

**EDSPE 510 Behavioral Measurement and Management in the Classroom (3)** *White* Response measurement in the classroom; use of data analysis for instructional decisions and behavior management; instructional programming for children with disabilities. Offered: A.

**EDSPE 511 Methods of Applied Behavior Analysis Research (3)** *Billingsley, White* Characteristics of applied behavior analysis are presented: direct, daily measurement, and the systematic investigation of important variables. Representative studies from various applied situations are discussed in terms of dependent and independent variables, research design, reliability, validity, and data analysis. Prerequisite: EDSPE 510 or equivalent preparation. Offered: WSp.

**EDSPE 513 Principles of Clinical Appraisal for Teachers of Exceptional Children (3)** *Jenkins, Troia* Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical and measurement considerations are used to buttress practical experiences in appraisal related to intervention. Offered: AS.

**EDSPE 514 Fundamentals of Reading for Children with Disabilities (3)** *Jenkins* Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the disabled child. Acquisition of comprehension skills by the disabled. Diagnosis of reading problems, published materials appropriate for children with disabilities, material modification. Offered: WS.

**EDSPE 515 Problems and Issues in Special Education (3, max. 9)** *Edgar* Intensive examination of the issues pertinent to special education, such as legislation, interdisciplinary functions, and the role of special education in general education and placement practices. Offered: Sp.

**EDSPE 517 Practicum in Research Design and Analysis in Special Education (1-4, max. 10)** Critical analysis of current research in special education and related fields serves as background for designing applied research projects. Projects are examined, evaluated, and revised in seminar discussion. Prerequisite: EDPSY 490 and EDSPE 591 or equivalent and permission of instructor. Offered: A/WSpS.

**EDPSE 518 Seminar in Special Education Research (1-3, max. 9)** Designed for doctoral students in special education during their first year of residency. Each candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and communication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal. Credit/no credit only. Offered: A/WSp.

**EDSPE 520 Seminar in Applied Special Education (1-12, max. 12)** *Jenkins, Rodriguez, Sandall, Schwartz* Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Offered: A/WSp.

**EDSPE 521 Communication and Language in Young Exceptional Children (3)** *Schwartz* Review and discussion of theories of language acquisition as they relate to communication and language in young children with special needs. Review of research of language environments that relate to early literacy and education and how to use this information to modify environments for children with special needs. Offered: jointly with EDPSY 519; W.

**EDSPE 522 Seminar on the Education of Students with Severe Disabilities (3)** *White* Advanced graduate seminar arranged to study and discuss the essential components of providing a comprehensive approach to the identification and education of infants, children, adolescents, and young adults with severe disabilities. Offered: Sp.

**EDSPE 523 Specific Numeracy Techniques for Elementary Students with Mild Disabilities (3)** *Neel* Provides the teacher with specific techniques for teaching numeracy to elementary students with mild disabilities in inclusive settings. Prerequisite: EDTEP 522 or equivalent. Offered: SpS.

**EDSPE 525 Educating Students with Autism or Severe Behavior Disorders (3)** *Schwartz* Consideration of the identification, etiology, education, and outcomes of individuals with autism or other severe behavior-disorders. Offered: Sp.

**EDSPE 526 Techniques for Instructing Social Behaviors for Elementary Students with Mild Disabilities (3)** *Cheney, Troia* Provides prospective and practicing teachers with foundational theory and knowledge to select specific techniques to promote social competency in elementary children with mild disabilities. Discusses research related to use of these techniques and interventions. Develops schoolwide, classroom, and individual plans for teaching social skills. Offered: ASpS.

**EDSPE 541 Education of Children with Behavior Disorders (3)** *Cheney, Neel* Introductory course covering characteristics of and educational practices for children with emotional/behavioral disabilities. Reviews theory, definitional issues, models, assessment, and instructional methods for educating children with emotional and behavioral disorders. Students develop a working knowledge of educational approaches for teaching students with emotional/behavioral disabilities. Offered: alternate years; W.

**EDSPE 545 Instructional Modifications for the Education of Children with Mild Disabilities (3)** *Lovitt, Troia* In-depth analysis and application of several modifications of instructional techniques necessary for the education of students with mild disabilities. Offered: WSpS.

**EDSPE 546 Seminar in Educating Children with Behavior Disorders (3, max. 9)** *Cheney, Neel* Advanced-level seminars focus on contemporary research topics relating to the effective education of children with serious behavior disorders. Students analyze and review research pertinent to the chosen topics and prepare a scholarly manuscript for dissemination. Offered: alternate years; W.

**EDSPE 548 Special Topics in the Education of the Learning Disabled (3, max. 12)** In-depth analysis of empirical findings in the specialty of learning disabilities with focus on the synthesis of research findings and their application to the educational environment. A paper suitable for publication required. Prerequisite: course in learning theory, introductory course in learning disabilities, or equivalent preparation.

**EDSPE 561 Educational Assessment of Young Children with Special Needs (3)** *Sandall* Special standardized and educational measurement and evaluation procedures for use with young children with a variety of disabling conditions. Observation, ecological assessment, and programming strategies are discussed in combination with practical application of the skills within an educational framework. Offered: A.

**EDSPE 562 Curricula for Preschool Children with Disabilities (3)** *Sandall* Basic theoretical models and approaches to curricula for preschoolers with disabilities. Promote specific preschool curricula and develop skills to assist students in critiquing and evaluating curricula. How to adapt materials for specific populations and to plan a program for exceptional preschoolers. Offered: Sp.

**EDSPE 563 Issues in Working with Families of Young Children with Special Needs (3)** *Rodriguez* Adjustment of parents to the presence of a young child with disabilities, transactions that occur between parents and their children, procedures that facilitate the child's development through these interactions, and strategies to promote relationships among families and professionals. Offered: W.

**EDSPE 565 Seminar: Early Childhood Education for Children with Disabilities (3, max. 9)** *Schwartz* Advanced seminar on early childhood education for infants and young children with disabilities. Historical and current research from special education and related fields reviewed with regard to their application to the education of young children with disabilities.

**EDSPE 599 Independent Studies in Education (\*)** Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed. Offered: A/WSpS.

**EDSPE 600 Independent Study or Research (\*)** Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed. Offered: A/WSpS.

**EDSPE 601 Internship (1-10)** Prerequisite: graduate standing and permission based on prearrangement of internship placement and approval by adviser. Offered: A/WSpS.

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## Teacher Education Program

**EDTEP 501 First Quarter Field Experience—Elementary (2)** Field experience and small group discussions accompanying the first quarter of study in the Elementary Teacher Education Program. Two weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

**EDTEP 502 Second Quarter Field Experience—Elementary (3)** Field experience and small group discussions accompanying the second quarter of study in the Elementary Teacher Education Program. Four weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

**EDTEP 503 Third Quarter Field Experience—Elementary (4)** Field experience and small group discussions accompanying third quarter of study in Elementary Teacher Education Program. Observe school year opening full-time for approximately one month in August and September and spend full-time days as assigned during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

**EDTEP 505 Fifth Quarter Field Experience—Elementary (2)** Field experience accompanying the fifth quarter of study in the Elementary Teacher Education Program. School placements and small group discussions. Credit/no credit only. Prerequisite: elementary TEP student.

**EDTEP 511 School and Society (3)** Exploration of issues regarding schooling and society, such as matters of value and value tension in American schools. Consideration of social values such as equality, opportunity, pluralism, and community; historical and contemporary evidence of values in schooling; and how values can conflict in policy and practice. Prerequisite: elementary TEP student.

**EDTEP 521 Topics and Issues in Numeracy (3)** Focus on mathematics from the perspective of the learner and on the meaning of understanding a mathematics concept. Examination of cultural aspects of the development of these concepts. Prerequisite: elementary TEP student.

**EDTEP 522 Teaching and Learning in Numeracy (3)** Focus on pedagogy of mathematics. In conjunction with field experience, students extend understanding of mathematics and successfully integrate mathematics as a tool for learning science and art. Prerequisite: elementary TEP student.

**EDTEP 523 Teaching and Learning in Science (3)** Science teaching in a manner consistent with how young children learn science concepts and skills. Opportunities are provided for work on science activities similar to those used with elementary school children and to experience many of the problems and successes of preadolescents. Prerequisite: elementary TEP student.

**EDTEP 531 Topics and Issues in Literacy (3)** Investigation of the multiple natures of literacy development. Students study the impact of culture and family on literacy development by reading and discussing a variety of texts while also experiencing the development of their own learning through literature study, the writing process, and oral presentations. Prerequisite: elementary TEP student.

**EDTEP 532 Teaching and Learning in Literacy I (3)** Introduces participants to the content and process of literacy learning in elementary school. Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

**EDTEP 533 Teaching and Learning in Literacy II (3)** Introduces participants to the content and process of literacy learning in elementary school. Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

**EDTEP 541 Dilemmas of Teaching and Learning in Elementary School (3)** Covers human learning in the elementary school setting with emphasis on discipline-specific cognition and cognitive development. Prerequisite: elementary TEP student.

**EDTEP 542 Meeting the Needs of All Students—Elementary (4)** Overview of physical, cognitive, and social development of elementary school age children. Discussion of ways in which differences in development may affect children in school. Provides elementary teachers with understanding of how to

facilitate the success of all children in general education classrooms. Prerequisite: elementary TEP student.

**EDTEP 543 Integrating Social Studies and the Arts (3)** Introduction to objectives, content, and teaching strategies of social studies and the arts as taught in elementary school. Emphasis on integration of the two subjects, as well as other curricular areas, within the context of instructional units. Prerequisite: elementary TEP student.

**EDTEP 552 Assessment in Elementary Education (3)** Emphasis on methods of assessment that reinforce understanding of the various disciplines. Includes performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: elementary TEP student.

**EDTEP 561 Dilemmas of Teaching and Learning (5)** Study of human learning in an educational setting, with an emphasis on learning of school subjects. Topics include nature of learning, knowledge and teaching, motivation, culture, and cognition. Prerequisite: secondary TEP student.

**EDTEP 562- Adolescent Development and Education I (3-)** Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

**EDTEP 563 Adolescent Development and Education II (-3)** Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

**EDTEP 564 Working in Secondary Schools (3)** Organizational, personal, and interpersonal aspects of working as a teacher in a secondary school. Preparation for membership and leadership in a learning community and for continuing professional growth. Credit/no credit only. Prerequisite: secondary TEP student.

**EDTEP 565 Planning and Teaching an Integrated Curriculum (3)** Introduction of models for integrating curriculum, congruent instructional and assessment strategies, and team planning skills. Provides direct and experiential learning activities and results in production of team-planned curricular units based on two different models of curriculum integration. Prerequisite: secondary TEP student.

**EDTEP 571 Topics and Tensions in School and Society (3)** Exploration of issues of value and value tension in American schools. Consideration of social values of equality, opportunity, pluralism, and community, historical and contemporary evidence of values in schooling, and how values can conflict in policy and practice. Prerequisite: secondary TEP student.

**EDTEP 573 Assessment in Secondary Education (3)** Strong emphasis on methods of assessment that reinforce understanding of the various disciplines, including performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: secondary TEP student.

**EDTEP 580- Teaching English and Language Arts in Secondary School I (5-)** Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP -581 Teaching English and Language Arts in Secondary School II (-3)** Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP 582- Teaching Mathematics in the Secondary School I (5-)** Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP -583 Teaching Mathematics in the Secondary School II (-3)** Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP 584- Teaching Social Studies in the Secondary School I (5-)** Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

**EDTEP -585 Teaching Social Studies in the Secondary School II (-3)** Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

**EDTEP 586- Teaching Science in the Secondary School I (5-)** Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP -587 Teaching Science in the Secondary School I (-3)** Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

**EDTEP 588- Teaching World Languages I (5-)** Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills—reading, writing, speaking, listening—and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

**EDTEP -589 Teaching World Languages II (-3)** Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills—reading, writing, speaking, listening—and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

**EDTEP 591 First Quarter Field Experience—Secondary (3)** Field experience and small group discussions accompanying the first quarter of study in the Secondary Teacher Education Program. Observe school year opening full-time for approximately one month in August and September and two weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

**EDTEP 592 Second Quarter Field Experience—Secondary (3)** Field experience and small group discussions accompanying the second quarter of study in the Secondary Teacher Education Program. Three weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

**EDTEP 593 Third Quarter Field Experience—Secondary (3)** Field experience and small group discussions accompanying third quarter of study in Secondary Teacher Education Program. Four weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

**EDTEP 595 Fifth Quarter Field Experience—Secondary (3)** Field experience accompanying the fifth quarter of study in the Secondary Teacher Education Program. School placements and small group discussions. Credit/no credit only. Prerequisite: secondary TEP student.

**EDTEP 600 Independent Study or Research (1, max. 6)** Registration must be accompanied by a study prospectus endorsed by the Director of Teacher Education or the Associate Dean for Professional Programs and the faculty adviser for the work proposed. Credit/no credit only.

**EDTEP 601 Fourth Quarter Field Experience (2-10, max. 15)** Field experience during the fourth quarter of study in the Teacher Education Program. Full-time student teaching in supervised school placements. Prerequisite: TEP student.

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## Independent Study, Research, and Field Experiences

**EDUC 301 Introductory Practice in Community Service Activity (1-10, max 10)** Observation and participation in a variety of activities in a K-12 classroom. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

**EDUC 401 Practicum in Community Service Activity (1-10, max. 10)** Tutoring and teaching experiences in a school or community service organization. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

**EDUC 700 Master's Thesis (\*)** Prerequisite: permission of faculty adviser and graduate program coordinator. Offered: AWSpS.

**EDUC 800 Doctoral Dissertation (\*)** Prerequisite: permission of supervisory committee chairperson and graduate program coordinator. Offered: AWSp.



# College of Engineering

## Dean

Denice D. Denton  
371 Loew

## Associate Deans

Mary E. Lidstrom  
Mani Soma



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/College\\_Engineering.html](http://www.washington.edu/students/genocat/academic/College_Engineering.html)



College Web page:  
[www.engr.washington.edu](http://www.engr.washington.edu)

Engineering is an increasingly critical societal enterprise. More than ever before, the engineer is challenged both to design products whose value is high by social and economic measures and to provide for efficient manufacture of such products within the constraints of environmental protection and diminishing raw-material resources. Requirements imposed on the transportation system and other elements of society's physical infrastructure pose analogous challenges. At the same time, reductions in computer costs and increases in sophistication are dramatically influencing both the products and processes designed by the engineer and the actual practice of engineering.

The primary goal of the College of Engineering educational programs is to prepare students for a professional career in engineering by providing the technical foundation required for success in industry, government, or academia. Other goals of the College are to instill within its students the highest ethical standards, the capability for lifelong learning, and a curiosity about the world. Excellence in undergraduate and graduate academic programs remains the College's highest priority.

The College offers active educational and research programs, both departmental and interdisciplinary, at the graduate levels. (See Interdisciplinary Engineering Studies Program for interdisciplinary undergraduate and graduate programs.)

The College of Engineering has been a major unit of the University since 1899. The first engineering degrees were authorized in mining engineering and metallurgical engineering in 1898. Degrees were added for civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), ceramic engineering (1919), aeronautical engineering (1929), bioengineering (1983), industrial engineering (1986), and computer engineering (1987). A degree program in technical communication was implemented in 1991. In 1999, 1,566 upper-division undergraduate majors and 1,407 graduate students were enrolled in engineering programs taught by a faculty of 195 members.

## College Facilities

Teaching and research activities of the College are conducted in thirteen major campus buildings (and portions of others), which contain the College's offices, classrooms, and research and teaching laboratories. The Engineering Library, a branch of the University Libraries, provides outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. Computers and terminals are available in all departments and at the University's Academic Computer Center.

## Student Organizations and Activities

All of the major professional engineering societies have student chapters on campus, and all engineering students are encouraged to join the chapter that represents his or her field of interest. The College also has student chapters of the Society of Women Engineers, American Indian Science and Engineering Society, National Society of Black Engineers, and the Society of Hispanic Professional Engineers. The Pre-Engineering Student Association (PESA) is the major College-wide organization for all students enrolled in a pre-engineering course of study but not yet admitted to a department. The Engineering Student Council, comprising student representatives from all departments and professional societies, is the major College-wide student organization and participates actively in College affairs. Honor societies open to engineering students are Tau Beta Pi and Sigma Xi.

Students serve with faculty members on engineering policy committees which make recommendations concerning instructor evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

## Educational Outreach

Engineering Professional Programs:  
[www.engr.washington.edu/~uw-epp/](http://www.engr.washington.edu/~uw-epp/)

Education at a Distance for Growth and Excellence:  
[www.engr.washington.edu/edge/](http://www.engr.washington.edu/edge/)

Fulfilling a commitment to lifelong learning, the College of Engineering offers courses, workshops, and conferences to respond to the professional development needs of practicing engineers and related technical professionals worldwide. Through Engineering Professional Programs (EPP) and Education at a Distance for Growth and Excellence (EDGE) thousands of practicing engineers update their technical knowledge or pursue advanced degrees each year. For more information contact Engineering Professional Programs at (206) 543-5539, or Education at a Distance for Growth and Excellence at (206) 685-2242.

## Special Facilities

### Office of Engineering Research

Coordinator, Mary Heusner  
372 Loew



[www.engr.washington.edu/research/](http://www.engr.washington.edu/research/)

The Office of Engineering Research promotes, stimulates, and coordinates research in all fields of engineering. Its primary role is to coordinate interdisciplinary research programs and national research initiatives. The Office of Research also reviews grant and contract proposals, tracks awards, and provides information on funding opportunities. This office allocates limited matching funds to College units to increase the quality of research in the College of Engineering.

## Interdisciplinary Engineering Studies Program

356 Loew Hall, Box 352180  
(206) 543-1770  
[engradv@engr.washington.edu](mailto:engradv@engr.washington.edu)

The College of Engineering directly administers non-departmental undergraduate and graduate degree programs. Some engineering fundamentals and writing courses required for admission to the departments are managed by specific engineering departments.

## Graduate Programs

The College also offers graduate programs leading to the Master of Science in Engineering and Master of Science degrees, without designation of a specific major.

Approved programs lead to the M.S.E. degree in civil, mechanical, electrical, chemical, and interengineering, and approved programs lead to the M.S. degree in civil engineering, interengineering, and materials science and engineering. Admission requires a B.S. degree in engineering, mathematics, or physical science, and evidence of aptitude for graduate study. Submission of scores on the Graduate Record Examination is required.

## Master of Science in Engineering

The Interengineering Master of Science in Engineering (M.S.E.) and Master of Science (M.S.) program is intended for students whose desired course of study includes two or more engineering departments and may also include study in departments outside the College of Engineering. Applications and files of students entering the M.S./M.S.E. option are handled in the Office of Organizational Infrastructure. Admission to the interengineering option requires a statement describing the applicant's objectives. This statement should state why the student wants to enter the M.S./M.S.E. program rather than one of the traditional engineering graduate programs. Applicants to the M.S./M.S.E. program must have well-defined educational objectives which cannot be satisfied by established engineering programs. Graduation and entrance requirements, which differ for the various programs, may be obtained from the Office of Organizational Infrastructure, College of Engineering, (206) 543-8590.

## Program in Engineering and Manufacturing Management—PEMM Fellows



[www.engr.washington.edu/pemm](http://www.engr.washington.edu/pemm)

For students interested in a career in manufacturing management, PEMM offers a two-year (24-month) joint degree program leading to both M.B.A. (Master of Business Administration) and M.S.E. (Master of Science in Engineering) degrees. PEMM applicants must apply to the M.B.A. program as well as the M.S.E. Interengineering/PEMM program. Prospective students must take the GMAT examination before applying. The Graduate Program Office in the School of Business must receive all M.B.A. applications by March 1. The deadline for submitting the PEMM application to the College of Engineering is March 1. Graduation and entrance requirements may be obtained from the Program in Engineering and Manufacturing Management (PEMM) at (206) 543-5349 or (206) 685-8047 or via email at [pemm@u.washington.edu](mailto:pemm@u.washington.edu)

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ENGR 498 Special Topics in Engineering (1-5, max. 6)** Offered: AWSpS.

**ENGR 499 Special Projects in Engineering (1-3, max. 6)** Offered: AWSpS.

## Courses for Graduates Only

**ENGR 598 Seminar Series in Engineering (1, max. 12)** Kalonji, Reed Seminar series on topics of interest to all engineering students.

# Aeronautics and Astronautics

206 Guggenheim



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Aeronautics\\_Astro.html](http://www.washington.edu/students/genocat/academic/Aeronautics_Astro.html)



Department Web page:  
[www.aa.washington.edu](http://www.aa.washington.edu)

Aeronautics and Astronautics deals with the design and analysis of air and space vehicles, and a broad spectrum of related engineering science, such as aerodynamics, structural mechanics, automatic controls, flight mechanics, space dynamics, propulsion, plasma dynamics, and related topics. Established in 1930, the department is one of the original aerospace engineering departments in the nation, and is the only one in the Pacific Northwest, a region whose vast aerospace industry is a major contributor to the technological development, economic vitality, and security of the United States. Educators and researchers in the department have contributed profusely to all major areas of aerospace engineering. Graduates at all degree levels have been successful and valued at local, national, and international industries, as well as at government organizations and institutes of higher learning. The department is unique at the University of Washington, in terms of its specific technological applications, its capacity for multidisciplinary integration of complex systems, and its long-term interaction with local industry.

## Graduate Program

Graduate Program Coordinator  
206 Guggenheim, Box 352400  
(206) 543-1950  
[gradadvising@aa.washington.edu](mailto:gradadvising@aa.washington.edu)

The Department of Aeronautics and Astronautics offers programs that provide a foundation in the engineering sciences and study in various engineering applications. These lead to the degrees of Master of Science in Aeronautics and Astronautics, Master of Aerospace Engineering, or Doctor of Philosophy.

## Master of Science in Aeronautics and Astronautics (M.S.A.A.)

The program of study is tailored to the needs and interests of the student. Each program must be approved by the department graduate committee and must provide breadth through a variety of subjects, depth through extensive study of a specialized field,

and analytical strength. Minimum programs consist of either 13 courses, or 10 courses and a 9-credit thesis.

## Master of Aerospace Engineering (M.A.E.)

The program is intended for recent graduates or engineers who wish to expand their knowledge in multidisciplinary areas while also learning other aspects of aerospace engineering, such as business, management, manufacturing, or communication. The student must complete a minimum of 37 credits of course work and 8 credits of independent or team project work in a program approved by the department graduate committee. The Master of Aerospace Engineering (M.A.E.) program is structured to permit completion of the degree requirements as a full-time or part-time student. The M.A.E. is a terminal degree and is not intended for those seeking a Ph.D.

## Doctor of Philosophy (Ph.D.)

The doctoral program consists of lectures, seminars, discussions, and independent study, enabling the student to master and to make original contributions to a particular field. In addition to the formal steps for obtaining the degree listed in the Graduate School section of this catalog, the student must complete an approved program of study consisting of 30 credits of course work beyond that required for the Master of Science in Aeronautics and Astronautics, and is expected to be in continuous full-time residence for a minimum of one academic year after advancement to Candidate standing.

## Research Activities

Research facilities include the Kirsten 8x12-foot low-speed wind tunnel, a water tunnel, a blow-down tunnel, shock tunnels and Ludwig tubes, a projectile accelerator, material and structural test machines, a dynamic-fracture laboratory, a composite-material laboratory, various fusion-research and engineering physics laboratories, and a development laboratory for small satellites. A variety of computer facilities is available, including a computational fluid dynamics laboratory and a new controls laboratory. The Aerospace and Energetics Research Program, which conducts interdisciplinary research in the Aerospace and Engineering Research Building, is also part of the Department of Aeronautics and Astronautics.

Externally funded research is carried out by faculty members and students on such topics as buoyant flows, separation control, combustor mixing, shear layers, computational fluid dynamics, internal flows, reacting flows, ram accelerators, space energy systems, space system design, control system design and engineering, robust and optimal control, wing optimization, impact mechanics, composite material structure and fracture, plasma dynamics, space propulsion, and fusion research.

## Special Facilities/Programs

### Aerospace and Energetics Research Program (AERP)

120 Aerospace and Engineering Research Building

The Aerospace and Energetics Research Program is directed toward high-technology engineering research and teaching through research. The program anticipates and tries to outpace the nation's critical technology needs. It therefore emphasizes those engineering skills that both match the requirements of the present and future, and develop in students a broad understanding of the impact of technology on society. Suitable programs are designed to develop the student's imagination and a willingness to respond to the complex and rapidly changing future of engineering. This directs the faculty's efforts and creates within the principal investigators, research faculty, and students the concept of engineering as an adventure.

The program covers many fields, usually centered on energy or aerospace. Currently the program is active in plasma engineering related to fusion power, space energy systems, ram accelerators, advanced gas-dynamics research involving new propulsive techniques, cryogenic automobile propulsion, and the use of shock waves to process chemicals.

## University of Washington Aeronautical Laboratory (UWAL)

Kirsten Aeronautical Laboratory

The primary facility that UWAL operates is the Kirsten Wind Tunnel, a subsonic, closed-circuit, double-return tunnel with an 8x12-foot test section. Undergraduate students, usually from the Department of Aeronautics and Astronautics, are employed at UWAL to run tests for University research, commercial customers, and for instructional uses, such as student projects. UWAL provides departmental support for research projects such as the Remotely Piloted Vehicle Project (RPV).

## Admission

Students who have earned a baccalaureate degree in an accredited program of aeronautics and astronautics or closely related field are eligible for the M.S.A.A. and M.A.E. programs. Backgrounds in related fields require review on a case-by-case basis and preparatory courses may be required, depending on the student's previous studies and educational objectives. Admission is competitive, with the equivalent of a 3.00 GPA a minimum standard. Submission of verbal, quantitative, and analytical scores on the Graduate Record Examination is required. Entrance-requirement details, application deadlines, application forms, and advising literature may be obtained from the department office or the department's Web page ([www.aa.washington.edu](http://www.aa.washington.edu)).

Admission to the Doctor of Philosophy program is based on satisfactory performance on a departmental qualifying examination. Admission to that examination is based on evidence of superior academic ability.

## Additional Information

Students who intend to work toward advanced degrees must apply for admission to the Graduate School. Most students are financially supported by the department as teaching or research assistants, or by their employers. For further information on this or other aspects of department programs, contact the Graduate Program Coordinator, 206 Guggenheim, Box 352400, or visit the department's Web site at [www.aa.washington.edu](http://www.aa.washington.edu).

## Faculty

### Chair

Adam Bruckner

### Professors

Bollard, R. John \* 1961, (Emeritus); PhD, 1954, Purdue University; mechanics of materials, structural mechanics, aeroelasticity, design and crashworthiness of aircraft.

Breidenthal, Robert E. \* 1980; PhD, 1979, California Institute of Technology; turbulence, mixing, combustion, vorticity, bluff body flows.

Bruckner, Adam \* 1972; PhD, 1972, Princeton University; space systems, propulsion, mission design, resource utilizations; hypervelocity accelerators.

Christiansen, Walter H. \* 1967; PhD, 1961, California Institute of Technology; gas dynamics and gas physics, high-power gas lasers, energy conversion.

Clark, Robert N. \* 1957, (Emeritus); PhD, 1969, Stanford University; automatic control systems, fault detection in dynamic systems.

Decher, Reiner \* 1973; PhD, 1968, Massachusetts Institute of Technology; aircraft propulsion, fluid mechanics, energy conversion.

Eastman, Fred 1974, (Emeritus); MS, 1929, Massachusetts Institute of Technology; aeronautics and astronautics.

Fyfe, Ian M. \* 1959, (Emeritus); PhD, 1957, Stanford University; dynamics, fracture mechanics.

Hertzberg, Abraham \* 1966, (Emeritus); MAEE, 1949, Cornell University; high-power lasers, fusion research, solar energy, space systems, energy systems, heat transfer.

Hoffman, Alan Lowell \* 1989; PhD, 1967, California Institute of Technology; plasma physics and magnetic confinement fusion.

Holsapple, Keith A. \* 1965; PhD, 1965, University of Washington; solid mechanics, continuum mechanics, structures, waves, finite element methods.

Jarboe, Thomas R. \* 1989; PhD, 1974, University of California (Berkeley); plasma physics and controlled fusion, magnetic reconnection and relaxation.

Joppa, Robert G. \* 1947, (Emeritus); PhD, 1972, Princeton University; aircraft flight mechanics, stability and control.

Keorkian, Jirair \* 1964; PhD, 1961, California Institute of Technology; partial differential equations, perturbation theory.

Kurosaka, Mitsuru \* 1987; PhD, 1968, California Institute of Technology; propulsion, turbo machinery, thermo-fluid mechanics, heat transfer and acoustics.

Lin, Kuen-Yuan \* 1984; PhD, 1977, Massachusetts Institute of Technology; composite materials, structural mechanics, finite element methods.

Parmerter, R. Reid \* 1963, (Emeritus); PhD, 1963, California Institute of Technology; structures, solid mechanics, fracture mechanics.

Pearson, Carl E. \* 1967, (Emeritus); PhD, 1949, Brown University; wave propagation, fluid dynamics, numerical analysis, optimization.

Russell, David A. \* 1967; PhD, 1961, California Institute of Technology; fluid mechanics and gas physics, aerodynamics, shock processes and nonequilibrium flow.

Street, Robert E. 1948, (Emeritus); PhD, 1939, Harvard University; aeronautics and astronautics.

Vagners, Juris \* 1967; PhD, 1967, Stanford University; dynamics, controls and optimization.

### Associate Professors

Eberhardt, David Scott \* 1986; PhD, 1985, Stanford University; computational fluid dynamics, flight mechanics.

Livne, Eli \* 1990; PhD, 1990, University of California (Los Angeles); aeroelasticity, aeroservoelasticity, multidisciplinary design optimization, structural dynamics.

Ly, Uy-Loi \* 1988; PhD, 1983, Stanford University; flight mechanics, flight control, multivariable control, optimization.

Mattick, Arthur T. \* 1975; PhD, 1975, Massachusetts Institute of Technology; gas physics, gas lasers, energy conversion, heat transfer, space power systems.

Slough, John T. \* 1992, (Research); PhD, 1981, Columbia University; plasma physics, magnetic fusion, space propulsion.

### Assistant Professors

Campbell, Mark E. \* 1997; PhD, 1996, Massachusetts Institute of Technology; precision-controlled structures, autonomous aerospace vehicles, smart materials.

Shumlak, Uri 1994; PhD, 1992, University of California (Berkeley); computational fluid dynamics, plasma science, plasma propulsion.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**A A 400 Gas Dynamics (3)** *Christiansen, Eberhardt, Russell* Introduction to kinetic theory and free molecule flows. Review of thermodynamics. One-dimensional gas dynamics: one-dimensional wave motion, waves in supersonic flow, flow in ducts and wind tunnels. Prerequisite: PHYS 123; CHEM E 260. Offered: W.

**A A 402 Fluid Mechanics (3)** *Christiansen, Russell* Inviscid equations of motion, incompressible potential flows, small perturbation flows, bodies of revolution, viscous equations, exact solutions, laminar boundary-layer equations, similar solutions, integral methods. Compressibility, instability, turbulent boundary layers. Prerequisite: MATH 324; A A 300. Offered: Sp.

**A A 405 Introduction to Aerospace Plasmas (3)** *Hoffman, Jarboe, Shumlak* Review of vector analysis. Development of introductory electromagnetic theory including Lorentz force and Maxwell's equations. Plasma description. Single particle motions and drifts in magnetic and electric fields. Derivation of plasma fluid model. Introduction to plasma waves. Applications to electric propulsion, magnetic confinement, and plasmas in space and Earth's outer atmosphere. Prerequisite: PHYS 123; MATH 324. Offered: W

**A A 406 Gas Discharges for Plasma Processing and Other Applications (3)** *Jarboe, Nelson, Shumlak* Lectures and demonstrations on direct-current and radio-frequency electrical discharges for sputtering, plasma etching and other plasma processing applications. Prerequisite: either MATH 136 or MATH 307; PHYS 122.

**A A 409 Computer Tools for Aerospace III (2)** Computer-aided drawing basics, three-dimensional drawing, projections, views. Computer-aided design and analysis tools for stress and heat transfer calculations. Offered: A.

**A A 410- Aircraft Design I (4-)** *Livne* Conceptual design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. Offered: W.

**A A 411 Aircraft Design II (4-)** *Livne* Preliminary design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. Prerequisite: A A 410. Offered: Sp.

**A A 419 Aerospace Heat Transfer (3)** *Bruckner, Jarboe, Mattick* Fundamentals of conductive, convective, and radiative heat transfer with emphasis on applications to atmospheric space flight. Prerequisite: PHYS 123; MATH 307. Offered: A.

**A A 420- Spacecraft and Space Systems Design I (4-)** *Bruckner, Campbell* Design of space systems and spacecraft for advanced near-Earth and interplanetary missions. Astrodynamics, space environment, space systems engineering. Mission design and analysis, space vehicle propulsion, flight mechanics, atmospheric entry, aerobraking, configuration, structural design, power systems, thermal management, systems integration. Design topics vary. Offered: W.

**A A 421 Spacecraft and Space System Design II (4-)** *Bruckner, Campbell* A continuation of 420. Course content varies from year to year and is dependent on the design topic chosen for 420. Prerequisite: A A 420. Offered: Sp.

**A A 430 Finite Element Structural Analysis (3)** *Holsapple, Lin* Introduction to the finite element method and application. One- and two-dimensional problems including trusses, beams, box beams, plane stress and plane strain analysis, and heat transfer. Use of finite element software. Prerequisite: CEE 220. Offered: A.

**A A 432 Composite Materials for Aerospace Structures (3)** *Lin* Introduction to analysis and design of aerospace structures utilizing filamentary composite materials. Basic elastic properties and constitutive relations of composite laminates. Failure criteria, buckling analysis, durability, and damage tolerance of composite structures. Aerospace structure design philosophy and practices. Prerequisite: A A 332. Offered: W.

**A A 441 Flight Mechanics (3)** *Eberhardt* Determination in flight of performance, stability, and control characteristics of aircraft; and comparison with predicted and wind tunnel results. Prerequisite: A A 311. Offered: Sp.

**A A 448 Control Systems Sensors and Actuators (3)** Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials, gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratories per week. Prerequisite: either A A 450 or E E 446. Offered: jointly with E E 448; W.

**A A 449 Design of Automatic Control Systems (4)** Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, nonminimum phase, nonlinear dynamics. Computer-aided analysis, design and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either A A 450, E E 446, or M E 471. Offered: jointly with E E 449; Sp.

**A A 450 Control in Aerospace Systems (4)** *Campbell, Ly, Vagners* Overview of feedback control. Linearization of nonlinear models. Model properties: stability, controllability, observability. Dynamic response: time and frequency domain techniques. Frequency response design techniques. Design of aerospace control systems via case studies. Prerequisite: M E 230; MATH 308. Offered: A.

**A A 461 Propulsion II (3)** *Bruckner, Kurosaka, Mattick* Physical characteristics and components of rockets. Nozzle gasdynamics and non-ideal flow effects. Solid and liquid propulsion systems, components, and design. Electric propulsion fundamentals and applications. Aerodynamics of airbreathing engine components: inlets, compressors, turbines, afterburners, nozzles. Engine design methodology. Prerequisite: A A 360. Offered: A.

**A A 480 Systems Dynamics (3)** *Campbell, Livne* Equations of motion and solutions for selected problems; natural frequencies and mode shapes; response of simple systems to applied loads. Prerequisite: A A 312. Offered: Sp.

**A A 498 Special Topics in Aeronautics and Astronautics (0-1, max. 10)** Lectures and discussions on topics of current interest in aviation and space engineering. Three quarters required for credit. Offered: AWSp.

**A A 499 Special Projects (1-5, max. 10)** Investigation on a special project by the student under the supervision of a faculty member. A maximum of 6 credits may be applied toward senior technical electives. Offered: AWSpS.

## Courses for Graduates Only

**A A 501 Physical Gasdynamics I (3)** *Christiansen, Hoffman, Mattick* Equilibrium kinetic theory; chemical thermodynamics; thermodynamic properties derived from quantum statistical mechanics; reacting gas mixtures; applications to real gas flows and gas dynamics. Offered: odd years; A.

**A A 502 Physical Gasdynamics II (3)** *Christiansen, Hoffman, Mattick* Introduction to vibrational relaxation and nonequilibrium chemistry. Nonequilibrium physics applied to flow. Brief introduction to nonequilibrium kinetic theory. Application to a variety of research and development areas such as high-temperature energy systems and gas lasers. Prerequisite: A A 501 or permission of instructor. Offered: even years; W.

**A A 503 Kinetic Theory/Radiative Transfer (3)** *Christiansen, Hoffman, Mattick* Boltzmann and Collisionless Boltzmann (Vlasov) equations. Instabilities in homogeneous and inhomogeneous plasma, quasi-linear diffusion, wave-particle interaction, collisional (Fokker-Planck) equation. Introduction to radiative non-equilibrium, scattering and absorption processes. Integral equation of radiative transfer. Prerequisite: A A 501 or permission of instructor. Offered: even years; Sp.

**A A 504 Fluid Mechanics (3)** *Breidenthal, Kurosaka, Russell* Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions; integrals of the equations of motion. Boundary conditions and discontinuity surfaces in fluids. Exact solutions. Dimensional analysis. Vorticity dynamics. Highly viscous flows. Rotational flows. Offered: A.

**A A 505 Fluid Mechanics of Inviscid Flow I (3)** *Christiansen, Kurosaka, Russell* Ideal incompressible flow; potential and stream functions. Airfoil theory and lifting line theory. Introduction to nonsteady flow; sound waves and surface waves; special topics. Offered: even years; W.

**A A 506 Fluid Mechanics of Inviscid Flow II (3)** *Breidenthal, Kurosaka, Russell* Ideal compressible flow; supersonic airfoils; shock waves; slender-body theory; lifting surface theory; approximate methods. Transonic flow; similarity; special topics. Prerequisite: A A 505. Offered: even years; Sp.

**A A 507 Aerodynamics of Viscous Fluids I (3)** *Breidenthal, Kurosaka, Russell* Introduction to viscous flow; exact solutions of the laminar equations of motion; approximate equations. Exact solutions for laminar boundary-layer equations. Approximate methods for compressible laminar boundary layers. Offered: odd years; W.

**A A 508 Aerodynamics of Viscous Fluids II (3)** *Breidenthal, Kurosaka, Russell* The phenomena of turbulence; transition prediction; Reynolds stresses; turbulent boundary-layer equations. Approximate methods for turbulent boundary layers. Prerequisite: A A 507 or permission of instructor. Offered: odd years; Sp.

**A A 509 Computational Fluid Dynamics I (3)** *Eberhardt, Shumlak* Numerical approximation of the inviscid compressible equations of fluid dynamics. Analysis of numerical accuracy, stability, and efficiency. Use of explicit, implicit, and flux split methods. Discussion of splitting, approximate factorization, discrete point, and finite volume approaches. Applications to the solution of simple hyperbolic systems of equations and the Euler equations. Offered: W.

**A A 510 Computational Fluid Dynamics II (3)** *Eberhardt, Shumlak* Numerical approximation of equations of compressible viscous flow. Mesh requirements for resolving viscous effects in high Reynolds number flows. Analysis of numerical accuracy, stability, and efficiency. Use of explicit and

implicit methods, boundary condition procedures. Applications to solution of the Navier-Stokes equations. Prerequisite: A A 509 or permission of instructor. Offered: odd years; Sp.

**A A 513 Gas Laser Theory and Practice (3)** *Christiansen, Mattick* Physics and fluid mechanics of gas lasers, with emphasis on performance of gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Development of laser optics, interaction of radiation and matter, laser oscillation conditions, and methods of obtaining population inversions. Applications of high-power lasers emphasized. Offered: even years; Sp.

**A A 516 Stability and Control of Flight Vehicles (3)** *Eberhardt, Livne, Ly* Static and dynamic stability and control of flight vehicles in the atmosphere. Determination of stability derivatives. Effects of stability derivatives on flight characteristics. Flight dynamic model. Responses to control inputs and external disturbances. Handling qualities. Control system components, sensor characteristics. Stability augmentation systems. Offered: W.

**A A 518 Automatic Control of Flight Vehicles (3)** *Ly, Vagners* Specifications of flight vehicle performance. Synthesis of stability augmentation systems and autopilot control laws in the frequency-domain and using multivariable control methods. Reduced-order controller synthesis, digital design, and implementation. Use of computer-aided control design packages. Prerequisite: A A 516 and A A 548. Offered: Sp, odd years.

**A A 520- Seminar (1-, max. 10)** Topics of current interest in aerospace engineering. Credit/no credit only. Prerequisite: A A major. Offered: AWSp.

**A A 523 Special Topics in Fluid Physics (3)** Offered: AWSp.

**A A 524 Aircraft Engine Noise (3)** *Kurosaka* Description and measurement of noise, power spectra. Elementary duct acoustics, rotor-stator interaction, effect of design blade loading. Turbine noise, core noise, acoustic linings. Jet noise, Lighthill theory, scaling laws. Offered: odd years; A.

**A A 525 Aerothermodynamics of Aircraft Engines Components (3)** *Kurosaka* Estimation of component performances. Inlets and nozzles. Aerodynamics of turbines and compressors. Radial equilibrium theory, through-flow theory. Offered: even years; W.

**A A 526 Aerothermodynamics of Aircraft Engine Systems (3)** *Kurosaka* Aircraft gas turbine engine, cycle analysis. Component performance measures. Preliminary design of engines, including component losses. Off-design performance. Variable geometry engines. Offered: even years; Sp.

**A A 527 Energy Conversion I (3)** *Christiansen* Energy resources. Heat generation by combustion, solar collection. Analysis of power systems for space and advanced commercial power generation. High-temperature cycles. Offered: even years; A.

**A A 528 Energy Conversion II (3)** *Christiansen* Heat exchangers, energy storage. Direct conversion of heat to electricity. Electrochemical processes. Recommended: A A 527. Offered: odd years; W.

**A A 529 Space Propulsion (3)** *Jarboe, Shumlak* Nuclear, and heat transfer of nuclear-heated rockets. Electrothermal, electromagnetic, and electrostatic thrusters. Power/propulsion systems. Prerequisite: permission. Offered: odd years; Sp.

**A A 530 Mechanics of Solids (3)** *Holsapple, Lin, Livne* General concepts and theory of solid mechanics. Large deformations. Behavior of elastic, viscoelastic, and plastic solids. Linear theory of elasticity and thermoelasticity. Wave propagation in solids. Offered: A.

**A A 531 Structural Reliability and Damage (3)** *Holsapple* Theory of plasticity, yield surfaces, flow rules, limit theorems. Concepts of failure and fatigue in aerospace structures, residual strength, cumulative damage, probability aspects and case histories. Prerequisite: A A 530 or equivalent or permission of instructor. Offered: odd years; W.

**A A 532 Mechanics of Composite Materials (3)** *Holsapple, Lin* Analyses and design of composite materials for aerospace structures. Micromechanics. Anisotropic elasticity. Laminated plate theory. Thermo-viscoelastic behavior and fracture of composites. Prerequisite: A A 530 or permission of instructor. Offered: odd years; Sp.

**A A 535 Analysis of Shells I (3)** General development of the geometrically non-linear theory of thin elastic shells. Topics include an introduction to tensor analysis with applications to curved two dimensional spaces, theory of surfaces, Kirchhoff approximations, membrane theory and non-linear shallow shells. Offered: even years; Sp.

**A A 540 Finite Element Analysis I (3)** *Holsapple, Lin* Formulation of the finite element method using variational and weighted residual methods. Element types and interpolation functions. Application to elasticity problems, thermal conduction, and other problems of engineering and physics. Offered: W.

**A A 541 Finite Element Analysis II (3)** *Holsapple, Lin* Advanced concepts of the finite element method. Hybrid and boundary element methods. Nonlinear, eigenvalue, and time-dependent problems. Prerequisite: A A 540 or permission of instructor. Offered: Sp.

**A A 546 Mathematical Foundations of Systems Theory (4)** Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with CHEM E 510/E E 510/M E 510; A.

**A A 547 Linear Systems Theory (3)** *Campbell, Ly, Vagners* Transfer-function and state-space description. Solution of the state equation; state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith-McMillan form. Systems norms. Systems inevitability. State feedback. Outback feedback with observers. Prerequisite: graduate standing or permission of instructor. Offered: jointly with EE 584 and ME 575 A.

**A A 548 Linear Multivariable Control (3)** *Ly, Vagners* Single loop feedback control theory; poles, zeros, Nyquist stability, performance, robustness of multivariable systems; multivariable control synthesis: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parameterization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 448 or M E 471 or equivalent. Offered: jointly with E E 548/M E 548; W.

**A A 549 Estimation and System Identification (3)** *Vagners* Review of system models, model structure, model parameterization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: A A/E E/M E 548. Offered: jointly with E E 549/M E 549; Sp.

**A A 550 Nonlinear Optimal Control (3)** *Vagners* Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the

Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with E E 550/M E 550; odd years.

**A A 553 Vibrations of Aerospace Systems (3)** *Livne* Continuous and discrete systems, natural frequencies, and modal analysis; forced vibrations and motion-dependent forces. Structural damping; control augmented structures. Measurements for structural dynamic testing. Prerequisite: A A 571 or equivalent. Offered: odd years; Sp.

**A A 554 Aeroelasticity (3)** *Livne* Static and dynamic aeroelasticity, unsteady aerodynamics, aeroservo-elastic modeling, and active control. Offered: even years; Sp.

**A A 556 Space and Laboratory Plasma Physics (3)** *Hoffman, Jarboe* Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: A A 405, or GPHYS 505, or permission of instructor. Offered: jointly with GPHYS 537; Sp.

**A A 557 Physics of Fusion Plasmas (3)** *Hoffman, Jarboe, Shumlak* Review and comparison of single particle and fluid descriptions of plasmas. MDH equilibrium, flux surfaces, and basic toroidal description. Collisional processes including physical and velocity space diffusion. Introduction to island formation, stochasticity, and various plasma instabilities. Prerequisite: A A 405 or GPHYS 505. Offered: even years; W.

**A A 558 Plasma Theory (3)** *Hoffman, Jarboe, Shumlak* Equilibrium, stability, and confinement. Classical transport, collisionless and resistive skin depths. Ideal MHD equations formally derived and properties of plasmas in the ideal limit are studied. Straight and toroidal equilibrium. Linear stability analysis with examples. Taylor minimum energy principle. Prerequisite: A A 405, A A 556, A A 557, or GPHYS 537. Offered: even years; Sp.

**A A 559 Plasma Science Seminar (1, max. 10)** *Hoffman, Jarboe, Shumlak* Current topics in plasma science and controlled fusion with presentations by invited speakers, on-campus speakers, and students. Students expected to give a seminar once or twice a year with instructor reviewing the method of presentation and material used for the presentation. Credit/no credit only. Offered: AWSp.

**A A 565 Fusion Reactor Fundamentals (3)** *Jarboe* Introduction to basic engineering features of fusion power plants. Brief description of basic fusion physics and discussion of power plants for leading thermonuclear concepts. Engineering problems; blanket, shield neutronics; materials, thermal hydraulics; tritium, superconducting systems. Prerequisite: completion of or concurrent enrollment in A A 405 or permission of instructor. Offered: odd years; W.

**A A 571 Principles of Dynamics I (3)** *Livne, Ly, Vagners* Systems of particles, rotating axes, rigid-body dynamics; calculus of variations. Lagrangian mechanics. Hamilton's principle. Kane's equations. Periodic and quasiperiodic motion. Stability of dynamical systems. Offered: A.

**A A 575 Continuum Mechanics (3)** *Holsapple* General foundations of the fundamental concepts of motion, stress, energy, and electromagnetism for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Offered: jointly with CEE 508; even years; W.

**A A 581 Digital Control I (3)** *Alexandro, Berg, Ly, Vagners* Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents

to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: M E 471 or equivalent; recommended: M E 575 or equivalent. E E 581/M E 581; W.

**A A 582 Digital Control II (3)** *Alexandro, Berg, Ly, Vagners* Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: A A 581 or permission of instructor. Offered: jointly with E E 582/M E 582; Sp.

**A A 591 Robotics and Control Systems Colloquium (1, max. 3)** Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Offered: jointly with CHEM E/E E/M E 591; AWSp.

**A A 599 Special Projects (1-5, max. 15)** Investigation on a special project by the student under the supervision of a faculty member. Offered: AWSpS.

**A A 600 Independent Study or Research (\*)** Offered: AWSpS.

**A A 700 Master's Thesis (\*)** Offered: AWSpS.

**A A 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Bioengineering

309 Harris Hydraulics Laboratory

The Center for Bioengineering provides a comprehensive, multidisciplinary program of education and research. The concepts and techniques of engineering are applied to the challenges in biology and medicine. Major areas of current bioengineering research include distributed diagnostics and home health care, molecular bioengineering and nanotechnology, engineered biomaterials, biomedical imaging and image-guided therapy, and computational bioengineering. Detailed information on Bioengineering, its faculty, and courses appears in the Interschool or Intercollege Programs section of this catalog.

## Chemical Engineering

105 Benson



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Chemical\\_Eng.html](http://www.washington.edu/students/gencat/academic/Chemical_Eng.html)



Department Web page:  
[depts.washington.edu/chemeng/](http://depts.washington.edu/chemeng/)

Chemical engineering is concerned with processes for transforming raw materials into energy and into a great variety of consumer products, such as gasoline, electronic materials, pulp and paper, fertilizers, rubber, polymers and composites, and pharmaceuticals. Chemical engineers work on research and development of these materials and on the processes for making them, as well as on the design and operation of chemical plants and equipment by which production is achieved. This must be done with efficiency, economy, and concern for society and the environment. Some chemical engineers are employed by government agencies. Few other professions can match the diversity of job opportunities available to graduates in chemical engineering.

Chemical engineers employ the skills of mathematics, physics, chemistry, and, increasingly, biology, along with oral and written communication skills. The chemical engineer develops competence in the use of funda-

mental tools for engineering analysis and design: thermodynamics, chemical kinetics and reactor design, fluid mechanics, heat and mass transfer, process control, and economics. At the University, students study intensively in these fields and work in teams, often to solve real-life problems, to acquire knowledge and skills applicable in a variety of specialized fields and industries. Flexibility, in fact, is the hallmark of the chemical engineer.

## Graduate Program

Graduate Program Coordinator  
105 Benson, Box 351750  
(206) 543-2250

The department offers studies leading to the degrees of Doctor of Philosophy, Master of Science in Chemical Engineering, and Master of Science in Engineering. The doctoral degree is centered on the dissertation with a foundation in course work; it is generally completed in four to five years beyond the baccalaureate degree.

In the master's program primary emphasis is placed on course work, and the degree generally requires 21 months of study. Thesis and non-thesis options are available, with the former requiring both course work and research.

The program of study normally includes basic subjects of importance to all chemical engineers, such as thermodynamics, transport phenomena, kinetics, and applied mathematics. In addition, students are invited to take more-specialized courses in chemical engineering or in other departments. Students usually take three courses during their first quarter. In subsequent quarters, less time is spent on course work and more on research.

The department has about sixty full-time graduate students, most of whom are working toward a doctorate. They study and collaborate with members of the faculty in an atmosphere that is informal, friendly, and intellectually vigorous. The range of interests among the faculty members is quite broad, so students in courses and in research work have access to a variety of fields while receiving individual attention and guidance.

## Research Facilities

The department is fortunate to have outstanding facilities. The chemical engineering building, Benson Hall, is supplied with much new research equipment. The building contains classrooms, offices, stockrooms, a machine shop, laboratories, and a variety of specialized research equipment. Each graduate student is provided desk space in a small laboratory or office as well as access to larger laboratories in the building. Students also may use the services of the Academic Computer Center, the glassblowing shop, and the Chemistry and Engineering Libraries.

## Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for admission as graduate students have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements. The Graduate Record Examination (GRE), not including the advanced test, is required of all applicants. In addition, applicants who do not have a baccalaureate degree in chemical engineering from an accredited university in the United States must take the advanced test in chemistry or engineering.

## Financial Aid

The department has various sources of support for qualified graduate students. Prospective students interested in applying for admission and support should request application forms from the department. The completed forms and reference letters should be received in the department office by January 15, if possible, and by February 15 at the latest. Offers of admission with financial support are usually made in February and March.

## Faculty

### Chair

Eric M. Stuve

### Professors

Allan, G. Graham \* 1966; PhD, 1956, University of Glasgow (UK); DSc, 1971, University of Strathclyde (UK); fiber and polymer science, creativity and innovation.

Babb, Albert L. \* 1956, (Emeritus); MS, 1949, PhD, 1951, University of Illinois; nuclear reactor engineering, bioengineering.

Berg, John C. \* 1964; PhD, 1964, University of California (Berkeley); interfacial phenomena, surface and colloid science.

Bowen, J. Ray \* 1981; PhD, 1963, University of California (Berkeley); combustion.

David, Morton 1983, (Emeritus); DEng, 1950, Yale University; chemical engineering.

Davis, E. James \* 1983; PhD, 1960, University of Washington; transport in porous media, microparticle physics and chemistry, surface and colloid science.

Finlayson, Bruce A. \* 1967; MS, 1963, Rice University; PhD, 1965, University of Minnesota; modeling of chemical engineering problems.

Garlid, Kermit L. \* 1960, (Emeritus); PhD, 1961, University of Minnesota; nuclear fuel cycles, radioactive waste management.

Gustafson, Richard Roy \* 1986, (Adjunct); PhD, 1982, University of Washington; process modeling and optimization, fiber composites.

Heideger, William J. \* 1957, (Emeritus); PhD, 1959, Princeton University; biomedical transport phenomena.

Hoffman, Allan S. \* 1970; DSc, 1957, Massachusetts Institute of Technology; polymer materials science and engineering.

Horbett, Thomas A. \* 1973; PhD, 1970, University of Washington; interfacial proteins, cell interactions, insulin delivery systems.

Johanson, Lennart N. \* 1951, (Emeritus); PhD, 1948, University of Wisconsin; chemical engineering.

Lidstrom, Mary E. \* 1990; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

McCarthy, Joseph L. \* 1941, (Emeritus); PhD, 1938, McGill University (Canada); thermodynamics, lignin and cellulose, chemistry, pulp and paper science, biochemical engineering.

McKean, William T. \* 1979; PhD, 1968, University of Washington; pulp and paper science, chemical engineering.

Moulton, R. Wells 1941, (Emeritus); MS, 1934, PhD, 1938, University of Washington; chemical engineering.

Pilat, Michael J. \* 1967, (Adjunct); PhD, 1967, University of Washington; air resources engineering (design of air-pollution-control equipment).

Ratner, Buddy D. \* 1972; PhD, 1972, Polytechnic Institute of Brooklyn; synthesis and characterization of polymeric biomaterials.

Ricker, Neil L. \* 1978; MS, 1972, PhD, 1978, University of California (Berkeley); process control and optimization.

Schwartz, Daniel T. \* 1991; MS, 1985, PhD, 1989, University of California (Davis); electrochemical and environmental engineering.

Seferis, James C. \* 1977; PhD, 1977, University of Delaware; polymers and their composites, manufacturing, scaling, and teaming concepts.

Sleicher, Charles A. \* 1960, (Emeritus); PhD, 1955, University of Michigan; fluid mechanics, heat transfer.

Stuve, Eric M. \* 1985; MS, 1979, PhD, 1983, Stanford University; electrochemical surface science, fuel cell engineering.

Woodruff, Gene L. \* 1965, (Emeritus); PhD, 1965, Massachusetts Institute of Technology; reactor physics, fusion engineering, neutron spectroscopy, energy studies.

Yager, Paul \* 1987, (Adjunct); PhD, 1980, University of Oregon; physical chemistry and applications of biomembranes.

### Associate Professors

Baneyx, Francois \* 1992; PhD, 1991, University of Texas (Austin); biotechnology, protein technology, biochemical engineering.

Castner, David G. \* 1986, (Research); PhD, 1979, University of California (Berkeley); polymer surfaces, metal-organic interfaces, catalytic materials.

Chang, Michael Wei \* 1992, (Adjunct); MD, 1988, University of Texas (Galveston); physical medicine and rehabilitation, electrophysiology biomechanics.

Hodgson, Kevin T. \* 1991, (Adjunct); PhD, 1986, University of Washington; surface and colloid science, papermaking chemistry, secondary fiber recycling.

Holt, Bradley R. \* 1984; PhD, 1984, University of Wisconsin; process design and control.

Krieger-Brockett, Barbara \* 1975; MS, 1972, PhD, 1976, Wayne State University; reaction engineering, chemical kinetics and catalysis simulation.

### Assistant Professors

Chistoserdova, Ludmila 1996, (Research); PhD, 1988, Nizhni Novgorod State University (Russia); biochemical pathways in methylotrophs, genomics of methylotrophs.

Hayes, Brian \* 1992, (Research); PhD, 1997, University of Washington; polymers and fiber-reinforced composites in aerospace and sporting goods industries.

Jiang, Shaoyi \* 1999; PhD, 1993, Cornell University; molecular simulation, statistical mechanics, and scanning microscopy.

Overney, Rene M. \* 1996; MS, 1989, PhD, 1992, University of Basel (Switzerland); nanoscale surface science and polymer rheology.

### Senior Lecturer

Baratuci, William B. 1998; PhD, 1990, Case Western Reserve University.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CHEM E 435 Transport Processes III (4)** Mass transfer, basic principles, and applications to equipment design. Physical separation processes. Prerequisite: CHEM E 326; CHEM E 340. Offered: A.

### CHEM E 436 Chemical Engineering Laboratory I

**(3)** Lectures on experimental design, instrumentation, laboratory safety, and report writing; laboratory experiments on fluid mechanics and heat transfer. Emphasis on experimental planning, procedures, and report writing. Prerequisite: CHEM E 326; CHEM E 340 which may be taken concurrently; T C 231; recommended: T C 333. Offered: Asp.

### CHEM E 437 Chemical Engineering Laboratory II

**(3)** Continuation of 436. Laboratory investigation of chemical engineering principles applied to equipment design with emphasis on mass transfer operations and chemical reactors. Prerequisite: CHEM E 435; CHEM E 436; CHEM E 465. Offered: W.

### CHEM E 450 Solid State Materials and Chemical Processes (3)

*Seferis* Fundamentals of solid state including process analysis, mechanical properties; heterogeneity; anisotropy; liquid/solid transformations; rate processes; thermal analysis; viscoelasticity; microscopy; molecular characterization techniques. Application of fundamentals in examining polymers, metals and ceramics as used in the electronics and aviation industries. Prerequisite: CHEM E 340; CHEM E 465. Offered: W.

### CHEM E 455 Surface and Colloid Science Laboratory (1/3, max. 3)

*Berg* Laboratory techniques, equipment, and underlying fundamentals in surface and colloid science. Experiments in the measurement of surface tension, adsorption, wetting and spreading, colloid properties, emulsion preparation and stability, electrophoresis, and interfacial hydrodynamics. Recommended: CHEM E 326; CHEM E 330; CHEM 461. Offered: Sp.

### CHEM E 458 Surface Analysis (3)

Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 492; W.

### CHEM E 461 Electrochemical Engineering (3)

*Schwartz* Explores role of thermodynamics, charge transfer kinetics, and mass transfer on behavior of electrochemical systems. Includes cell thermodynamics, faradaic and non-faradaic rate processes, ionic transport, nucleation and growth theories. Applications to chemical sensors, batteries, corrosion, thin film deposition. In-class demonstrations to illustrate concepts. Offered: W.

### CHEM E 462 Application of Chemical Engineering Principles to Environmental Problems (3)

Environmental problems in chemical engineering. Team taught; topics vary from year to year. Includes: geomechanics, flow and dispersion through porous media water flow in dry soils, chemistry of radioactive waste, in situ site cleanup, ex situ site cleanup, colloid and surface science. Prerequisite: CHEM E 330. Offered: Sp.

### CHEM E 465 Reactor Design (3)

Application of principles of chemical kinetics to the design of commercial-scale chemical reactors; characterization of batch and flow reactors in homogeneous and heterogeneous systems. Prerequisite: CHEM E 326; CHEM E 340. Offered: A.

### CHEM E 467 Biochemical Engineering (3)

*Baneyx* Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: CHEM E 340; either CHEM 223, CHEM 237, or CHEM 335; recommended: CHEM E 465. Offered: jointly with BIOEN 467; W.

**CHEM E 468 Air-Pollution Control Equipment Design (3)** Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CEE 494/M E 468; W.

**CHEM E 470 Chemistry of Wood (3)** Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite: either CHEM 220, CHEM 238, or CHEM 336. Offered: A.

**CHEM E 471 Pulping and Bleaching Processes (3)** Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semichemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with PSE 476; W.

**CHEM E 472 Papermaking Processes (3)** Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with PSE 477; A.

**CHEM E 473 Pulp and Paper Laboratory (2)** Laboratory experiments in chemical and semichemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with PSE 478; Sp.

**CHEM E 475 Computer Analysis in Chemical Engineering (3)** Model building/simulation of chemical engineering processes: reactor design, fiber spinning, electrochemistry, biotech processes. Numerical methods include integrating ordinary differential equations as initial and boundary-value problems; finite difference, collocation, Galerkin methods. For each model the appropriate tool is developed. Offered: A.

**CHEM E 477 Prokaryotic Molecular Biology Applications to Engineering (3)** *Lidstrom* For engineers with no prior experience in the biological sciences. Covers fundamentals and concepts of molecular biology and directed genetic modification strategies using prokaryotic microorganisms as examples. Focus on approaches, techniques, and relevance to engineered systems. Prerequisite: either CHEM 223, CHEM 237, or CHEM 335; recommended: either CHEM E 467 or BIOEN 450.

**CHEM E 480 Process Dynamics and Control (4)** Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Weekly two-hour laboratory included. Majors only. Prerequisite: CHEM E 435; CHEM E 465. Offered: W.

**CHEM E 481 Process Optimization (3)** Concepts and techniques of optimizing chemical engineering processes and systems, including classical and direct methods of search, linear and nonlinear programming, dynamic programming, statistical experimental design, and evolutionary operation. Offered: Sp.

**CHEM E 482 Advanced Topics in Process Control (3)** *Holt, Ricker* Current topics in process control design and analysis. Possible topics include robustness analysis and design, time delay compensation, modern frequency response techniques, discrete control, adaptive control, model-based control, and nonlinear control. Prerequisite: CHEM E 480.

**CHEM E 485 Process Design I (3)** Applied economics in chemical engineering design and operations; market survey and plant location; introduction to plant and process design. Prerequisite: CHEM E 480 which may be taken concurrently. Offered: W.

**CHEM E 486 Process Design II (5)** Comprehensive design of a specific process, including economic feasibility studies, utilization of market survey and plant location studies, process equipment design and optimization, and overall plant integration and layout. Prerequisite: CHEM E 485. Offered: Sp.

**CHEM E 490 Engineering Materials for Biomedical Applications (3)** *Hoffman* Combined application of the principles of physical chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials, the design and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered: jointly with BIOEN 490; odd years; W.

**CHEM E 491 Controlled Release Systems-Principles and Applications (3)** *Hoffman* Mechanisms or controlled release of active agents and the development of useful systems for this purpose. Release mechanisms include diffusive, convective, or erosive driving forces. Applications to the biomedical, agricultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered: jointly with BIOEN 491; even years; W.

**CHEM E 497- Special Projects in Chemical Engineering Design ([1-6]- max. 12)** Chemical engineering design instruction and experience in special projects, such as industrially motivated, timely, or interdisciplinary projects. Project subject and content varies. Majors only. Prerequisite: CHEM E 340.

**CHEM E 498 Special Topics in Chemical Engineering (1-4, max. 12)** Topics of current interest in the field. Subject matter changes from year to year.

**CHEM E 499- Undergraduate Research ([1-6]-, max. 12)** Independent research projects in chemical engineering. Offered: AWSp.

### Courses for Graduates Only

**CHEM E 510 Mathematical Foundations of Systems Theory (4)** *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/E E/M E 510; A.

**CHEM E 511 Biomaterials Seminar (1)** *Hoffman, Horbett, Ratner* Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with BIOEN 511; AWSp.

**CHEM E 512 Methods of Engineering Analysis (3)** Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Prerequisite: MATH 205, MATH 307 or AMATH 351, MATH 324 or permission of instructor. Offered: jointly with AMATH 512; A.

**CHEM E 523 Seminar in Chemical Engineering (1)** Topics of current interest in chemical engineering. Credit/no credit only. Offered: AWSp.

**CHEM E 525 Chemical Engineering Thermodynamics (4)** Review of principles of thermodynamics. Applications to problems in multiphase and multi-component systems; theories of solutions. Prerequisite: undergraduate thermodynamics. Offered: A.

**CHEM E 530 Momentum, Heat, and Mass Transfer I (4)** Derivation of the differential equations for mass, energy, and momentum transport. Principles of fluid mechanics; creeping flow, turbulence, boundary-layer theory. Offered: A.

**CHEM E 531 Momentum, Heat, and Mass Transfer II (4)** Continuation of 530. Flows of fluid-particle systems; convective heat transfer, natural convection. Prerequisite: CHEM E 530. Offered: W.

**CHEM E 554 Nanoscale Science I: Contact Mechanics and Rheology on the Nanoscale (3)** *Overney* Introductory nanoscale science with emphasis on contact mechanics, principle and concept of forces, scanning force microscopy, tribology (friction, wear, lubrication), rheology, ultrathin organic films, physical properties of polymers, and computer simulation.

**CHEM E 555 Interfacial Phenomena (4)** *Berg* Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, adsorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Prerequisite: CHEM E 525, CHEM E 530, or permission of instructor. Offered: even years.

**CHEM E 556 Principles and Applications of Colloidal Materials (3/4)** *Berg, Hoffman* Preparation, stabilization, properties, and destruction of important colloidal materials. The theory and structure of the electrical double layer, electrokinetics. Includes selected case studies pertinent to air and water pollution, biological fluids, industrial processes. Offered: odd years.

**CHEM E 557 Research in Interfacial and Colloid Science (1)** *Berg* Weekly research seminar and discussion of scientific literature pertaining to interfacial and colloid science. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**CHEM E 558 Surface Analysis (3)** *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 592; W.

**CHEM E 559 Thin Film Science, Engineering, and Technology (3)** *Rogers* The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with MSE 559.

**CHEM E 560 Reactions at Solid Surfaces (3)** *Stuve* Fundamental studies of adsorption systems and reactions that occur at surfaces with application toward heterogeneous catalysis, electrochemistry, etching, and corrosion. Analysis of reaction poisons and promoters, acid-base theory of metal surfaces, jellium theory of metals, and water and ion adsorption, plus other topics of current interest. Recommended: 558 or CHEM 560.

**CHEM E 561 Electrons at Surfaces (3)** *Stuve* Properties of electrons at solid surfaces and their role in surface chemical reactions pertaining to electrochemistry, corrosion/etching, and catalysis. Topics include the jellium model of surfaces, surface electronic structure, work function, surface electric fields, reactions involving electrons, ions, and net charge transfer, and relationships between catalysis and electrochemistry.

**CHEM E 562 Hazardous Air Pollution (3)** Control of emission of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and adsorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CEWA 562; W.

**CHEM E 564 Applications of Chemical Kinetics (3)** Fast reactions and highly energetic reactions with applications to combustion, explosions, and lasers. Coupling of transport processes and reaction rates, photochemical kinetics, intermolecular energy transfer, free radical, and chain reaction kinetics. Rate plasmas, flames, and biological systems.

**CHEM E 565 Kinetics and Catalysis (3)** *Finlayson, Krieger, Stuve* Homogeneous and heterogeneous systems with emphasis on chemical engineering principles applied to industrial reactor design. Prerequisite: CHEM E 525. Offered: W.

**CHEM E 566 Control of Gaseous Air Pollutants (3)** *Pilat* Physical and chemical processes used to control gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CHEM E 435 or CHEM E 468 or permission of instructor. Offered: jointly with CEWA 566; even years; Sp.

**CHEM E 567 Control of Particulate Air Pollutants (3)** *Pilat* Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CHEM E 468 or permission of instructor. Offered: jointly with CEWA 567; odd years; A.

**CHEM E 570 Chemistry of High Polymers (3, max. 6)** *Allan* Fundamentals of high polymer chemistry, including kinetics of addition and condensation polymerization, the determination of average molecular weights and chain length distributions, solution properties and the relationship between molecular structure and plastic film and fiber properties of various polymers. Prerequisite: an undergraduate sequence in organic chemistry. Offered: W.

**CHEM E 571 Polymer Physics and Engineering (3)** *Seferis* Description and analysis of methods for processing polymeric materials. Introduction to solid polymer physics with emphasis on the coupling of structure morphology and properties. Development of structure-property models for quantitative description and control of properties in synthetic and natural polymers and composite materials. Offered: A.

**CHEM E 572 Advanced Polymeric Composites (3)** *Seferis* Design, manufacture, and properties of organic and inorganic particle and fiber-reinforced polymers. Advanced techniques for characterization of processing and properties, including anisotropic elasticity/viscoelasticity theory, polymerization and network formation of matrices, theory of reinforcement, environmental and chemical effects. Prerequisite: CHEM E 571 or MSE 423 or permission of instructor. Offered: Sp.

**CHEM E 575 Nonlinear Analysis in Chemical Engineering (3)** *Finlayson* Comparison of numerical techniques: similarity, perturbation, finite difference, Galerkin, orthogonal collocation methods as applied to nonlinear chemical engineering problems. Offered: odd years.

**CHEM E 588 Research in Applied Microbiology (1)** *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with MICROM 588; AWSpS.

**CHEM E 590 Advanced Topics in Biomaterials (3)** Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: CHEM E 490 or BIOEN 490. Offered: jointly with BIOEN 590.

**CHEM E 591 Robotics and Control Systems Colloquium (1, max. 3)** Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Offered: jointly with A A/E E/M E 591; AWSp.

**CHEM E 598- Effective Teaching of Chemical Engineering ([1/2]-, max. 3)** *Finlayson* Topics/activities include: curriculum development: outlining a course, comparing textbooks, preparing lectures, use of lectures versus quiz sections, microteaching, other modes of instruction, e.g., self-paced, use of design problems. Tests: creating and grading. Role of computers, review of engineering software, diversity, international teaching assistants, sexual harassment, assessment of teaching, resume. Offered: WSp.

**CHEM E 599 Current Topics in Chemical Engineering (1-3, max. 12)** Readings or lectures and discussions of topics of current interest in the field of chemical engineering. Subject matter changes from year to year. Prerequisite: permission of instructor.

**CHEM E 600 Independent Study or Research (\*)** Offered: AWSpS.

**CHEM E 700 Master's Thesis (\*)** Offered: AWSpS.

**CHEM E 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Civil and Environmental Engineering

201 More



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Civil\\_Engineering.html](http://www.washington.edu/students/gencat/academic/Civil_Engineering.html)



Department Web page:  
[www.ce.washington.edu](http://www.ce.washington.edu)

Civil and environmental engineering is a profession which interfaces closely with society in the planning, design, construction, and management of facilities serving the needs of people. These activities include all transportation modes: highways, aerospace, rivers, and harbors; water resources, hydraulics, and coastal engineering; structures, mechanics, and geotechnical engineering; surveying, mapping, and photogrammetry; urban planning and development; water supply, wastewater treatment, and water-quality management; solid- and hazardous-waste disposal; and quality control and management of the air resources.

A civil engineer may specialize in one or several of these activities and may further specialize in a particular function, such as design or management. The work frequently provides close associations with the legal profession, urban and regional planners, economists, public officials, biologists, chemists, financial consultants, architects, and system analysts. Education and practice require a consideration not only of the technological-science aspects of a particular problem but also of its relationship to social, economic, political, and environmental constraints.

To accommodate these wide interests, the department is organized into six academic areas: construction management; transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

## Graduate Program

Graduate Program Coordinator  
309 More, Box 352700  
(206) 543-2574

The Department of Civil and Environmental Engineering offers courses leading to the degrees of Master of Science in Civil Engineering and Doctor of Philosophy. The department also provides authorized options leading to the College-wide Master of Science and Master of Science in Engineering degrees.

The three master's programs are intended to accommodate the needs of three categories of students: the M.S.C.E. degree is for those who have completed an undergraduate degree in civil engineering and plan to continue with their professional training; the College-wide M.S.E. degree is for other engineering graduates who wish to do graduate work in civil and environmental engineering; and the College-wide M.S. degree is for those whose Bachelor of Science degrees are not in engineering, but who desire to apply their training in science to the solution of problems in some specific sector related to civil and environmental engineering. The non-engineer may be required to take additional course work to obtain an M.S.E. degree.

Graduate work is offered in most fields of civil and environmental engineering, including construction management; transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

Priority for admission is based on an applicant's apparent ability to progress satisfactorily in a graduate degree program. The applicant's scholastic record is of major importance; usually, at least a "B" or 3.00 GPA in the junior and senior years is required. Consideration is also given to Graduate Record Examination scores and other information.

## Degree Requirements

The master's degree requires a minimum of 42 credits. A student may choose between a thesis and a course-work-only master's degree. The thesis option requires 30 course-work credits, 3 seminar credits, and 9 thesis credits. The course-work-only master's degree requires 39 course-work credits and 3 seminar credits. Both master's degrees require 3 credits outside the major field of study, 5 credits minimum of 400- and 500-level courses in Civil and Environmental Engineering, and a minimum of one-half of the course-work credits in courses numbered 500 and above. Students working for the Ph.D. degree must complete an approved program of studies and research normally requiring an additional two or three years beyond the master's degree.

## Financial Aid

Research and teaching assistantships are available on a competitive basis. The number of positions depends upon the current level of funding. Additionally, there are a limited number of fellowships, scholarships, and traineeships.

## Research Facilities

More Hall and Wilcox Hall have structural, concrete, bituminous materials, soil mechanics, computer, water-quality, solid-wastes, and air-quality laboratories as well as an air-monitoring station and equipment for fieldwork in the construction, water, air, and solid-waste programs. Facilities for experimental studies in hydraulics and coastal engineering and in fluid mechanics are located in the Harris Hydraulics Laboratory.

## Faculty

### Chair

Fred L. Mannering

### Professors

Ang, Alfredo H. S. 1997, (Affiliate); PhD, 1959, University of Illinois; structural engineering.

Benjamin, Mark M. \* 1977; MS, 1973, MS, 1975, PhD, 1979, Stanford University; chemistry of natural waters, chemical and biological treatment of water and wastewater.

Bogan, Richard H. \* 1954, (Emeritus); DSc, 1954, Massachusetts Institute of Technology; environmental engineering.

Brown, Colin B. \* 1969, (Emeritus); PhD, 1962, University of Minnesota; structural engineering and systems.

Burges, Stephen J. \* 1970; PhD, 1970, Stanford University; surface and ground water hydrology, water resource systems analysis and design.

Carlson, Dale A. \* 1955, (Emeritus); PhD, 1960, University of Wisconsin; water resources and solid-waste management.

Colcord, J. E. \* 1949, (Emeritus); MSCE, 1949, University of Minnesota; surveying engineering.

Covert, David S. \* 1975, (Adjunct Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry, aerosol instrumentation, aerosol physics, chemistry, optics.

Decher, Reiner \* 1973, (Adjunct); PhD, 1968, Massachusetts Institute of Technology; aircraft propulsion, fluid mechanics, energy conversion.

Eikum, Arild 1982, (Affiliate); PhD, 1973, University of Washington; environmental engineering.

Elias, Ziad \* 1969; DSc, 1963, Massachusetts Institute of Technology; engineering mechanics.

Evans, Roger J. \* 1966, (Emeritus); PhD, 1965, University of California (Berkeley); engineering mechanics, structural engineering.

Ferguson, John F. \* 1974; PhD, 1970, Stanford University; chemical and biological processes in water and waste treatment and in natural water systems.

Hammer, Vernon B. 1947, (Emeritus); MS, 1941, Harvard University; solid-waste management.

Hartz, Billy J. \* 1955, (Emeritus); PhD, 1955, University of California (Berkeley); engineering mechanics, structural mechanics.

Hodge, David C. \* 1975, (Adjunct); MS, 1973, PhD, 1975, Pennsylvania State University; urban geography, urban transportation geography, equity, gender.

Holtz, Robert Dean \* 1988; PhD, 1970, Northwestern University; geotechnical engineering.

Hou, Michael C. Y. 1995, (Affiliate); PhD, 1973, University of Washington; transportation engineering.

Karr, James \* 1991, (Adjunct); PhD, 1970, University of Illinois; ecology and conservation biology, water resources, environmental sciences, natural resources.

Kramer, Steven \* 1984; PhD, 1984, University of California (Berkeley); soil mechanics, foundation engineering, geotechnical earthquake engineering.

Kulp, John Laurence 1990, (Affiliate); PhD, 1945, Princeton University; environmental engineering.

Larson, Timothy \* 1970; PhD, 1976, University of Washington; airborne particles, air quality modeling, and instrument development.

Lindell, L. Tommy 1983, (Affiliate); PhD, 1974, University of Uppsala (Sweden); environmental engineering.

Lettenmaier, Dennis P. \* 1973; PhD, 1975, University of Washington; systems analysis and water resources planning.

Mahoney, Joseph P. \* 1978; PhD, 1979, Texas A&M University; construction materials, pavement systems.

Mannering, Fred L. \* 1986; PhD, 1983, Massachusetts Institute of Technology; traffic flow theory, networks, econometric methods, equilibration in transportation markets.

Mar, Brian W. \* 1967, (Emeritus); PhD, 1958, University of Washington; system engineering, environmental management, interdisciplinary management.

Mattcock, Alan \* 1964, (Emeritus); PhD, 1955, University of London (UK); structural behavior and design.

Meese, Richard H. 1975, (Emeritus); MS, 1941, Harvard University; soil mechanics and foundations.

Miller, Gregory \* 1983; PhD, 1984, Northwestern University; structural materials, solid mechanics, nonlinear dynamics.

Morgan, Michael S. \* 1974, (Adjunct); DSc, 1972, Massachusetts Institute of Technology; applied respiratory, physiology and inhalation toxicology.

Nece, Ronald E. \* 1959, (Emeritus); DSc, 1958, Massachusetts Institute of Technology; hydraulic and coastal engineering.

Nihan, Nancy L. \* 1973; PhD, 1970, Northwestern University; transportation planning and systems analysis.

Palmer, Richard \* 1979; PhD, 1979, Johns Hopkins University; civil engineering systems, computer methods, water resources planning and management.

Peterson, Spencer Alan 1988; PhD, 1971, University of North Dakota

Pilat, Michael J. \* 1967; PhD, 1967, University of Washington; air resources engineering (design of air-pollution-control equipment).

Reed, Dorothy \* 1983; MSE, 1977, PhD, 1980, Princeton University; structural and wind engineering, and expert systems.

Richey, Eugene 1954, (Emeritus); MS, 1947, MSCE, 1948, California Institute of Technology; PhD, 1955, Stanford University; hydraulic engineering.

Roeder, Charles W. \* 1977; PhD, 1977, University of California (Berkeley); structures and materials.

Rossano, August T. 1963, (Emeritus); MS, 1941, ScD, 1954, Harvard University; air resources.

Rutherford, G. Scott \* 1981; PhD, 1974, Northwestern University; transportation planning and engineering.

Sawhill, Roy 1952, (Emeritus); MEng, 1952, University of California (Berkeley).

Schneider, Jerry \* 1967, (Emeritus); PhD, 1966, University of Pennsylvania; metropolitan area and regional planning, transportation and other urban models.

Seabloom, Robert \* 1954, (Emeritus); MSCE, 1956, University of Washington; water-quality and solid-waste management.

Stanton, John F. \* 1978; PhD, 1978, University of California (Berkeley); structural engineering, analysis and design.

Stensel, H. David \* 1983; PhD, 1971, Cornell University; biological wastewater treatment, fixed film reactors, mass transfer mechanics, modeling.

Strand, Stuart E. \* 1982, (Adjunct Research); PhD, 1982, Pennsylvania State University; forest biotechnology, environmental pollution control.

Sylvester, Robert O. 1941, (Emeritus); MS, 1941, Harvard University; water resources.

Terrel, Ronald L. 1967, (Emeritus); MSCE, 1961, Purdue University; PhD, 1967, University of California (Berkeley).

Walters, Roy A. 1997, (Affiliate); PhD, 1976, University of Washington; environmental engineering.

Welch, Eugene B. \* 1968, (Emeritus); PhD, 1967, University of Washington; water resources and aquatic biology.

Wenk, Edward 1970, (Emeritus); MS, 1947, Harvard University; PhD, 1950, Johns Hopkins University.

Wood, Eric F. 1993, (Affiliate); ScD, 1974, Massachusetts Institute of Technology; environmental engineering.

Yeh, Harry H. \* 1983; PhD, 1983, University of California (Berkeley); fluid mechanics, water wave motions, coastal and hydraulic engineering.

Zabinsky, Zelda \* 1985, (Adjunct); PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

### Associate Professors

Booth, Derek B. \* 1980, (Research); PhD, 1984, University of Washington; geomorphology, environmental geology.

Chenoweth, Harry H. 1946, (Emeritus); MSCE, 1957, University of Washington; engineering mechanics and hydraulic engineering.

Dailey, Daniel J. \* 1982, (Adjunct Research); MS, 1982, PhD, 1988, University of Washington; time series modeling of physical phenomena, optimization, distributed computing, networking.

Eberhard, Marc O. \* 1989; PhD, 1989, University of Illinois; structural analysis and design, reinforced concrete, earthquake engineering, nondestructive testing.

Goldblatt, Steven M. 1982, (Adjunct); JD, 1977, Golden Gate University; construction law, labor relations, and accounting.

Horner, Richard R. \* 1981, (Adjunct Research); PhD, 1978, University of Washington; wetland and stream conservation and storm water management.

Jacoby, Jean M. \* 1994, (Affiliate); PhD, 1986, University of Washington; applied aquatic ecology and restoration, water quality management.

Janssen, Donald J. \* 1985; PhD, 1985, University of Illinois; construction materials, pavements.

Kent, Joseph C. \* 1952, (Emeritus); PhD, 1952, University of California (Berkeley); hydraulic engineering.

Massmann, Joel W. \* 1991; PhD, 1987, University of British Columbia (Canada); groundwater hydrology, subsurface contaminant transport, site remediation, applied decision analysis.

Miller, William \* 1951, (Emeritus); MSCE, 1952, University of Washington; materials.

Nemati, Kamran M. 1998, (Adjunct); PhD, 1994, University of California (Berkeley); civil engineering materials, concrete technology, mechanical behavior of concrete, fracture mechanics.

Ongerth, Jerry E. 1999, (Affiliate); PhD, 1973, University of Michigan; public water supply, solid waste and water quality management; waterborne pathogens.

Snyder, Mark B. 1996, (Affiliate); PhD, 1989, University of Illinois; construction engineering.

Spyridakis, Dimitris \* 1970, (Emeritus); PhD, 1965, University of Wisconsin; soil and water chemistry.

Strausser, Howard \* 1955, (Emeritus); MScEng, 1950, Johns Hopkins University; hydraulic engineering.

Tangborn, Wendell V. 1982, (Affiliate); BS, 1958, University of Minnesota; environmental engineering.

Tawresey, John G. 1985, (Affiliate); MS, 1968, Cornell University; MBA, 1975, University of Washington; structural engineering.

Turkiyyah, George \* 1991; PhD, 1990, Carnegie Mellon University; computer-aided engineering, finite element modeling.

Waddell, Paul A. \* 1997, (Adjunct); PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

### Assistant Professors

Arduino, Pedro \* 1997; PhD, 1996, Georgia Institute of Technology; mechanics of porous media, constitutive modeling of soils, numerical methods of geomechanics.

Brett, Michael T. \* 1997; PhD, 1990, University of Uppsala (Sweden); eutrophication, food web and nutrient regulation of algal biomass and secondary production in lakes.

Chandler, Robert Douglas 1997, (Affiliate); PhD, 1995, University of Washington; environmental engineering.

Chang, Yu-Jung 1999, (Affiliate); PhD, 1996, University of Washington; environmental engineering.

Dunston, Phillip S. \* 1994; MS, 1992, PhD, 1994, North Carolina State University; construction engineering process, quality, productivity, and management, emphasizing automation.

Jessup, Andrew T. \* 1990, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; applications of remote sensing to air-sea interaction.

Korshin, Gregory \* 1991, (Research); PhD, 1983, Chemical Engineering Institute (Russia); chemical processes in water treatment.

MacRae, Gregory Anthony \* 1994; PhD, 1990, University of Canterbury (New Zealand); design of structures to withstand earthquakes.

Petroff, Catherine \* 1993; PhD, 1993, California Institute of Technology; sediment transport, coastal engineering, and environmental fluid mechanics.

Reiber, Steve H. 1992, (Affiliate); PhD, 1983, University of Utah; environmental engineering.

Shankar, Venkataraman \* 1999; PhD, 1997, University of Washington; modeling of transportation infrastructure and civil engineering systems.

Zeitler, Teresa Taylor \* 1992, (Affiliate); PhD, 1988, Washington State University; geotechnical/geological engineering, physical modeling, centrifuge modeling.

### Instructor

Schultz, Michael 1990, (Affiliate); MSCE, 1972, University of Washington; construction engineering.

### Senior Lecturer

Bucknam, Ronald E. 1985; PhD, 1964, University of Illinois; Professional Engineering Practice Liaison (PEPL).

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CEE 405 Construction Planning and Scheduling (3)** Principles of construction planning and scheduling, including network analysis of construction activities, examination of arrow and precedence diagrams, time-cost tradeoffs, resource leveling, resource allocation, PERT, integrated cost/schedule systems, computer applications, and a CPM project.

**CEE 406 Construction Engineering II (3)** Heavy construction equipment. Equipment economics, contractor equipment policies, equipment specifications, selection and performance of equipment, estimating productivity of construction equipment, and engineering support for construction operating. Prerequisite: CEE 306.

**CEE 407 Contracts and Specifications (3)** Construction industry, forms of organizations, real property laws, and bidding procedures. Basic elements of contracts, types of specifications, general conditions of standard construction contracts, legal disputes related to construction contract provisions, surety bonds and construction insurance. Prerequisite: CEE 306.

**CEE 410 Traffic Engineering Fundamentals and Surveys (3)** General review of the fundamentals of traffic engineering, including their relationship to transportation operations management and planning, with special emphasis on traffic engineering field surveys and data analysis. Prerequisite: CEE 320. Offered: A.

**CEE 416 Urban Transportation Planning and Design (3)** Brief review of major issues in urban transportation planning. Planning process discussed and transportation models introduced. Uses a systems framework, including goals and objectives, evaluation, implementation, and monitoring. A design term project, individual or small groups, utilizes material presented on a contemporary problem. Prerequisite: CEE 320. Offered: A.

**CEE 418 Computer-Aided Planning of Urban Systems (3)** Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigations of hardware/software tradeoffs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered: jointly with URBDP 429.

**CEE 421 Pavement Design (3)** Current and developing procedures for the structural thickness design of pavements. Bituminous and concrete pavements for highways, airports, and special heavy loading. Elastic layered systems, slab theory. Performance evaluation for maintenance and overlay design. Offered: ASp.

**CEE 422 Construction Materials II (4)** Types, sources, uses, performance behavior from construction point of view of aggregates; asphalt products and mixtures; Portland cement, concrete, and other materials the civil engineer is responsible for selecting and manufacturing on job site. Includes laboratory work. Prerequisite: CEE 363. Offered: A.

**CEE 423 Heritage of Civil Engineering (3/4) I&S** Contribution of civil engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals from prehistory to the nineteenth century give the student an awareness of the profession and its influence on society. Industrial archaeology and historic sites are considered. An additional 1 credit may be earned by participating in a special project. Emphasis on the control of elements and the methodology, planning, objectives, and reasons for the project. May be used as social science distribution. Offered: W.

**CEE 431 Seismology and Earthquake Engineering (3) NW** Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: jointly with GPHYS 431.

**CEE 436 Foundation Design (3)** Design considerations for foundations and retaining structures. Subsurface investigations and determination of soil

properties for design. Design of shallow and deep foundations and retaining structures. Foundations and soil considerations for waterfront structures.

**CEE 437 Engineering Geology I (3)** General overview of engineering geology and its importance to civil engineers. Topics include geologic processes, hazards, origin and classification of geologic materials, data synthesis, and natural construction materials.

**CEE 440 Design Seminar (2)** Fundamentals of integrated civil engineering design, professional services marketing, project management, team dynamics, total quality management, value engineering, professional liability, and applied ethics in engineering practice. Emphasis on written and oral communications and on ethical, social, and economic factors.

**CEE 441 Highway and Traffic Engineering-Geometric Design (4)** Factors and elements in geometric design of arterials, intersections, freeways, interchanges, including problem solution. Prerequisite: CEE 320; CEE 440 which may be taken concurrently.

**CEE 442 Structural Geotechnical Design Project (4)** Comprehensive team design project focusing on structural and geotechnical engineering. Requires design drawings, written reports, and oral presentations interfacing with related fields such as aesthetics and architecture, mechanical systems, traffic, environmental planning. Prerequisite: CEE 440; two courses from CEE 436, CEE 451, CEE 452, CEE 453, CEE 454, or CEE 457.

**CEE 443 Design of Subsurface Remediation Activities (4)** Technologies for cleaning sites with subsurface contamination, including groundwater extraction, vapor extraction, groundwater containment, and in-situ treatment. Analytical tools and methods for making design calculations are emphasized. Comprehensive design project involving design and evaluation of site remediation activities required. Prerequisite: CEE 440.

**CEE 444 Water Resources and Hydraulic Engineering Design (4)** Opportunity to effect design solutions for projects or major project components in such representative areas as reservoirs and associated systems for flood control, water supply, irrigation, and hydroelectric power, surface water control systems, fisheries related projects, small harbors, and coastal engineering problems. Prerequisite: CEE 440.

**CEE 445 Environmental Engineering Design Studies (4)** Individual and group design studies addressing environmental engineering problems such as stormwater management, water and wastewater treatment facilities, and residual processing. Prepare proposals, engineering reports, and alternative evaluations; process equipment design, present reports on selected design problems. Prerequisite: CEE 345; CEE 482; CEE 440 which may be taken concurrently.

**CEE 451 Design of Metal Structures (3)** Introduction to the design and behavior of metal structures using LRFD concepts. Application of design methods and codes to columns, beams, frames, connections, and tension members. Prerequisite: CEE 380; recommended: CEE 457, CEE 458.

**CEE 452 Design of Reinforced Concrete Structures (3)** Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite: CEE 380.

**CEE 453 Prestressed Concrete Design (3)** Analysis, design, and construction of prestressed concrete structures. Prerequisite: CEE 452.

**CEE 454 Design of Timber Structures (3)** The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite: CEE 381.

**CEE 455 Structural Unit Masonry (3)** Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Prerequisite: CEE 380. Offered: jointly with ARCH 426.

**CEE 457 Advanced Structures I (3)** The displacement method in matrix form with programming applications. Fundamentals of modeling of various types of structures. Prerequisite: CEE 380.

**CEE 458 Advanced Structures II (3)** Introduction to stability, including a consideration of elastic and inelastic buckling with applications to beam-columns and plates. Introduction to plastic analysis. Prerequisite: CEE 379.

**CEE 459 Advanced Structural Mechanics (3)** Formulation and solution of the basic equations of elasticity. Applications in 2-D stress analysis, torsion, thermal stresses, and beams on elastic foundation. Plate theory optional. Prerequisite: CEE 379.

**CEE 461 Biological Problems in Water Pollution (3/5) NW** Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities. Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with FISH 430.

**CEE 462 Ecological Effects of Waste Water (3/5) NW** Principles of aquatic ecology that relate to causes and effects of water quality problems in lakes and streams. Population growth kinetics, nutrient cycling, eutrophication; acidification, oxygen/temperature requirements, and effects of various wastes on aquatic animals. Offered: jointly with FISH 434.

**CEE 464 Subsurface Contaminant Transport (3)** Principles of transport through porous media used to study fate and movement of subsurface contamination. Processes include aqueous phase transport, flow of immiscible fluids, vapor transport, solid-liquid-vapor interactions. Techniques for simulating transport processes presented. Effects of subsurface heterogeneities and uncertainties are emphasized. Prerequisite: CEE 342.

**CEE 472 Introduction to Hydraulics in Water Resources (3)** Physics of water movements in natural freshwater bodies and inshore marine waters. Brief review of some essential fluid mechanics. Flow in rivers and streams; motions in lakes, reservoirs, and estuaries. Some aspects of diffusion.

**CEE 473 Coastal Engineering I (3)** Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Prerequisite: CEE 342.

**CEE 474 Hydraulics of Sediment Transport (3)** Introduction to sediment transport in steady flows with emphasis on physical principles governing the motion of sediment particles. Topics include sediment characteristics, initiation of particle motion, particle suspension, bedforms, streambed roughness analysis, sediment discharge formulae, and modeling of scour and deposition in rivers and channels. Prerequisite: CEE 345.

**CEE 475 Analysis Techniques for Groundwater Flow (3)** Development of appropriate equations to describe saturated groundwater flow, and application of numerical methods for solving groundwater flow problems and flow to wells. Participants required to solve specific problems using numerical techniques developed during the course. Prerequisite: CEE 342.

**CEE 476 Physical Hydrology (3)** Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, hydrographs. Hydrologic

data frequency analysis. Hydrologic design: flood mitigation, drainage. Introduction to deterministic and stochastic models.

**CEE 477 Open-Channel Engineering (3)** Water flow in natural and constructed channels. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Introduction to river mechanics. Design-oriented problems. Prerequisite: CEE 345.

**CEE 480 Air-Quality Modeling (3)** Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Prerequisite: either CEE 490, ATM S 458, or CHEM 458. Offered: jointly with ATM S 480.

**CEE 481 Environmental Engineering Design (3)** Introduction to the theory and the practice of planning and design of urban water supply, sewerage, solid wastes, and drainage collection systems. Evaluation of service areas and service requirements and their relationships to urban and regional planning activities. Engineering methods and computer programs for designing basic system elements. Prerequisite: CEE 351.

**CEE 482 Water and Wastewater Treatment (3)** Fundamental mechanisms, basic design models, and applications of engineered treatment processes for water treatment, water reuse, nutrient removal, and protection of public health and the environment. Prerequisite: CEE 350.

**CEE 484 On-Site Wastewater Disposal (3)** Latest information on design, construction, operation, maintenance of individual and small community wastewater disposal systems. Conventional water carriage septic tank soil absorption systems considered with new alternatives, such as mounds, evapotranspiration systems, anaerobic filters, pressure drainfields, sand filters. Nonwater carriage methods studied. Pressure and vacuum sewers introduced.

**CEE 485 Aquatic Chemistry (3)** Principles of chemical equilibrium relevant to natural water systems; the nature and effect of chemical interactions of domestic and industrial waste effluents on natural water systems; chemical principles involved in the treatment of water and wastewaters.

**CEE 486 Water-Quality Analysis (3)** Laboratory evaluation of chemical quality of natural and wastewaters. Theory and application of instrumentation used in water-quality measurement.

**CEE 487 Solid-Waste Disposal (3)** Describes sources and handling of municipal and industrial solid waste, with examination of collection, processing, recycling and resource recovery, and disposal alternatives. Public policy issues, local agencies and solid waste facilities, the legal and regulatory framework are all addressed in context of solid waste engineering.

**CEE 488 Hazardous Wastes Engineering (3)** Classification of hazardous wastes; resource conservation, Recovery Act regulations; characteristics and behavior of toxic organics; superfund; groundwater contamination, solutions. Hazardous waste site remedial action; case histories; sampling; landfill design. Stabilization and processing technologies, including incineration, carbon adsorption, emerging techniques. Prerequisite: CEE 351.

**CEE 489 Water and Air Quality Sampling (2)** Samples collected from lakes, streams, precipitation, and air and resulting (and supplemental) data interpreted for cause-effect and statistical inference. Design for water and air quality monitoring programs. Prerequisite: CEE 462.

**CEE 490 Air-Pollution Control (4)** Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with ENV H 461.

**CEE 491 Deterministic Systems (3)** Development of quantitative methods for mathematical problem solving with emphasis on computer applications. Linear programming, mathematics of the simplex algorithm, sensitivity analysis, dynamic programming, systems simulation, and goal programming. Class project required. Prerequisite: CEE 390.

**CEE 492 Stochastic Systems (3)** Introduction to probability distributions and statistics useful in systems analysis, conditional distributions, queuing theory and applications, Monte Carlo simulation, chance-constrained mathematical programming, and stochastic dynamic programming. Emphasis on application of the techniques to civil engineering systems problems, including transportation, water resources, and structures. Prerequisite: CEE 491.

**CEE 493 Air-Pollution Source Testing and Equipment Evaluation (3)** Engineering evaluation of air pollutant sources and air control equipment. Air-pollutant source testing and stack sampling. Analysis of equiformance and source emissions in the field and in the laboratory.

**CEE 494 Air-Pollution Control Equipment Design (3)** Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particulate pollutants. Actual case studies. Offered: jointly with CHEM E/M E 468.

**CEE 498 Special Topics (1-5, max. 5)** Special topics in civil engineering offered as course with lecture and/or laboratory. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree.

**CEE 499 Special Projects (1-5, max. 5)** Individual undergraduate research projects. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree. Recommended: 400-level CEE course.

## Courses for Graduates Only

**CEE 501 Structural Mechanics (6)** *Elias, Miller, Turkiyyah* Equations of a continuum for small displacements, applications to linear elasticity. Kirchhoff plate theory, problems in advanced strength of materials. Virtual work, minimum potential energy, force and displacement methods of structural analysis. Direct stiffness method. Approximate solutions, geometric stiffness matrix. Linearized buckling. Offered: A.

**CEE 502 Structural Dynamics (3)** *Eberhard, MacRae, Reed* Lagrange's equations. Free vibrations of linear, single, and multiple degree of freedom systems. Damping. Mode superposition. Forced vibrations by time history and by response spectrum methods. Free and forced vibrations of continuous systems. Wave propagation in rods and beams. Prerequisite: CEE 501. Offered: W.

**CEE 503 Materials Modeling (3)** *Miller, Reed, Roeder* Behavior of materials used in civil engineering structures. Yield and failure surfaces. Physical and phenomenological models of plastic and viscoelastic behavior. Fracture mechanics. Fatigue models and predictions. Damping and friction. Behavior of anisotropic and composite materials.

**CEE 508 Continuum Mechanics (3)** *Elias, Miller* General foundation of fundamental concepts of motion, stress, and energy for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Prerequisite: CEE 501. Offered: jointly with A A 575.

**CEE 511 Advanced Reinforced Concrete (3)** *Eberhard, MacRae, Stanton* Behavior and design of reinforced concrete members and structures. Members subject to torsion and torsion combined with flexure and shear; members with small shear span/depth ratios, slabs. Offered: A.

**CEE 512 Advanced Structural Systems (3)** *Eberhard, Stanton* Prestress loss. Design of statically indeterminate prestressed concrete structures; continuous beam, frame, and slab structures (cast in place or assembled from precast units). Prerequisite: CEE 453 or equivalent. Offered: Sp.

**CEE 513 Advanced Steel I (3)** *MacRae, Roeder* Factors influencing strength and serviceability of steel structures; LRFD limit state design procedures. Use of theories of plasticity and stability in development of design methods and specifications, bolted and welded connections, temperature effects, and effect of different fabrication methods on behavior of structure. Prerequisite: CEE 501, CEE 503. Offered: W.

**CEE 542 Microbial Degradation of Toxic Contaminants (3)** *Hervig, Strand* Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with ESC 518/MICROM 518; Sp.

**CEE 553 Seminar-Topics in Atmospheric Chemistry (1-3, max. 6)** *Charlson, Harrison* Seminar for atmospheric scientists, chemists, engineers in problems associated with the chemical composition of the atmosphere. Covers wide variety of topics, ranging from the natural system to urban pollution and global atmospheric change. Faculty lectures, student participation. Prerequisite: ATM S 301 or permission of instructor. Offered: jointly with ATM S 525.

**CEE 554 Acoustics of Environmental Noise (4)** Offered: jointly with M E 528.

**CEE 560 Risk Assessment for Environmental Health Hazards (3/4)** *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with ENV H 577/PB AF 577; A.

**CEE 576 Water Resources Planning (3)** *Mar, Palmer* Engineering, social, and economic factors involved in water resource development and management; water policies, programs, and administration; use relationships and conflicts; considerations for regional water resource systems. Offered: W.

**CEE 578 Water Resource System Management and Operations (3)** *Burges, Mar, Palmer* A readings course in recent literature related to the modeling and management of water resources. Topics include drought management, expansion of existing water supplies, hydropower production, streamflow forecasting, water demand forecasting, regional water planning, climate change, and other topical issues. Recommended: 557, 558. Offered: A.

**CEE 584 Analytical Methods in Transportation I (3)** *Manning* Application of analytical and statistical methods to transportation planning problems. Analysis of probability distributions that describe variables. Development of statistical models for predicting transportation phenomena. Elementary sampling theory hypothesis testing, regression analysis, time series analysis, applied to transportation data. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

**CEE 588 Land Use/Transportation Models (3)** Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with URBDP 530.

**CEE 593 Construction Labor Law (3)** *Goldblatt* In-depth study of construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Examines importance of labor relations in construction firms, whether in a union setting or an open shop environment.

**CEE 700 Master's Thesis (\*)** Prerequisite: permission of adviser.

**CEE 800 Doctoral Dissertation (\*)** Prerequisite: permission of adviser.

## Environmental Engineering and Science

### Courses for Graduates Only

**CEWA 540 Hydrodynamics (4)** Applications of the equations of motion to the flow of ideal and real fluids. Fundamentals of fluid potential motion. Viscous flows; Navier-Stokes equations and some exact solutions. Boundary-layer theory. Introduction to turbulence. Two- and three-dimensional examples, including free surface flows. Applications of field equations to problems of engineering significance. Prerequisite: CEE 342 or equivalent.

**CEWA 541 Hydrodynamics in Water Quality (3)** Theoretical, field study, and laboratory model approaches to diffusion in transport problems of concern to water resources engineers. Prerequisite: CEE 342 or permission of instructor.

**CEWA 544 Water Wave Mechanics (3)** Theory of water waves. Classical water wave problem and approximate solution techniques. Evolution equations for and their solutions wave systems. Viscous damping effects and mass transport. Nonlinear shallow-water waves and the Korteweg-deVries equation. Waves on beaches. Recommended: graduate-level course in fluid mechanics.

**CEWA 545 Advanced Computational Hydraulics (4)** Review of hydrodynamic and transport equations for hydraulic engineering application; numerical solution methods; implementation and practice with existing two- and three-dimensional numerical models; numerical model calibration and verification techniques; case studies. Theoretical and civil engineering decision makers aspects. Prerequisite: CEWA 474, CEWA 540, CEWA 541 or permission of instructor.

**CEWA 547 Advanced Hydrology (3)** Detailed treatment of statistical methods used in hydrologic analysis. Stochastic hydrology, detailed examination and use of a deterministic watershed model (e.g., Stanford Watershed Model). Prerequisite: graduate standing in civil engineering or permission of instructor.

**CEWA 548 Groundwater Transport Modeling (3)** Review of equations for flow and transport in porous media; techniques for simulating transport as bound-

ary value problems; analytical and numerical solution techniques; finite element models; field-scale applications and case histories.

**CEWA 550 Microbiological Process Fundamentals (3)** Fundamental concepts for microbial processes including organic chemical structure, nomenclature and environmental properties, principles of microbial metabolism, study of specific types of bacteria important to environmental engineering and their metabolism and development of microbial kinetic equations including substrate utilization, energetics, and stoichiometry. Prerequisite: permission of instructor.

**CEWA 551 Biological Treatment Systems (3)** Basic reactions, design principles, models, and operational considerations for biological treatment systems in environmental engineering. Applications include activated sludge, bulking sludge control, fixed film reactors, nitrification, nitrogen removal, phosphorus removal, anaerobic treatment, and toxic organics removal. Prerequisite: CEWA 550.

**CEWA 552 Physical-Chemical Treatment Processes (4)** Principles and design of major physical-chemical unit processes used in water, wastewater, and hazardous waste treatment. Processes include chemical and reactor kinetics, filtration, chemical coagulation, ion exchange, adsorption, and gas transfer. Development of mathematical models, laboratory demonstrations, and evaluation of current design practice. Prerequisite: CIVE 485 or permission of instructor.

**CEWA 553 Topics in Ecological Effects of Wastewater (3)** Application of ecological concepts for analysis and interpretation of bioenvironmental problems and data (eutrophication, acid rain, and toxicity). Students participate in presentation and discussion of current research. Prerequisite: CIVE 462 or BIOL 473 or permission of instructor.

**CEWA 554 Advanced Topics in Environmental Engineering, Chemistry, and Biology (3)** Special topics of current importance in environmental engineering. Application of fundamental chemical and biological principles to the study of such phenomena as the behavior of aqueous colloids, corrosion processes, bacterial metabolism in chemically complex solutions, and acid precipitation. May be taken more than once for credit. Prerequisite: CEWA 550, CEWA 551.

**CEWA 555 Lake Management (2)** Application of recognized techniques/approaches to restore and manage eutrophic lakes. Includes critiques of restoration proposals. Credit/no credit only. Prerequisite: CEE 462/FISH 434, BIOL 473, or permission of instructor.

**CEWA 556 Industrial Waste Treatment (3)** Survey of laws and regulations governing industrial waste discharge. Sources, amounts, and characteristics of wastes from various industries. Specialized treatment processes, case studies, and site visits. Prerequisite: CEWA 550 or CEWA 551 or permission of instructor.

**CEWA 558 Water-Quality Management (3)** Application of biological, ecological, and chemical processes to modeling of water quality and use of such models in appropriate management of water resource systems. Includes units on the modeling of temperature, BOD, nutrient, phytoplankton, zooplankton, and other processes in lakes, streams, and estuaries. Recommended: 476, 485, CEE 462/FISH 434, and CIVE 491.

**CEWA 560 Topics in Environmental Health (3)** Introduction to human biology, including physiology, epidemiology, and toxicology. Study of contemporary environmental health problems and practices as they relate to radiological health, solid-waste disposal, occupational health, biometeorology, and bioengineering.

**CEWA 562 Hazardous Air Pollution (3)** Control of emissions of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and absorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CHEM E 562.

**CEWA 563 Air Resources Management (3)** Technical, administrative, and legal aspects of air conservation. Current case studies involving engineering analysis, air-quality modeling, and regulatory aspects at local, state, and federal governmental levels.

**CEWA 566 Control of Gaseous Air Pollutants (3)** Physical and chemical processes used to control gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CIVE 468 or CHEM E 435 or permission of instructor. Offered: jointly with CHEM E 566; even years.

**CEWA 567 Control of Particulate Air Pollutants (3)** Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CIVE 468 or permission of instructor. Offered: jointly with CHEM E 567; odd years.

## Structural and Geotechnical Engineering and Mechanics

### Courses for Graduates Only

**CESM 504 Finite Element Methods in Structural Mechanics (3)** Extension of the matrix methods of structural analysis to the solution of elasticity, plate, and shell problems by use of finite element approximations. Discussion of convergence and bounding and extension to investigation of stability and finite deformations. Prerequisite: CESM 501 or permission of instructor.

**CESM 514 Design for Earthquakes I (3)** Linear elastic analysis for prediction of structural behavior in earthquakes. Ground-shaking and earthquake mechanism. Factors affecting severity and frequency of shaking. Ductility and multilevel design approach. Response spectra and design codes such as UBC and ATC, and evaluation of rationale for these specifications. Design problem. Prerequisite: CESM 501, CESM 502.

**CESM 516 Design for Wind (3)** Wind effects on structures, including atmospheric boundary layer flow, bluff body aerodynamics, structural dynamics, and aeroelasticity; development and use of ANSI standards; estimation of along-wind, across-wind, and torsional response of tall buildings; design strategies for avoiding wind-induced discomfort in humans. Fundamentals of wind-tunnel testing. Prerequisite: CESM 501, CESM 502.

**CESM 523 Reliability and Design (3)** Introduction to theory of structural reliability and its application to design procedures in civil engineering, including probability theory; assessment of uncertainties; code specification (first-order, second-moment format) and the related concept of risk and the influence of socioeconomic factors; loads, load combinations, and probabilities of damage.

**CESM 561 Seepage and Consolidation (3)** Confined and unconfined seepage through porous media, flow net solutions, consolidation, settlement, numerical solution of seepage, and consolidation problems. Prerequisite: CEE 366 or equivalent.

**CESM 562 Shear Strength and Slope Stability (3)** Shear strength of cohesive and cohesionless soils and slope stability analysis of natural and man-made slopes. Prerequisite: CESM 561.

**CESM 563 Advanced Foundation Engineering (3)** Design of shallow and deep foundations for bearing capacity and settlement. Construction considerations. Prerequisite: CESM 562 and CESM 567.

**CESM 564 Lateral Earth Pressures and Retaining Structures (3)** Analysis of groundwater flow and seepage through dams using analytical and numerical techniques. Various one- and two-dimensional methods of analysis of soil slopes under static and seismic conditions. Computer application of stability analysis methods to slope-stability problems. Prerequisite: CESM 437 or equivalent or permission of instructor.

**CESM 565 Soil Dynamics (3)** Dynamics of discrete systems; dynamics of continuous systems, wave propagation; dynamic soil properties; linear, nonlinear, and equivalent linear ground response analysis; vibrations of footings; construction vibrations; vibration isolation.

**CESM 566 Geotechnical Earthquake Engineering (3)** Plate tectonics and elastic rebound theory of earthquakes and faults; characterization of ground motions; seismicity; seismic risk analysis; effect of local soil conditions on ground response; development of design ground motions; liquefaction; dynamic lateral earth pressures; seismic slope stability. Prerequisite: CESM 565 or permission of instructor.

**CESM 567 Advanced Geotechnical Laboratory (4)** Soil and site investigation, classification and engineering properties of soils and rock as determined by standard and advanced test procedures and equipment. Evaluation of test data. Report writing. Prerequisite: CEE 366 or equivalent.

**CESM 568 Geosynthetic Engineering (3)** Identification and testing of geosynthetics. Design of geosynthetic filters, roadway stabilization, earth reinforcement, and waste containment systems. Prerequisite: CESM 562 and CESM 563.

**CESM 569 Foundation Soil Improvement (3)** Analysis and design of physical and chemical treatment techniques commonly applied to problem foundation soils for civil engineering structure. Prerequisite: CESM 563.

**CESM 570 Engineering Geology II (3)** Application of engineering geology fundamentals to: location, design and maintenance of engineered structures; policy decisions related to potential geological hazards. Case histories, governmental policy discussions, interpretation of geological maps for engineering purposes. Prerequisite: graduate standing and CEE 437 or permission of instructor.

**CESM 571 Rock Engineering (3)** Engineering classification, physical and mechanical properties of rocks, failure modes and initial stresses in rocks, laboratory and field testing of rocks, rock slope engineering, underground openings, foundations on rocks. Prerequisite: graduate standing and CEE 366 or permission of instructor.

## Transportation, Surveying, and Construction Engineering

### Courses for Graduates Only

**CETS 509 Construction Productivity (3)** Work improvement techniques applied to construction operations. Review of major contributions in behavioral science that may be applicable to the construction industry. Case studies. Innovative productivity programs successfully implemented on construction projects. Safety on construction projects, especially as influenced by managerial practices.

**CETS 511 Traffic Systems Operations (3)** Operational planning, management of arterial and freeway traffic systems. Review of transportation system management strategies to achieve more efficient use of existing infrastructure, including improved and innovative traffic control systems and demand management policies, measures of effectiveness, impact assessment, traveler response. Introduction to use of relevant computer models and packages.

**CETS 541 Transit Systems Planning (3)** Planning, operational methods for urban public transportation. Review of technological, operating characteristics of vehicles and systems; financing, management, institutional aspects. Paratransit. Short-range planning, operational strategies, revenue-fare structures. Service monitoring. Mode choice, transit demand relating to service. Computer-aided methods for planning, design of transit systems. Prerequisite: graduate standing or permission of instructor.

**CETS 543 Airport Engineering (3)** Definitions and terminology relating to airport engineering. Characteristics of aircraft, air traffic control, and resulting impact upon design process. Airport capacity, configuration, and planning associated with terminal design. Emphasis on geometric and structural design of pavements and airside. Design projects relating to airport engineering required. Prerequisite: permission of instructor.

**CETS 574 Advanced Travel Demand Theory and Applications (3)** New methods for estimating and forecasting travel demand. Individual as economic, psychological decision-making unit. Theoretical background to models, model structures, model specification, attitudinal measurement, empirical estimation, market segmentation, aggregation issues, model transferability, parameter updating. Practical applications, directions of present and future research. Prerequisite: graduate standing or permission of instructor.

## Computer Science and Engineering

114 Sieg



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Computer\\_Sci\\_Eng.html](http://www.washington.edu/students/genocat/academic/Computer_Sci_Eng.html)



Department Web page:  
[www.cs.washington.edu](http://www.cs.washington.edu)

Computer science and computer engineering are fields of unparalleled excitement and opportunity, now and for the future—fields where the smartest young men and women are choosing to study and to work. Whether your goal is graduate study and research, employment in the Northwest's vibrant information technology industry, business leadership, or public service, the UW Department of Computer Science and Engineering should be on your "short list." Ranked among the top ten research programs in the nation (along with MIT, Stanford, Berkeley and Princeton), UW CSE's focus on educational excellence was recognized in 1999 by the Brotman Award for Instructional Excellence.

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in such topics as the representation and storage of information; algorithms to access, display, edit, and transform information; programming languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead to practical developments in computer systems software, such as operating systems and compilers; in application areas, such as artificial intelligence, computer graphics, and computational biology; and also lead to theoretical investigations of computers, algorithms, and data.

Computer engineering is a closely related field that is concerned with the design and practical application of computer hardware and software systems to the solution of technological, economic, and societal problems. The computer engineer analyzes a problem and selects from a variety of tools and technologies those most appropriate for its solution. A computer engineer can expect to be involved in hardware design, software creation, and systems integration. The program provides an in-depth education in computer engineering while retaining strong foundations in traditional electrical engineering and computer science. The computer engineering program involves digital hardware, software, and architecture. Mathematics, engineering design, laboratory work, and communication-skills development are emphasized. A capstone design course is used to apply the knowledge and skills collected during the program to a major team project that must be completed during the senior year. The objective of undergraduate education in computer engineering is to develop broadly educated and competent graduates for professional careers or graduate studies. Especially important is a foundation that will endure as technology advances and changes.

### Instructional and Special Research Facilities

The Computer Science Laboratory provides extensive, efficient, and powerful state-of-the-art facilities for undergraduate, graduate, and faculty instruction and research. The equipment base is upgraded frequently; for an up-to-date description please see the descriptions in the online undergraduate and graduate brochures, which can be accessed through the department's Web page. The same is true for the department's software base, where there are several modern operating systems including Windows NT, Unix, Solaris, and Linux, as well as extensive collections of software applications and development tools for each. Students have access to these resources in several laboratories in Sieg Hall and through direct modem access administered by the department. All the department's workstations provide users with full Internet access and almost all the department's courses make extensive use of the World Wide Web. In addition to general computing laboratories, the department also supports specialized laboratories for computer graphics, hardware, and embedded system design that also support more-advanced computing platforms and software.

## Graduate Program

Graduate Program Coordinator  
114 Sieg, Box 352350  
(206) 543-1695  
grad-admissions@cs.washington.edu

The Department of Computer Science and Engineering offers programs of study leading to the degrees of Master of Science and Doctor of Philosophy. Students can pursue full-time graduate study leading to an M.S. or Ph.D. Students can also pursue part-time graduate study in the evening, leading to an M.S. Individual programs can be designed to provide considerable breadth of knowledge, as well as depth in an area of specialization.

The department has 30 faculty and is authorized to grow to more than 40 faculty over the next few years. In addition, there are nearly 30 adjunct, affiliate and emeritus faculty members. The faculty is currently conducting research in the following areas: embedded systems and reconfigurable computing; computer architecture; networking; operating systems and distributed systems; programming systems; information retrieval, database systems, and intelligent Internet systems; software engineering; computer graphics, vision, and animation; human interface to computing; artificial intelligence; theory of computation; and computing and biology.

### Full-Time Graduate Program

The full-time graduate program offers both M.S. and Ph.D. degrees. An M.S. degree can usually be completed in one to two years, and a Ph.D. degree can be completed in four to five years. It is not necessary to complete an M.S. program before entering the Ph.D. program. Degree requirements are outlined in *The Computer Science and Engineering Graduate Program Brochure*, available from the department.

### Application Requirements

Most entering graduate students are expected to have a solid background in computer science, including programming, machine organization, data structures, discrete mathematics, automata theory, and programming systems (i.e., the equivalent of CSE 378, 326, 321, 322, and either 401 or 451). Some exceptions to these requirements are made for otherwise-promising students. Graduate Record Examination scores are required; a GRE subject-test score (not necessarily in computer science) is recommended. Scores should be earned within the preceding five years. *The Computer Science and Engineering Graduate Program Brochure* gives full details of application procedures.

Complete applications must be received by January 1 (November 1 for international students) for autumn-quarter admission.

### Assistantships

Research and teaching assistantships are available and are allocated on the basis of scholastic excellence and potential. All students accepted to the program are awarded three years of funding. Students who are applying for assistantships to start in autumn quarter should have all applications to the Graduate School and the department completed by January 1 (November 1 for international students).

The application packet contains all the necessary forms for applying to the Graduate School and to the graduate program in Computer Science and Engineering and for consideration for assistantships.

### Professional Master's Program

The Professional Master's degree program is designed for active professionals in the vibrant information-technology industry who wish to further their educational and professional goals. Courses are offered in the evening and by distance to accommodate students working full-time.

To satisfy the requirements of the Professional Master's Program, students must successfully complete eight 4-credit courses and other courses providing 8 additional credits. The additional credits may be earned through participation in the department's colloquium series, which features leading-edge researchers and developers in computer science from around the world. This series airs throughout the Puget Sound region on UWTV and through live Internet video. Students take one course per quarter, plus 1 credit of colloquium. This allows students to complete the program in two-and-a-half years.

Successful applicants to the program will have a bachelor's degree in computer science or a related field and professional experience in advanced com-

puting technology. Most incoming students will have taken the following courses at the undergraduate level: data structures, discrete math, machine organization, automata theory, and programming languages, and will have programming experience.

Applications are accepted quarterly. Deadlines are July 1 for autumn quarter; November 1 for the winter quarter; and February 1 for spring quarter. For more information, see the department's Web site.

## Faculty

### Chair

Edward D. Lazowska

### Professors

Anderson, Richard J. \* 1986; PhD, 1985, Stanford University; parallel algorithms, computational geometry, combinatorial optimization.

Atlas, Les Eugene \* 1983, (Adjunct); MS, 1978, PhD, 1984, Stanford University; time-frequency representations, nonstationary signal and time-varying system analysis.

Baer, Jean-Loup \* 1969; MS, 1963, Grenoble (France); PhD, 1968, University of California (Los Angeles); computer architecture and performance evaluation.

Beame, Paul W. \* 1987; PhD, 1987, University of Toronto (Canada); computational complexity, proof complexity.

Bernstein, Philip Alan 1996, (Affiliate); PhD, 1975, University of Toronto (Canada).

Borning, Alan H. \* 1980; MS, 1974, PhD, 1979, Stanford University; human-computer interaction, constraint-based languages and systems; land use/transportation modeling.

Borriello, Gaetano \* 1988; MS, 1981, Stanford University; PhD, 1988, University of California (Berkeley); invisible and ubiquitous computing, embedded network systems.

De Rose, Anthony David \* 1985, (Affiliate); PhD, 1985, University of California (Berkeley).

Duchamp, Thomas E. \* 1984, (Adjunct); PhD, 1976, University of Illinois; differential geometry, computer graphics.

Ebeling, William H. C. \* 1986; MS, 1976, Southern Illinois University; PhD, 1986, Carnegie Mellon University; VLSI architectures, configurable computing, computer-aided design.

Eggers, Susan Jane \* 1989; PhD, 1989, University of California (Berkeley); uniprocessor and parallel architectures and program behavior, back-end compiler optimizations.

Golde, Hellmut \* 1959, (Emeritus); PhD, 1959, Stanford University; computer networks, compilers.

Haralick, Robert M. \* 1986, (Adjunct); MS, 1967, PhD, 1969, University of Kansas; computer vision, artificial intelligence, pattern recognition, image processing.

Hood, Leroy E. \* 1992, (Adjunct); PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

Hunt, Earl B. \* 1966, (Adjunct); PhD, 1960, Yale University; individual differences in cognition, cognition in education and the workplace.

Kalonji, Gretchen \* 1990, (Adjunct); PhD, 1982, Massachusetts Institute of Technology; crystalline defects, computer simulation, rapid solidification of ceramics.

Karlin, Anna R. \* 1994; PhD, 1987, Stanford University; online algorithms, probabilistic algorithms and probabilistic analysis.

Kehl, Theodore 1963, (Emeritus); PhD, 1961, University of Wisconsin; real-time hardware and software systems, computer design, VLSI.

Kim, Yongmin \* 1982, (Adjunct); MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, media processors, imaging and video systems, medical imaging modeling.

Ladner, Richard E. \* 1971; PhD, 1971, University of California (Berkeley); design and analysis of algorithms, cache performance, data compression, network algorithms.

Lazowska, Edward D. \* 1977; MS, 1974, PhD, 1977, University of Toronto (Canada); computer systems: modeling and analysis, design and implementation, distributed and parallel systems.

Leach, Paul Jay 1992, (Affiliate).

Levy, Henry M. \* 1983; MS, 1981, University of Washington; operating systems, distributed parallel systems, computer architecture.

Lewis, John 1994, (Affiliate); PhD, 1977, Stanford University.

Noe, Jerre D. \* 1968, (Emeritus); PhD, 1948, Stanford University; distributed computer systems, computer measurement and evaluation, simulation.

Notkin, David S. \* 1984; PhD, 1984, Carnegie Mellon University; software engineering, software evolution, software tools and environments, software model checking.

Olson, Maynard V. 1992, (Adjunct); PhD, 1970, Stanford University; large-scale genome mapping and sequencing.

Ruzzo, Walter L. \* 1977; PhD, 1978, University of California (Berkeley); computational complexity, parallel computation, computational biology.

Shapiro, Linda G. \* 1986; PhD, 1974, University of Iowa; computer vision, multimedia information systems, medical informatics, pattern recognition.

Shaw, Alan Cary \* 1971; PhD, 1968, Stanford University; operating systems, software specifications, real-time systems.

Snyder, Lawrence \* 1983; PhD, 1973, Carnegie Mellon University; the theory, algorithms, languages, architecture, and VLSI issues of parallel computation.

Stuetzle, Werner \* 1984, (Adjunct); PhD, 1977, Swiss Federal Institute of Technology; nonparametric methods in multivariate analysis, statistical applications of computer graphics.

Tanimoto, Steven L. \* 1977; MA, 1974, PhD, 1975, Princeton University; visual languages, image analysis, computer graphics, artificial intelligence, educational technology.

Tompkins, Martin \* 1986; MS, 1975, PhD, 1978, University of Toronto (Canada); computational complexity, computational biology.

Weld, Daniel Sabey \* 1988; MS, 1984, PhD, 1988, Massachusetts Institute of Technology; artificial intelligence, planning, software agents, data integration.

Zahorjan, John \* 1980; MS, 1976, PhD, 1980, University of Toronto (Canada); computer systems, performance analysis, parallel programming models, scheduling and runtime support.

Zick, Gregory L. \* 1974, (Adjunct); MS, 1972, PhD, 1974, University of Michigan; image and multimedia databases, medical imaging.

### Associate Professors

Adams, Loyce M. \* 1985, (Adjunct); PhD, 1983, University of Virginia; numerical algorithms for parallel computers.

Anderson, Thomas E. \* 1987; MS, 1990, PhD, 1991, University of Washington; internetworking local and wide-area distributed systems, operating systems, computer architecture.

Benaloh, Josh 1999, (Affiliate); PhD, 1987, Yale University.

Bershad, Brian \* 1986; MS, 1989, PhD, 1990, University of Washington; operating systems, architecture, distributed systems, parallel systems.

Brinkley, James F. III \* 1988, (Adjunct Research); MD, 1974, University of Washington; PhD, 1984, Stanford University; computer applications in medicine and biology.

Burns, Steven M. \* 1991, (Affiliate); PhD, 1991, California Institute of Technology; VLSI, asynchronous circuit design, CAD, concurrent computation.

Chambers, Craig D. \* 1991; PhD, 1992, Stanford University; object-oriented language design and implementation.

Cohen, Michael F. 1998, (Affiliate); PhD, 1992, University of Utah.

Dekker, David B. 1948, (Emeritus); PhD, 1948, University of California (Berkeley); numerical analysis, curve fitting, numerical solutions of differential equations.

Etzioni, Oren \* 1991; MS, 1988, PhD, 1990, Carnegie Mellon University; artificial intelligence and information retrieval, intelligent webware, software agents, Web search.

Friedman, Batya \* 1999, (Adjunct); PhD, 1988, University of California (Berkeley); value-sensitive design, social-cognitive and cultural aspects of information systems.

Green, Philip \* 1994, (Adjunct); PhD, 1976, University of California (Berkeley); mathematical and computer methods for genome analysis.

Kalet, Ira J. \* 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Kimura, Gary D. 1999, (Affiliate); PhD, 1984, University of Washington.

Larus, James R. 1999, (Affiliate); PhD, 1989, University of California (Berkeley).

Salesin, David Henry \* 1992; PhD, 1991, Stanford University; computer graphics.

Szeliski, Richard Stephen 1998, (Affiliate); PhD, 1988, Carnegie Mellon University.

### Assistant Professors

Arnstein, Lawrence 1999, (Affiliate); PhD, 1993, Carnegie Mellon University.

Bohringer, Karl F. \* 1998, (Adjunct); PhD, 1997, Cornell University; microelectromechanical systems, applied microtechnology, micro spacecraft.

Curless, Brian L. \* 1998; MSEE, 1991, PhD, 1997, Stanford University; computer graphics, active machine vision.

Diorio, Christopher J. \* 1997; MS, 1984, PhD, 1997, California Institute of Technology; silicon learning chips, neural networks and learning algorithms, implantable microcontrollers.

Domingos, Pedro 1999; MS, 1992, University of Lisbon (Portugal); MS, 1994, PhD, 1997, University of California (Irvine); artificial intelligence, machine learning, data mining.

Hauck, Scott \* 1990, (Adjunct); MS, 1992, PhD, 1995, University of Washington; FPGAs, reconfigurable computing, VLSI/CAD, digital logic, adaptive computing.

Levy, Alon Y. \* 1998; PhD, 1993, Stanford University; database systems, artificial intelligence, query optimization.

Sengupta, Rimli 1999, (Research); PhD, 1995, Georgia Institute of Technology.

Wetherall, David James 1999; MS, 1994, PhD, 1998, Massachusetts Institute of Technology; networks, distributed systems, programming languages and operating systems.

### Senior Lecturer

Mones-Hattal, Barbara 1999; MFA, 1989, Rhode Island School of Design; computer graphics, character animation.

### Lecturers

Dickey, Martin 1996; PhD, 1992, Arizona State University; computer science education, computational linguistics.

Perkins, John H. Jr. 1998; MS, 1982, Cornell University; computer science education, programming languages and compilers.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**CSE 401 Introduction to Compiler Construction (3)** Fundamentals of compilers and interpreters for symbol tables; lexical analysis, syntax analysis, semantic analysis, code generation, and optimizations for general purpose programming languages. No credit to students who have taken 413. Prerequisite: CSE 322; CSE 326; CSE 341; CSE 378.

**CSE 403 Software Engineering (4)** Fundamentals of software engineering using a group project as the basic vehicle. Topics covered include the software crisis, managing complexity, requirements specification, architectural and detailed design, testing and analysis, software process, and tools and environments. Prerequisite: CSE 321; CSE 341; CSE 378; recommended: CSE 401; CSE 451.

**CSE 410 Computer Systems (3)** Structure and components of hardware and software systems. Machine organization, including central processor and input-output architectures; assembly language programming; operating systems, including process, storage, and file management. No credit to students who have completed 378 or 451. Prerequisite: CSE 373.

**CSE 413 Programming Languages and Their Implementation (3)** Concepts and implementation strategies for ALGOL-class languages, including Pascal, Modula, ALGOL 60, Ada. Compilers for ALGOL-class languages. Languages with late binding times, including LISP, APL, Smalltalk. No credit to students who have completed 341 or 401. Prerequisite: CSE 373.

**CSE 415 Introduction to Artificial Intelligence (5) NW** Principles and programming techniques of artificial intelligence: LISP, symbol manipulation, knowledge representation, logical and probabilistic reasoning, learning, language understanding, vision, expert systems, and social issues. Not open for credit to students who have completed 473. Prerequisite: CSE 373.

**CSE 417 Algorithms and Computational Complexity (3)** Design and analysis of algorithms and data structures. Efficient algorithms for manipulating graphs and strings. Fast Fourier Transform. Models of computation, including Turing machines. Time and space complexity. NP-complete problems and undecidable problems Prerequisite: CSE 373. Offered: W.

**CSE 421 Introduction to Algorithms (3)** Techniques for design of efficient algorithms. Methods for showing lower bounds on computational complexity. Particular algorithms for sorting, searching, set manipulation, arithmetic, graph problems, pattern matching. Prerequisite: CSE 322; CSE 326.

**CSE 431 Introduction to Theory of Computation (3)** Models of computation, computable and noncomputable functions, space and time complexity, tractable and intractable functions. Prerequisite: CSE 322.

**CSE 444 Introduction to Database Systems (3)** Fundamental concepts, system organization, and implementation of database systems. Relational, hierarchical, and network data models; file organizations and data structures; query languages; query optimization; database design; concurrency control; security; issues involving distributed database systems. Prerequisite: CSE 326.

**CSE 451 Introduction to Operating Systems (4)** Principles of operating systems. Process management, memory management, auxiliary storage management, resource allocation. No credit to students who have completed 410 or E E 474. Prerequisite: CSE 326; CSE 378.

**CSE 457 Computer Graphics (4)** Introduction to computer image synthesis and interactive computer graphics applications. Topics include computer graphics hardware, color image display, event-driven programming, line drawing, polygon scan conversion, texture mapping, image morphing, image compositing, curves and surfaces, hidden surface algorithms, local illumination models, ray tracing, and photorealistic image synthesis. Prerequisite: CSE 326.

**CSE 458 Computer Animation (5)** Introduction to basic principles of computer generated animation. Focus on the modeling and lighting of animated characters. Students from Art, CSE, and Music team up on projects to be built on commercially-available modeling and lighting packages. Prerequisite: either CSE 457, ART 380, or MUSIC 403.

**CSE 461 Introduction to Computer-Communication Networks (4)** Computer network architectures, protocol layers. Transmission media, encoding systems, error detection, multiplexing, switching. Data link, multiple access channel protocols. Methods for network routing, congestion control, flow control. End-to-end transport services, protocols. Network security, privacy. Applications including electronic mail, virtual terminals, distributed operating systems. Network programming. Prerequisite: CSE 143. Offered: jointly with E E 461.

**CSE 466 Software for Embedded Systems (4)** Software issues in the design of embedded systems. Microcontroller architectures and peripherals, embedded operating systems and device drivers, compilers and debuggers, timer and interrupt systems, interfacing of devices, communications and networking. Emphasis on practical application of development platforms. Prerequisite: CSE 326; CSE 370; CSE 378.

**CSE 467 Advanced Digital Design (4)** Advanced techniques in the design of digital systems. Hardware description languages, combinational and sequential logic synthesis and optimization methods, partitioning, mapping to regular structures. Emphasis on reconfigurable logic as an implementation medium. Memory system design. Digital communication including serial/parallel and synchronous/asynchronous methods. Prerequisite: CSE 326; CSE 370.

**CSE 468 Very Large Scale Integration (5)** Introduction to CMOS technology and circuit design; implementation of combinational and sequential logic; VLSI design methodologies; CAD tools for layout, simulation, and validation. Students design a VLSI chip using modern CAD tools. Prerequisite: CSE 370.

**CSE 471 Computer Design and Organization (4)** CPU instruction addressing models, CPU structure and functions, computer arithmetic and logic unit, register transfer level design, hardware and micro-program control, memory hierarchy design and or-

ganization, I/O and system components interconnection. Laboratory project involves design and simulation of an instruction set processor. Prerequisite: CSE 370; CSE 378.

**CSE 472 Introduction to Computational Linguistics (3) VLPA** Introduction to computer applications of linguistic theory, including syntactic processing, semantic, and pragmatic interpretation and natural language generation. Prerequisite: either ANTH 461 or LING 461. Offered: jointly with LING 472.

**CSE 473 Introduction to Artificial Intelligence (3)** Principal ideas and developments in artificial intelligence: theorem proving, problem-solving methods, representation of knowledge, natural language analysis and synthesis, programming languages for artificial intelligence. Not open for credit to students who have completed 415. Prerequisite: CSE 326; recommended: CSE 341.

**CSE 476 Embedded System Design (5)** System building course to provide students with a complete experience in embedded system design. Students will design, simulate, construct, debug, and document a substantial project of their choosing. Lectures will focus on case studies and emerging components and platforms. Prerequisite: CSE 451; CSE 466.

**CSE 477 Digital System Design (5)** Students use laboratory to design, simulate, construct, and debug a substantial project that includes hardware, software, and communication components. Lectures focus on use of embedded processors in digital system design and interfacing techniques. Writing and debugging of real-time reactive software emphasized. Prerequisite: CSE 378; CSE 467.

**CSE 481 Capstone Software Design (5)** Students work in teams to design and implement a software project involving multiple areas of the CSE curriculum. Emphasis is placed on the development process itself, rather than on the product. Prerequisite: CSE major; CSE 326; CSE 341; CSE 378 and substantial programming experience, such as in CSE 451 or 457.

**CSE 490 Special Topics in Computer Science and Engineering (1-5, max 15)** Lectures, discussions, and possibly labs on topics of current interest in computer science and engineering not covered by other CSE undergraduate courses. Offered: AWSpS.

**CSE 498- Senior Project ([1-9]-, max. 9)** A report (and perhaps demonstration) describing a development, survey, or small research project in computer science or an application to another field. Objectives are: (1) integrating material from several courses, (2) introducing the professional literature, (3) gaining experience in writing a technical document, and (4) showing evidence of independent work. Work normally extends over more than one quarter, for a maximum of 6 credits for 498; 9 credits are required for 498H. Offered: AWSpS.

**CSE 499 Reading and Research (1-24, max. 24)** Available in special situations for advanced computer science majors to do reading and research in field, subject to approval of undergraduate adviser and CSE faculty member. Free elective, but does not replace core course or computer science elective. Credit/no credit only. Offered: AWSpS.

## Courses for Graduates Only

**CSE 500 Computers and Society (2)** Study of impact of computer technology on present and future society, including political, economic, cultural, social, and moral issues. Includes guest lecturers and discussion leaders. Each student is required to complete a term project. Credit/no credit only. Prerequisite: graduate standing in computer science or permission of instructor. Offered: alternate years.

**CSE 501 Implementation of Programming Languages (3)** Design of compilers and run-time systems for traditional and non-traditional programming

languages. Intra- and interprocedural analyses and optimization. Compile-time and run-time implementation techniques for LISP-like, functional, and object-oriented languages. Students construct an optimizing compiler. Prerequisite: CSE major and CSE 401 and CSE 505.

**CSE 503 Software Engineering (3)** Specification, implementation, and testing of large, multiperson, software systems. Topics include abstraction, information hiding, software development environments, and formal specifications. Prerequisite: CSE major and CSE 322, CSE 326, and CSE 378 or equivalents.

**CSE 504 Advanced Topic in Software Engineering (3)** Topics vary but may include software design and evolution, formal methods, requirements specifications, software and system safety, reverse engineering, real-time software, metrics and measurement, programming environments, and verification and validation. Prerequisite: CSE major or permission of instructor.

**CSE 505 Concepts of Programming Languages (3)** Data structures, types, control structures. Languages in the ALGOL family; functional, object-oriented, and logic programming languages. Prerequisite: CSE major, CSE 401 and a working knowledge of Pascal and LISP.

**CSE 510 Advanced Topics in Human-Computer Interaction (3)** Content varies, including interface issues for networks, embedded systems, education applications, safety and critical systems, graphics and virtual reality, databases, and computer-supported cooperative work. Offered: odd years.

**CSE 519 Computer Science Research Seminar (1, max. 3)** Weekly presentations on current research activities by members of the department. Only Computer Science graduate students may register, although others are encouraged to attend. Credit/no credit only. Offered: AWSp.

**CSE 520 Computer Science Colloquium (1, max. 9)** Weekly public presentations on topics of current interest by visiting computer scientists. Credit/no credit only. Offered: AWSp.

**CSE 521 Design and Analysis of Algorithms I (3)** Principles of design of efficient algorithms: recursion, divide and conquer, balancing, dynamic programming, greedy method, data structure selection. Correctness and analysis of algorithms. Examples drawn from problems in sorting, searching, set manipulation, pattern-matching, graphs, matrices, polynomials, and integers. Prerequisite: CSE major and CSE 326 or equivalent.

**CSE 522 Design and Analysis of Algorithms II (3)** Analysis of algorithms more sophisticated than those treated in 521. Content varies and may include such topics as algebraic algorithms, combinatorial algorithms, techniques for proving lower bounds on complexity, and algorithms for special computing devices such as networks or formulas. Prerequisite: CSE major and CSE 521. Offered: alternate years.

**CSE 523 Computational Geometry (3)** Algorithms for discrete computational geometry. Geometric computation, range searching, convex hulls, proximity, Voronoi diagrams, intersection. Application areas include VLSI design and computer graphics. Prerequisite: CSE major and CSE 521; recommended: CSE 457 or equivalent. Offered: alternate years.

**CSE 527 Computational Biology (3)** Introduces computational methods for understanding biological systems at the molecular level. Problem areas such as mapping and sequencing, sequence analysis, structure prediction, phylogenetic inference, regulatory analysis. Techniques such as dynamic programming, Markov models, expectation-maximization, local search. Prerequisite: graduate standing in biological, computer, mathematical or statistical science, or permission of instructor.

**CSE 531 Automata, Computability, and Complexity (3)** Computational models including finite automata, regular expressions, context-free grammars, pushdown automata, Turing machines, and techniques for analyzing them. Basic computability theory and undecidability. Fundamentals of computational complexity theory and NP-completeness. Prerequisite: CSE majors only.

**CSE 532 Complexity Theory (3)** Deterministic, nondeterministic, alternating, and probabilistic Turing machines. Time and space complexity, complexity classes, complexity hierarchies, and provably intractable problems. Prerequisite: CSE major and CSE 531.

**CSE 536 Theory of Distributed Computing (3)** Formal approaches to distributed computing problems. Topics vary, but typically include models of distributed computing, agreement problems, impossibility results, mutual exclusion protocols, concurrent reading while writing protocols, knowledge analysis of protocols, and distributed algorithms. Prerequisite: CSE major. Offered: alternate years.

**CSE 543 Computer System Performance (3)** Emphasizes the use of analytic models as tools for evaluating the performance of centralized, distributed, and parallel computer systems. Prerequisite: CSE major and CSE 451.

**CSE 544 Principles of Database Systems (3)** Data models and query languages (SQL, datalog, OQL). Relational databases, enforcement of integrity constraints. Object-oriented databases and object-relational databases. Principles of data storage and indexing. Query-execution methods and query optimization algorithms. Static analysis of queries and rewriting of queries using views. Data integration. Data mining. Principles of transaction processing.

**CSE 548 Computer Systems Architecture (3)** Notations for computer systems. Processor design (single chip, look-ahead, pipelined, data flow). Memory hierarchy organization and management (virtual memory and caches). Microprogramming. I/O processing. Multiprocessors (SIMD and MIMD). Prerequisite: CSE major and CSE 451.

**CSE 549 High-Performance Computer Architectures (3)** Algorithm design, software techniques, computer organizations for high-performance computing systems. Selected topics from: VLSI complexity for parallel algorithms, compiling techniques for parallel and vector machines, large MIMD machines, interconnection networks, reconfigurable systems, memory hierarchies in multiprocessors, algorithmically specialized processors, data flow architectures. Prerequisite: CSE major and CSE 548 or permission of instructor. Offered: alternate years.

**CSE 551 Operating Systems (3)** Operating system design and construction techniques. Concurrent programming, operating system kernels, correctness, deadlock, protection, transaction processing, design methodologies, comparative structure of different kinds of operating systems, and other topics. Prerequisite: CSE major and CSE 451.

**CSE 552 Distributed and Parallel Systems (3)** Principles, techniques, and examples related to the design, implementation, and analysis of distributed and parallel computer systems. Prerequisite: CSE major and CSE 551.

**CSE 553 Real-Time Systems (3)** Design and construction of software for real-time computer systems. Software architectures. Requirements and specification methods. Scheduling algorithms and timing analysis. Real-time operating systems. Real-time programming languages. Selected case studies. Prerequisite: CSE major and CSE 451. Offered: alternate years.

**CSE 557 Computer Graphics (3)** Introduction to computer image synthesis, emphasizing the underlying theoretical principles in preparation for undertaking computer graphics research. Topics include color theory, photorealistic image synthesis, affine and projective geometry, curve and surface design, numerical methods, sampling theory, physical dynamics. Laboratory project. CSE majors only. Prerequisite: CSE major and knowledge of data structures and linear algebra.

**CSE 558 Special Topics in Computer Graphics (3)** Advanced topics in computer graphics not treated in CSE 557. Topics vary from year-to-year but typically include advanced image synthesis and/or computer aided geometric design. Prerequisite: CSE major and CSE 557 or permission of instructor. Offered: alternate years.

**CSE 563 Fault Tolerant Computing (3)** Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with E E 563.

**CSE 567 Principles of Digital Systems Design (3)** Principles of logic design, combinational and sequential circuits, minimization techniques, structured design methods, CMOS technology, complementary and ratioed gates, delay estimation and performance analysis, arithmetic circuits, memories, clocking methodologies, synthesis and simulation tools. VLSI processor architecture. Prerequisite: CSE major and basic knowledge of logic design.

**CSE 568 Introduction to VLSI Systems (3)** Introduction to CMOS technology and circuit design; combinational logic-design alternatives; register-design and system-clocking methodologies; datapath and subsystem design; VLSI system-design methodologies; CAD tools for synthesis, layout, simulation, and validation; design of a complex VLSI chip. Prerequisite: CSE 567 or permission of instructor. CSE majors only

**CSE 573 Artificial Intelligence I (3)** Introduction to computational models of thought and construction of intelligent information systems. Topics include search algorithms, data dependencies and truth-maintenance systems, approaches to knowledge representation, automated deduction, reasoning under uncertainty, and machine learning. Prerequisite: CSE 421 or equivalent; exposure to logic, LISP programming experience, CSE major.

**CSE 574 Artificial Intelligence II (3)** Advanced topics in artificial intelligence. Subjects include planning, natural language understanding, qualitative physics, machine learning, and formal models of time and action. Students are required to do projects. Prerequisite: CSE major and CSE 573.

**CSE 576 Image Understanding (3)** Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures. Prerequisite: CSE 573 or E E 562 or equivalent or permission of instructor. Offered: jointly with E E 576.

**CSE 577 Mathematical Morphology (3)** Theory of mathematical morphology and its application in various commercial, industrial, medical, and research applications. Contents include binary and grayscale morphologic dilation, erosion, opening and closing, morphological sampling theorem, structuring element decomposition, thinning, skeletonizing, and relational shape description. Group project. Prerequisite: CSE 576 or E E 568 or permission of instructor. Offered: jointly with E E 577; alternate years.

**CSE 582 Compiler Construction (4)** Principles and practice of building efficient implementations of modern programming languages. Lexical, syntactic, and semantic analysis of programs. Intermediate program representations. Intra- and interprocedural analysis and optimization. Run-time system techniques. Related programming environment facilities such as source-level debuggers and profilers. Prerequisite: CSE majors only.

**CSE 583 Programming Languages (4)** A study of non-imperative programming paradigms such as functional, object-oriented, logic, and constraint programming. Programming language semantics and type theory. Prerequisite: CSE majors only.

**CSE 584 Principles of Software Engineering (4)** Study of major developments in software engineering over the past three decades. Topics may include design (information hiding, layering, open implementations), requirements specification (informal and formal approaches), quality assurance (testing, verification and analysis, inspections), reverse and re-engineering (tools, models, approaches). Prerequisite: CSE majors only.

**CSE 586 Computer Architecture (4)** Architecture of the single-chip microprocessor: instruction set design and processor implementation (pipelining, multiple issue, speculative execution). Memory hierarchy: on-chip and off-chip caches, TLBs and their management, virtual memory from the hardware viewpoint. I/O devices and control: buses, disks, and RAIDs. Prerequisite: CSE majors only.

**CSE 587 Computer Operating Systems (4)** A study of developments in operating systems from the 1960s to the present. Topics include operating system structure, protection, virtual memory, communication mechanisms, concurrency, lightweight threads, object-oriented systems, distributed systems, and transaction support in operating systems. Prerequisite: CSE majors only.

**CSE 588 Network Systems (4)** Current choices and challenges in network systems. Fundamental concepts combined with emphasis on evaluation of design/operations alternatives. Topics include: alternative link, network, and transport-layer technologies, topologies, routing, congestion control multimedia, Ipv6, aTM v. IP, network management and policy issues. Prerequisite: CSE majors only.

**CSE 589 Applied Algorithms (4)** Principles of design of efficient algorithms with emphasis on algorithms with real world applications. Examples drawn from computational geometry, biology, scientific computation, image processing, combinatorial optimization, cryptography, and operations research. Prerequisite: CSE majors only.

**CSE 590 Special Topics in Computer Science (\*)** Several offerings each quarter, on topics of current interest. Prerequisite: permission of instructor. Offered: AWWSp.

**CSE 591 Current Trends in Computer Graphics (4)** Introduction to computer image synthesis and interactive computer graphics applications, emphasizing the state-of-the-art algorithms and applications. Topics may include hardware, color image display, event-driven programming, texture mapping, image morphing, image compositing, curves and surfaces, photorealistic image synthesis, and physical dynamics for modeling and animation. Prerequisite: CSE majors only.

**CSE 592 Applications of Artificial Intelligence (4)** Introduction to the use of Artificial Intelligence tools and techniques in industrial and company settings. Topics include: foundations (search, knowledge representation) and tools such as expert systems, natural language interfaces and machine learning techniques. Prerequisite: CSE majors only.

**CSE 593 Transaction Processing (4)** Technology supporting reliable large-scale distributed computing, including transaction programming models, TP monitors, transactional communications, persistent queuing, software fault tolerance, concurrency control and recovery algorithms, distributed transactions, two-phase commit, data replication. Prerequisite: CSE majors only.

**CSE 594 Database Management System (4)** Introduction to the principles of database management systems. Topics include database system architecture, data models, theory of database design, query optimization, concurrency control, crash recovery, and storage strategies. CSE majors only.

**CSE 595 Human Computer Interaction (4)** Topics in human-computer interaction, including tools and skills for user interface design, user interface software architecture, rapid prototyping and iterative design, safety and critical systems, evaluation techniques, and computer supported cooperative work. Prerequisite: CSE majors only.

**CSE 596 Parallel Computation (4)** Survey of parallel computing including the processing modes of pipelining, data parallelism, thread parallelism, and task parallelism; algorithmic implications of memory models; shared memory and message passing; hardware implementations; bandwidth and latency; synchronization, consistency, interprocessor communication; programming issues including implicit and explicit parallelism, locality, portability. CSE majors only.

**CSE 597 Performance Analysis (4)** Broad introduction to computer system performance evaluation techniques and their application. Includes measurement/benchmarking, stochastic and trace driven simulation, stochastic queuing networks, and timed Petri nets. Applications of the techniques are studied using case study papers. CSE majors only. Not open for credit to students who have completed CSE 543. Offered: AWSp.

**CSE 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**CSE 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSpS.

**CSE 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.

## Electrical Engineering

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General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Electrical\\_Eng.html](http://www.washington.edu/students/gencat/academic/Electrical_Eng.html)



Department Web page:  
[www.ee.washington.edu](http://www.ee.washington.edu)

Electrical engineering is concerned with the understanding and utilization of electricity and with providing society useful, efficient, and economic products and services. Electrical engineering is an amazingly broad-based and rapidly growing discipline. It encompasses everything from batteries and power supplies to crystal fabrication, autonomous robots, and devices that can recognize human speech. Electrical engineers design, produce, study, and operate all manners of devices and systems that use electric and electromagnetic energy. Electrical engineers work on systems at the macro scale of electric power grids and at the micro scale of nanotechnology.

Contemporary society is in the midst of an information revolution, created in large part from the fruits of electrical engineering. Rapid improvements in communication technologies, computer visualization, and

information access continue to have a significant impact on manufacturing, medicine, transportation, and environmental monitoring. Dramatic advances in personal communication services, digital imaging, and network hardware and software are changing the texture of everyday life for an increasing portion of the world's population.

Graduates with a degree in electrical engineering find employment in industries such as aerospace, communications, computer manufacturing, power distribution, consumer electronics, and biomedical engineering. Positions can be found focusing on the research, design, and testing of new products; in technical sales and marketing; business consulting; and even growing areas such as intellectual property. Students who pursue graduate studies are quite successful in highly competitive programs nationally and internationally.

## Graduate Program

Graduate Program Coordinator  
253 EE/CSE Building, Box 352500  
(206) 543-4924  
[grad@ee.washington.edu](mailto:grad@ee.washington.edu)

The Department of Electrical Engineering offers graduate programs leading to the degrees of Master of Science in Electrical Engineering (M.S.E.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in biosystems, circuits and network theory, computational intelligence, computer networks and distributed systems, computer architecture, digital systems, software engineering, operating systems, microprocessors, VLSI design, control systems, electromagnetics (including optics and radio science), electronic materials (including devices and micro-electronics), energy systems (including power electronics and electric drives), signal and image processing, telecommunications, and virtual reality. Numerous interdisciplinary research opportunities exist, including projects relating to bioengineering, computer engineering, and marine acoustics. The department does extensive research in coordination with the University of Washington's Applied Physics Laboratory and Washington Technology Center.

For the M.S.E.E. degree, a minimum of 45 credits is required. Students writing a thesis must register for 9-12 credits. Students selecting the non-thesis option can either complete their degree by total course work or by a one-term project of 4 credits.

Course work for any of the above-mentioned options must be selected with each student's supervisory committee's approval to prepare the student in an area of specialization. If more flexibility is desired than the M.S.E.E. requirements allow, the interdisciplinary degree of Master of Science in Engineering is available.

The M.S.E.E. degree is also offered to part-time students employed in local industries through the Education at a Distance for Growth and Excellence (EDGE) program. Regular graduate courses are offered over cable television or by videotape to enable working engineers to participate in the program without traveling to campus.

For the Ph.D. degree, students must pass the departmental qualifying examination, pass an advanced General Examination, pursue an original research problem, and report the results of that research in a dissertation that must be a contribution to knowledge. At least one year of course work beyond the M.S.E.E. degree is usually desirable.

## Research Groups

Facilities in the Department of Electrical Engineering include research laboratories for advanced digital systems, advanced power technology, applied electromagnetics, optics, remote sensing, applied signal and image processing, mechatronics and intelligent control, modern sensors, and semiconductor technology.

## Admissions Qualifications

In addition to meeting Graduate School admission requirements, the Graduate Record Examination (GRE) general test is required of all students. Official test scores must be submitted, along with a formal application and a minimum of two reference letters.

Although most applicants have baccalaureate degrees in electrical engineering, applicants with degrees in other branches of engineering, the physical sciences, computer science, or mathematics often are able to pursue graduate study in electrical engineering following some additional preparation. Such applicants are strongly encouraged to contact the department for further information.

## Financial Aid

Research assistantships, teaching assistantships, scholarships, and graduate fellowships are available to qualified graduate students in all areas of electrical engineering. Most awards include a monthly stipend plus payment of tuition and fees.

## Faculty

### Chair

Howard Jay Chizeck

### Professors

Afromowitz, Martin \* 1975; MS, 1966, PhD, 1969, Columbia University; microtechnology, solid-state and fiber-optics sensors, biomedical instrumentation.

Albrecht, Robert W. \* 1961; MS, 1958, PhD, 1961, University of Michigan; robotics, stochastic analysis, nuclear reactor theory.

Alexandro, Frank J. \* 1964; MSEE, 1959, DSc, 1964, New York University; control systems.

Allstot, David James \* 1999; PhD, 1979, University of California (Berkeley); design and simulation of RF and mixed-signal integrated circuits.

Andersen, Jonny \* 1967; MS, 1962, PhD, 1965, Massachusetts Institute of Technology; analog circuit design, modeling and CAD.

Atlas, Les Eugene \* 1983; MS, 1978, PhD, 1984, Stanford University; time-frequency representations, nonstationary signal and time-varying system analysis.

Baer, Jean-Loup \* 1969, (Adjunct); MS, 1963, Grenoble (France); PhD, 1968, University of California (Los Angeles); computer architecture and performance evaluation.

Beach, Kirk Watson \* 1976, (Adjunct Research); MSChE, 1968, PhD, 1971, University of California (Berkeley); MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Bergseth, F. Robert 1947, (Emeritus); MSEE, 1938, Massachusetts Institute of Technology; electric power systems.

Bernard, Gary D. \* 1989, (Affiliate); PhD, 1964, University of Washington; advanced sensors for manufacturing, time-frequency classification, visual information processing.

Chizeck, Howard Jay \* 1998; ScD, 1982, Massachusetts Institute of Technology; biologically inspired control systems for autonomous robotics, prosthetics, and rehabilitation.

Clark, Robert N. \* 1957, (Emeritus); PhD, 1969, Stanford University; automatic control systems, fault detection in dynamic systems.

Crum, Lawrence A. \* 1992, (Research); PhD, 1967, Ohio University.

Damborg, Mark J. \* 1969; MSEE, 1963, PhD, 1969, University of Michigan; control systems theory, power system dynamics, expert systems and database applications.

Daniels, Patricia D. 1996, (Affiliate); PhD, 1974, University of California (Berkeley).

Darling, Robert B. \* 1985; MS, 1982, PhD, 1985, Georgia Institute of Technology; semiconductor devices, microelectronics, optoelectronics, sensors, micro-fabrication.

Denton, Denise D. 1996; MS, 1982, PhD, 1987, Massachusetts Institute of Technology; micromachining for the design and fabrication of microelectronic systems.

Dow, Daniel G. \* 1968, (Emeritus); PhD, 1958, Stanford University; microwaves, physical electronics, semiconductor devices, sensors.

Ehrenberg, John E. \* 1970, (Affiliate); PhD, 1973, University of Washington; communications, signal processing, underwater acoustics.

El-Sharkawi, Mohamed A. \* 1980; MS, 1977, PhD, 1980, University of British Columbia (Canada); intelligent systems applications; analysis and control of power electronics and systems.

Furness, Thomas A. \* 1989, (Adjunct); PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics.

Guilford, Edward C. \* 1959, (Emeritus); PhD, 1959, University of California (Berkeley); electronics, computers.

Hannaford, Blake \* 1989; MS, 1982, PhD, 1985, University of California (Berkeley); human and robotic movement control, bioengineering, controls, human-machine interaction.

Haralick, Robert M. \* 1986; MS, 1967, PhD, 1969, University of Kansas; computer vision, artificial intelligence, pattern recognition, image processing.

Hsu, Chih-Chi \* 1958, (Emeritus); PhD, 1951, Ohio State University; control systems and cybernetics.

Hwang, Jenq-Neng \* 1989; PhD, 1988, University of Southern California; signal and image processing, neural networks, pattern recognition.

Ishimaru, Akira \* 1953, (Emeritus); PhD, 1958, University of Washington; electromagnetics, optics, acoustics, applied mathematics, scattering theory.

Jackson, Darrell R. \* 1976, (Research); PhD, 1966, University of Washington; PhD, 1977, California Institute of Technology; signal processing, underwater acoustics, wave scattering.

Johnson, David L. 1955, (Emeritus); PhD, 1955, Purdue University; digital design, artificial intelligence, models of learning systems.

Kuga, Yasuo \* 1991; MS, 1979, PhD, 1983, University of Washington; microwave and millimeter-wave remote sensing, optics, and electromagnetics.

Ladner, Richard E. \* 1971, (Adjunct); PhD, 1971, University of California (Berkeley); design and analysis of algorithms, cache performance, data compression, network algorithms.

Lauritzen, Peter O. \* 1968, (Emeritus); MS, 1958, PhD, 1961, Stanford University; power electronics, device modeling for circuit simulation, electronic devices.

Lewellen, Thomas \* 1967, (Adjunct); PhD, 1972, University of Washington; bioengineering, electrical engineering.

Liu, Chen-Ching \* 1983; MS, 1978, National Taiwan University; PhD, 1983, University of California (Berkeley); power system analysis/computing, intelligent system methodologies/applications, power electronics.

Malvar, Henrique S. 1999, (Affiliate); PhD, 1986, Massachusetts Institute of Technology.

Marks, Robert \* 1977; MS, 1973, Rose Hulman Institute of Technology; PhD, 1977, Texas Technological University; neural networks, computational intelligence, fuzzy systems, statistical communication theory.

Meditch, James S. \* 1977, (Emeritus); MS, 1957, Massachusetts Institute of Technology; PhD, 1961, Purdue University; broadband communication networks, video and multimedia systems.

Mitchell, Gordon Lynn 1993, (Affiliate); PhD, 1978, University of Washington.

Moritz, William E. \* 1973, (Emeritus); PhD, 1969, Stanford University; human-powered transportation.

Noges, Endrik \* 1958, (Emeritus); PhD, 1959, Northwestern University; automatic control systems, nonlinear and discontinuous control.

Ostendorf, Mari \* 1999; PhD, 1985, Stanford University; speech synthesis and understanding, spoken document retrieval, statistical pattern recognition.

Pearsall, Thomas P. \* 1989; PhD, 1973, Cornell University; physics of semiconductors and the technology of semiconductor devices.

Peden, Irene Carswell \* 1961, (Emeritus); PhD, 1962, Stanford University; subsurface remote sensing and applied electromagnetics.

Pinter, Robert B. \* 1967, (Emeritus); MS, 1960, PhD, 1964, Northwestern University; cybernetics, robotics, biophysics.

Porter, Robert P. \* 1985, (Emeritus); PhD, 1970, Northeastern University; acoustics, electromagnetics, signal processing.

Ritcey, James A. \* 1985; MS, 1979, Syracuse University; PhD, 1985, University of California (San Diego); communications, signal processing, radar/sonar.

Sechen, Carl M. \* 1992; PhD, 1987, University of California (Berkeley); design and computer-aided design of digital integrated circuits and systems.

Shapiro, Linda G. \* 1986; PhD, 1974, University of Iowa; computer vision, multimedia information systems, medical informatics, pattern recognition.

Sigelmann, Rubens A. \* 1959, (Emeritus); PhD, 1963, University of Washington; bioengineering, ultrasonics, propagation, acoustics.

Soma, Mani \* 1982; MS, 1977, PhD, 1980, Stanford University; IC design and testing, mixed signal testing, bioengineering.

Spelman, Francis A. \* 1961, (Adjunct); PhD, 1975, University of Washington; biophysics of implanted cochlea, bioinstrumentation for primate research.

Spindel, Robert C. 1987; MS, 1966, PhD, 1971, Yale University; ocean acoustics, signal processing, acoustic navigation systems, acoustic tomography.

Szablya, John F. \* 1984, (Affiliate); PhD, 1948, Josef Nador University (Hungary).

Tanimoto, Steven L. \* 1977, (Adjunct); MA, 1974, PhD, 1975, Princeton University; visual languages, image analysis, computer graphics, artificial intelligence, educational technology.

Tsang, Leung \* 1983; MS, 1973, PhD, 1976, Massachusetts Institute of Technology; electromagnetics, propagation and scattering, remote sensing, and optics.

Uscinski, Barry Joseph 1999, (Affiliate); PhD, 1998, University of Cambridge (UK).

Vagners, Juris \* 1967, (Adjunct); PhD, 1967, Stanford University; dynamics, controls and optimization.

Venkata, Subrahmanyam S. 1979, (Affiliate); MS, 1965, Indian Institute of Technology (India); PhD, 1971, University of South Carolina; computer applications to power systems, AI applications, transmission and distribution.

Yee, Sinclair S. \* 1966; MS, 1961, PhD, 1965, University of California (Berkeley); physical electronics, semiconductor devices, optical sensors.

Zick, Gregory L. \* 1974; MS, 1972, PhD, 1974, University of Michigan; image and multimedia databases, medical imaging.

## Associate Professors

Aggoune, Mohamed E. 1987, (Affiliate); MS, 1984, PhD, 1988, University of Washington.

Azizoglu, Murat \* 1994; MS, 1987, Ohio State University; PhD, 1991, Massachusetts Institute of Technology; communication networks, optical networks, communication theory, information theory.

Babbitt, William R. \* 1993, (Affiliate); MAE, 1986, PhD, 1987, Harvard University; optical memories, processors, optical interconnects and nonlinear optics.

Borriello, Gaetano \* 1988, (Adjunct); MS, 1981, Stanford University; PhD, 1988, University of California (Berkeley); invisible and ubiquitous computing, embedded network systems.

Chang, Kou-Chuan \* 1997, (Affiliate); PhD, 1986, University of Minnesota; digital-systems design, design automation algorithms, hardware description languages.

Chen, Qingjun 1999, (Affiliate); PhD, 1990, University of Houston.

Chou, Philip A. \* 1998, (Affiliate); PhD, 1998, Stanford University.

Christie, Richard Dunstan Jr. \* 1989; MSEE, 1974, Rensselaer Polytechnic Institute; PhD, 1989, Carnegie Mellon University; power systems analysis, distribution system reliability, user interfaces.

Cwik, Thomas A. 1997, (Affiliate); PhD, 1986, University of Illinois.

Dailey, Daniel J. \* 1982, (Research); MS, 1982, PhD, 1988, University of Washington; time series modeling of physical phenomena, optimization, distributed computing, networking.

Dunham, Scott T. \* 1999; PhD, 1985, Stanford University; modeling of VLSI fabrication and device operation, microtechnology modeling, computational materials.

Falk, Robert Aaron 1995, (Affiliate); MS, 1974, PhD, 1979, University of Washington.

Giri, Jay \* 1990, (Affiliate); MS, 1971, State University of New York (Stony Brook); PhD, 1977, Clarkson University; power system analysis, software development and user interfaces for real-time power system control.

Healy, Michael J. \* 1995, (Affiliate); MS, 1967, University of Idaho; formal semantics, mathematical semantic analysis and design of systems.

Helms, Ward J. \* 1964; PhD, 1968, University of Washington; VLSI analog and digital circuit design, integrated circuits, acoustics and audio.

Ly, Uy-Loi \* 1988, (Adjunct); PhD, 1983, Stanford University; robust controls, parameter optimization, model reduction, digital control, design integration.

Meldrum, Deirdre R. \* 1992; MS, 1985, Rensselaer Polytechnic Institute; PhD, 1992, Stanford University; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots.

Nelson, Brian A. \* 1987, (Research); PhD, 1987, University of Wisconsin; fusion plasma physics, plasma processing of materials, data acquisition software.

Phillips, Ihsin Tsai-Yun \* 1988, (Affiliate); PhD, 1984, University of Maryland; computer vision, document image understanding, image database, software engineering.

Redeker, Charles C. 1963, (Emeritus); MS, 1964, University of Washington.

Riskin, Eve A. \* 1990; MS, 1985, PhD, 1990, Stanford University; image compression and processing, and signal processing.

Roy, Sumit \* 1998; MA, 1985, MSEE, 1985, PhD, 1988, University of California (Santa Barbara); performance analysis of communications networks, statistical and numerical computing.

Sahr, John D. \* 1991; PhD, 1990, Cornell University; radar remote sensing, ionospheric physics; signal processing; wireless communications.

Sinanan, Mika N. \* 1980, (Adjunct); MD, 1980, Johns Hopkins University; PhD, 1986, University of British Columbia (Canada); general and laparoscopic surgery.

Sun, Ming-Ting \* 1996; MS, 1981, University of Texas (Arlington); PhD, 1985, University of California (Los Angeles); multimedia, video processing, networking, VLSI.

Thorsos, Eric I. \* 1980, (Research); PhD, 1972, Massachusetts Institute of Technology; rough surface scattering, numerical simulation and theory, underwater acoustics.

Vivekanandan, J. 1994, (Affiliate); PhD, 1986, Colorado State University.

Winebrenner, Dale P. \* 1986, (Research); PhD, 1985, University of Washington; wave propagation and scattering and remote sensing of planetary surfaces.

Yuan, Chun 1991, (Adjunct); PhD, 1988, University of Utah; medical biophysics, MRI.

### Assistant Professors

Alilovic-Curgus, Jadranka 1997, (Affiliate); PhD, 1993, University of British Columbia (Canada).

Belcher, Edward O. \* 1982, (Affiliate); MA, 1970, Stanford University; MSEE, 1973, Purdue University; signal processing, artificial intelligence, underwater acoustics.

Benson, Daniel C. 1991, (Affiliate); PhD, 1992, University of Washington.

Bilmes, Jeffrey A. \* 1999; PhD, 1999, University of California (Berkeley); speech and pattern recognition, learning, audio processing, high-performance computing, interfaces.

Bohringer, Karl F. \* 1998; PhD, 1997, Cornell University; microelectromechanical systems, applied microtechnology, micro spacecraft.

Campbell, Mark E. \* 1997, (Adjunct); PhD, 1996, Massachusetts Institute of Technology; precision-controlled structures, autonomous aerospace vehicles, smart materials.

Chalana, Vikram 1991, (Affiliate); MS, 1993, PhD, 1996, University of Washington.

Choi, Jai Joon \* 1988, (Affiliate); PhD, 1990, University of Washington; adaptive signal processing, neural networks, and fuzzy logic.

Diorio, Christopher J. \* 1997, (Adjunct); MS, 1984, PhD, 1997, California Institute of Technology; silicon learning chips, neural networks and learning algorithms, implantable microcontrollers.

Goldschneider, Jill \* 1989, (Affiliate); PhD, 1997, University of Washington; data compression, image processing and clustering.

Gu, Chuang \* 1999, (Affiliate); PhD, 1995, Swiss Federal Institute of Technology; video processing, video analysis, and video coding.

Hauck, Scott \* 1990; MS, 1992, PhD, 1995, University of Washington; FPGAs, reconfigurable computing, VLSI/CAD, digital logic, adaptive computing.

Jandhyala, Vikram 2000; MS, 1995, PhD, 1998, University of Illinois; computational electromagnetics and applications.

Li, Ming 1999, (Affiliate); PhD, 1987, University of Washington.

Liu, Hui \* 1998; PhD, 1995, University of Texas (Austin); wireless system and network design, DSP and VLSI for communications, numerical computing.

Luby, James C. \* 1979, (Affiliate); PhD, 1984, University of Washington; signal processing, underwater acoustics, computer simulation, adaptive array processing, tracking.

Mamishev, Alexander V. \* 1999; PhD, 1999, Massachusetts Institute of Technology; sensors, non-destructive testing, power, MEMS, inverse problems, optimization.

Matula, Thomas J. \* 1993, (Affiliate); PhD, 1993, Washington State University.

Melendez, Jose L. 1997, (Affiliate); MS, 1991, Massachusetts Institute of Technology; PhD, 1994, Stanford University.

Navarro, Julio A. 1999, (Affiliate); PhD, 1995, Texas A&M University.

Oh, Seho \* 1987, (Affiliate); PhD, 1989, University of Washington; neural networks and fuzzy systems.

Padmanabhan, Venkata N. Z. \* 1999, (Affiliate); PhD, 1998, University of California (Berkeley); Internet performance analysis, wireless networking, and mobile computing.

Ryu, Bong K. 1999, (Affiliate); .MS, 1993, PhD, 1996, Columbia University.

Shi, Chuan Jin \* 1998; PhD, 1994, University of Waterloo (Canada); VLSI and VLSI-CAD, optimization.

Wilson, Denise M. \* 1999; PhD, 1995, Georgia Institute of Technology; distributed sensing systems design with emphasis on electronics interface.

### Senior Lecturers

Peckol, James 1994; PhD, 1985, University of Washington; real-time embedded systems, hardware/software co-design, computer architecture, digital fuzzy logic.

Yee, Hsian-Pei 1985; MS, 1989, PhD, 1992, University of Washington.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat](http://www.washington.edu/students/crsctat).

**E E 400 Advanced Topics in Electrical Engineering (1-4, max. 8)** Contemporary topics at the advanced undergraduate elective level. Faculty presents advanced elective topics not included in the established curriculum. Offered: AWSp.

**E E 411 Network Synthesis (4)** *Andersen* Network representation in the complex frequency domain, realizability criteria for driving-point and singly and doubly terminated transfer function, canonical forms, Butterworth and Bessel Approximation methods, and application of the digital computer in synthesis procedures. Prerequisite: 1.0 in E E 233. Offered: A.

**E E 415 Computer-Aided System Analysis and Design (3)** Concepts, principles, and techniques concerned with the design, testing, and application of general-purpose problem-oriented computer programs for analyzing large-scale systems. Offered: Sp.

**E E 416 Communications I: Random Signals (4)** Probability and random processes in communications. Random variables, distributions, and expectation. Statistical filter design for detection and estimation. Prerequisite: 1.0 in E E 341; 1.0 in STAT 390.

**E E 417 Communications II: Modulation and Coding (4)** Modulation techniques for modern digital communication systems. Signal space, optimum receiver design, error performance. Energy-bandwidth tradeoff in modulation. Error control coding for high reliability, block coding, convolutional coding. Multipath fading and its effects on performance, diversity signaling. Spread spectrum signaling and code division multiple access for wireless communications. Prerequisite: 1.0 in E E 416. Offered: W.

**E E 418 Communications III: Multiple Access (3)** Issues in communication systems with multiple users. Multiplexing based on time, frequency, and code. Error performance and power control in multiuser communications. Random access in networks, Aloha protocol and carrier sensing. Queuing theory for performance analysis. Delay-throughput tradeoff. Switch architectures and performance. Prerequisite: 1.0 in E E 417. Offered: Sp.

**E E 420 Design in Communications (4)** Design projects in communications. Frequent projects solved by student teams. Reports and presentations. Prerequisite: 1.0 in E E 417 which may be taken concurrently. Offered: Sp.

**E E 433 Analog Circuit Design (5)** Design of analog circuits and systems applying modern integrated circuit technology: operational amplifiers, differential amplifiers, active filters, voltage references and regulators. Prerequisite: 1.0 in E E 332. Offered: AW.

**E E 436 Medical Instrumentation (4)** *Spelman* Introductory course in the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For upper-division and first-year graduate students who are preparing for careers in bioengineering-both research and industrial. Offered: jointly with BIOEN 436; Sp.

**E E 440 Introduction to Digital Imaging Systems (4)** *Hwang* Image representation and standards, visual perception and color spaces, spatial domain image filtering and enhancement, image restoration, image transforms, image and video coding, image geometrical transformation and camera modeling. Prerequisite: E E 341. Offered: A.

**E E 442 Digital Signals and Filtering (3)** Methods and techniques for digital signal processing. Review of sampling theorems, A/D and D/A converters. Demodulation by quadrature sampling. Z-transform methods, system functions, linear shift-invariant systems, difference equations. Signal flow graphs for digital networks, canonical forms. Design of digital filters, practical considerations, IIR and FIR filters. Digital Fourier transforms and FFT techniques. Prerequisite: 1.0 in E E 341. Offered: W.

**E E 443 Design and Application of Digital Signal Processing (5)** Application of learned theories/algorithms and available computer technologies to modern image and speech processing problems. Two-dimensional signals and systems. Image transform, enhancement, restoration, coding. Characteristics of speech signals, linear predictive coding (LPC) of speech, pitch detection, and LPC speech synthesis, speech recognition, hardware designs for signal processing. Prerequisite: 1.0 in E E 442. Offered: Sp.

**E E 445 Nonlinear Systems Analysis (4)** Dynamic analysis of nonlinear circuits, neural networks and of other simple systems. Exact methods, graphical methods, approximate methods, including linearization and numerical and analog computer solutions. Stability. Forced oscillations. Prerequisite: 1.0 in E E 235. Offered: A.

**E E 446 Control System Analysis I (4)** Linear Servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to advanced topics in automatic control theory, state variable methods. Prerequisite: 1.0 in E E 233. Offered: AWSp.

**E E 448 Control Systems Sensors and Actuators (3)** Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials,

gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratories per week. Offered: jointly with A A 448; W.

**E E 449 Design of Automatic Control Systems (4)** Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, nonminimum phase, nonlinear dynamics. Computer-aided analysis, design, and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either 1.0 in A A 450, 1.0 in E E 446, or 1.0 in M E 471. Offered: jointly with A A 449; Sp.

**E E 452 Power Electronics Design (5)** Electronic conversion and control of electrical power. Includes semiconductor switching devices, power converter circuits, design of magnetics, and control of power converters. Also ac/ac, ac/dc, and dc/dc power converters; circuit simulation; extensive laboratory work a four-week power converter design project. Prerequisite: 1.0 in E E 332; 1.0 in E E 351. Offered: A.

**E E 453 Electric Drives (5)** Elements of drive systems, speed-torque characteristics of electric motors and industrial loads, solid-state converter. Starting and braking methods of loaded motors. Speed control of electric motors. Solid-state drives. Transient analysis of loaded motors. Special forms of individual- and multimotor drives. Prerequisite: 1.0 in E E 351. Offered: W.

**E E 454 Power System Analysis I (4)** Introduction to methods of analyzing power systems. Includes symmetrical components, calculation of line parameters, representation of transmission lines and power components, and power flow control. Prerequisite: 1.0 in E E 351. Offered: A.

**E E 455 Power System Analysis II (4)** Analysis of symmetrical and unsymmetrical power systems' networks, fault analysis, and stability studies. Prerequisite: 1.0 in E E 351. Offered: W.

**E E 456 Computer-Aided Design in Power Systems (4)** Design-oriented course in power system engineering. Students are assigned a project concerning system operation and planning, steady-state and dynamic behaviors of power systems, or distribution systems. Each involves formulation of design criteria, development of approach, application of existing software. Prerequisite: either 1.0 in E E 454 or 1.0 in E E 455. Offered: Sp.

**E E 457 Electric Energy Distribution Systems (4)** Introduction to electric utility distribution systems. Primary and secondary network analysis and design, distribution substation problems, distribution transformers, capacitor application, overcurrent and overvoltage protection. System planning and reliability. Prerequisite: 1.0 in E E 351. Offered: Sp.

**E E 461 Introduction to Computer-Communication Networks (4)** Computer network architectures, protocol layers. Transmission media, encoding systems, error detection, multiplexing, switching. Data link, multiple access channel protocols. Methods for network routing, congestion control, flow control. End-to-end transport services, protocols. Network security, privacy. Applications including electronic mail, virtual terminals, distributed operating systems. Network programming. Prerequisite: CSE 143. Offered: jointly with CSE 461.

**E E 462 Principles of Mobile Robotics (4)** Principles of autonomous vehicles and their operation environments. Typical configuration of indoor vehicles, sensors, controllers, communications with base stations, systems for planning, cartography, navigation, piloting, and learning to achieve autonomous performances. Laboratory exercises to illustrate real-time expert system development and integration expert system knowledge into robotic system. Offered: A.

**E E 463 Simulation of Autonomous Systems (4)** Study principles of simulation of and sensory interaction between vehicles and environments. Study of requirements to simulate complex mechatronic devices such as multi-legged mobile robots. Implementation of hexapod simulator. Simulation of computer command structures, motors, controllers, chassis, sensors, and environments. Animation to provide human interface to simulation. Offered: W.

**E E 465 Fiber Optics, Devices, and Applications (4)** Wave propagation in optical waveguiding structures, signal distortion, coupling of modes, modulation, sources and detectors, fabrication and measurement methods, communication and sensor systems. Prerequisite: 1.0 in E E 332; recommended: E E 361. Offered: W.

**E E 466 Design in Electromagnetics, Optics, and Acoustics (4)** Design of electromagnetic, optical, and acoustic (EOA) devices and systems. Measurements of material properties and system characteristics. Utilization of software for simulation of propagation, interaction and devices in optics, microwave, millimeter wave, acoustic, and ultrasound. A list of projects available prior to registration. Prerequisite: 1.0 in E E 361. Offered: Sp.

**E E 467 Antennas: Analysis and Design (4)** *Sahr, Tsang* Fundamentals of antennas, analysis, synthesis and computer-aided design, and applications in communications, remote sensing, and radars. Radiation pattern, directivity, impedance, wire antennas, arrays, numerical methods for analysis, horn antennas, microstrip antennas, and reflector antennas. Prerequisite: 1.0 in E E 235; 1.0 in E E 361. Offered: Sp.

**E E 471 Computer Design and Organization (5)** Introduction to computer architecture, algorithms, hardware design for various computer subsystems, CPU control unit design, hardwired and microprogrammed control, memory organization, cache design, virtual memory, I/O organization, and I/O hardware design. Prerequisite: 1.0 in E E 371. Offered: ASP.

**E E 472 Microcomputer Systems (5)** Concepts of multi-level machines and computer systems organization. Utilizing microprocessors, digital computer studied at assembly- and high-language levels with emphasis on concepts of central processor architecture, memory organization, input/output and interrupts. Assembly language programming concepts applied to solution of various laboratory problems including I/O programming. Prerequisite: 1.0 in E E 471. Offered: AW.

**E E 476 Digital Integrated Circuit Design (5)** *Sechen* Comprehensive view of digital integrated circuit design. Topics to be covered include the design of inverters, static logic circuits, switch logic, and synchronous logic. Students design, simulate, and layout a complete digital IC using modern computer-aided design tools. Prerequisite: 1.0 in E E 331; 1.0 in E E 371. Offered: A.

**E E 477 Custom Digital CMOS Circuit Design (4)** *Sechen* Design and analysis of custom CMOS digital integrated circuits. Interface circuit design, memory design, datapath design. VLSI design methodologies, scaling properties and design tradeoffs. Prerequisite: E E 476.

**E E 478 Design of Computer Subsystems (5)** Design of digital computer subsystems and systems, using SSI, MSI, and LSI digital components. Combinational logic, sequential logic, memory hardware designs, I/O hardware and interface design, system design steps, high-speed digital circuit design, noise reduction techniques, and hardware description language. One four-hour laboratory each week and design project. Prerequisite: 1.0 in E E 331; 1.0 in E E 472. Offered: WSP.

**E E 480 Microwave Engineering I (4)** Analysis and design of transmission lines and matching circuits. Lossy transmission lines. Mode structures in metallic and dielectric waveguides. Microwave resonators and magnetic devices. Smith chart and matching techniques. Prerequisite: 1.0 in E E 361. Offered: A

**E E 481 Microwave Electronic Design (4)** Design of microwave circuits using S-parameter techniques. Measurement techniques, CAD of microwave systems. Includes design, fabrication, and evaluation of a microwave amplifier. Prerequisite: 1.0 in E E 332; 1.0 in E E 361. Offered: W.

**E E 482 Semiconductor Devices (4)** Fundamentals of semiconductor theory: carrier diffusion and drift; concept of direct and indirect energy materials, effective mass of mobile carriers; device physics: homo- and heterojunctions, operating principles of bipolar, junction, and MOS field-effect transistors. Prerequisite: 1.0 in E E 332. Offered: A.

**E E 484 Sensors and Sensor Systems (4)** Introduction to optical and solid-state chemical and physical sensors. Topics include transduction mechanisms, design parameters, fabrication methods and applications. Offered: Sp.

**E E 485 Introduction to Photonics (4)** *Afromowitz, Darling, Pearsall, Yee* The properties, characterization, and use of photonic devices in the design of electronic circuits are studied in the laboratory through experiments and projects. Laboratory work is supplemented by classroom examination of the principles behind measures device properties. Offered: Sp.

**E E 486 Fundamentals of Integrated Circuit Technology (3)** *Afromowitz* Processing physics, chemistry, and technology, including evaporation, sputtering, epitaxial growth, diffusion, ion implantation, laser annealing, oxidation, chemical vapor deposition, photoresists. Design considerations for bipolar and MOS devices, material and process characterization. Future trends. Prerequisite: 1.0 in E E 482. Offered: Sp.

**E E 488 Laser Electronics (4)** Analysis and design of laser systems. Basic resonator design, Gaussian beams, longitudinal and transverse modes, rate equations, oscillation, gain, Q-switching, mode-locking, and important non-linear processes. Design concepts underlying various laser systems discussed. Prerequisite: 1.0 in E E 361. Offered: A.

**E E 498 Design of Consumer Electronics (4) NW** Design of consumer electronics products. Typical products include conventional audio systems, CD players, VCRs, camcorders, and FAX systems. Choice of products varies from quarter to quarter. Course includes an integrated laboratory and design project. Prerequisite: 1.0 in E E 233; recommended: E E 332. Offered: ASP.

**E E 499 Special Projects (2-5, max. 10)** Assigned construction or design projects carried out under the supervision of the instructor. Offered: AWSp.

## Courses for Graduates Only

**E E 500 Graduate Seminar (1, max. 3)** Weekly seminars on current topics in electrical engineering. More than one section may be offered in a given quarter. Credit/no credit only.

**E E 501 Radar Remote Sensing (3)** *Sahr* General introduction to radar remote sensing of geophysical targets. Fundamentals of radar systems, range-time diagram, ambiguity function, pulse compression, spectrum estimation for underspread and overspread targets; multi-antenna correlations, interferometry, closure phases; maximum entropy source imaging; Aperture Synthesis (SAR and ISAR).

**E E 502 Introduction to Microelectro Mechanical Systems (4)** Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered jointly with M E 504.

**E E 505 Probability and Random Processes (4)** Foundations for the engineering analysis of random processes: set theoretic fundamentals, basic axioms of probability models, conditional probabilities and independence, discrete and continuous random variables, multiple random variables, sequences of random variables, limit theorems, models of stochastic processes, noise, stationarity and ergodicity, Gaussian processes, power spectral densities. Prerequisite: graduate standing and understanding of probability at the level of E E 416.

**E E 506 Communication Theory I (3)** *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 505 or equivalent.

**E E 507 Communication Theory II (3)** *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 505 or equivalent.

**E E 508 Stochastic Processes (3)** *Ritcey* Modeling and analysis of random processes encountered in engineering applications. Stationarity and ergodicity. Harmonic analysis, power spectral densities. Karhunen-Loeve expansions. Poisson, Gaussian, and Markov processes. Stochastic integrals and differential equations. Prerequisite: E E 505 or permission of instructor.

**E E 509 Engineering Applications of Linear Graphs (3)** *Andersen* Elementary theory of linear graphs, incidence, cut-set and circuit matrices, matrix formulation of loop, node, and state equations, topological analysis and synthesis of networks, signal flow graphs, applications to switching circuits, automata and communication nets. Prerequisite: graduate standing or permission of instructor.

**E E 510 Mathematical Foundations of Systems Theory (4)** *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/CHEM E 510/M E 510.

**E E 513 Active Circuit Theory (3)** *Andersen* Principles of analysis and synthesis of linear active circuits. Emphasis on general principles, including conservation theorems, invariants, performance limitations in the presence of parasitic elements and realizability conditions. Illustrative applications related to negative resistance amplifiers, feedback amplifiers, and active filters. Prerequisite: E E 341 or permission of instructor.

**E E 518 Digital Signal Processing (4)** *Atlas* Digital representation of analog signals. Frequency domain and Z-transforms of digital signals and systems design of digital systems; IIR and FIR filter design techniques, fast Fourier transform algorithms. Sources of error in digital systems. Analysis of noise in digital systems. Prerequisite: knowledge of Fourier analysis techniques and graduate standing, or permission of instructor.

**E E 519 Stochastic Analysis of Data From Physical Systems (4)** *Atlas* Computer systems for acquisition and processing of stochastic signals. Calculation of typical descriptors of such random processes as correlation functions, spectral densities, probability densities. Interpretation of statistical measurements made on a variety of physical systems (e.g., electrical, mechanical, acoustic, nuclear). Lecture plus laboratory. Prerequisite: E E 505 or equivalent.

**E E 520 Spectral Analysis of Time Series (4)** *Ritcey* Estimation of spectral densities for single and multiple time series. Basic theory for nonparametric estimation of spectral density, cross-spectral density and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform in spectral estimation and computation of correlation functions. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes, and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, E E 505, or permission of instructor. Offered: jointly with STAT 520; W.

**E E 521 Multidimensional Signal Processing (3)** *Marks* Multidimensional (MD) signals and systems, MD sampling theorem, sample dependence in higher dimensions, MD FIR filter design using windows and the McClellan transform, MD IIR filter stability and design. Current topics in MD signals and systems. Prerequisite: E E 442 or E E 518 or equivalent.

**E E 522 Shannon Sampling and Interpolation Theory (4)** *Marks* Historical overview of Shannon sampling theorem; fundamentals of the cardinal series; generalizations including those of Papoulis, Kramer, and Lagrange; effects of jitter, truncation and data noise on interpolation; continuous sampling restoration using prolate spheroidal wave functions and the Papoulis-Gerchberg algorithm. Prerequisite: E E 508.

**E E 523 Computational Neural Networks (3)** *Atlas, Hwang, Marks* Fundamentals of computational neural networks from perspectives of system theory and electrical engineering applications: historical review, adaptive parameter estimation, nonlinear optimization, combinatorial optimization, learning rules, neural network models, data clustering and regression, pattern classification, speech recognition, image modeling, nonlinear control, principal component analysis, probability density estimation. Prerequisite: permission of instructor.

**E E 524 Waves in Random Media II (4)** *Tsang* Continuation of 575, treating recent developments and advanced topics in wave scattering by discrete random media, random rough surfaces, photon localization, and their engineering applications. Emphasis on multiple scattering field theory, polarimetry, transport theory, Monte-Carlo simulations and media characterization. Prerequisite: E E 572 and E E 575 or equivalent.

**E E 527 Solid-State Laboratory Techniques (4)** *Darling* Principles and laboratory techniques used in solid-state electronics research. Basic familiarity with practices and equipment used on-campus. Laboratory safety; materials handling, storage and disposal; clean room use; photoresist characteristics; mounting, bonding, and probing; wet chemical etching; vacuum evaporation; patterning of metal films using photoresist. Extensive laboratory with limited enrollment. Prerequisite: graduate standing and permission of instructor.

**E E 528 Semiconductor Band Theory (4)** *Pearsall, Tsang* Limits of classical physics, Schrodinger's equation, eigenvalues of simple systems; postulates of quantum mechanics, matrix methods, Dirac notation, operator methods; basic crystallography, real

and reciprocal lattices, Brillouin zones, phonons, E(k) diagrams, band structure calculations in solids; effective mass equation, spin-orbit splitting; application to quantum wells, superlattices, tunneling devices. Prerequisite: graduate standing or permission of instructor.

**E E 529 Semiconductor Optics and Optical Devices (4)** *Atromowitz, Pearsall, Yee* Perturbations of energy states in semiconductor devices; direct and indirect transitions; absorption processes; optical constants; absorption spectroscopy; radiative and nonradiative transitions; processes occurring at p-n junctions; junction devices; LEDs and lasers, photovoltaics; self-electro-optic effect device; modern laser structures. Prerequisite: graduate standing or permission of instructor.

**E E 530 Optical Properties of Matter: A Quantum Mechanical Approach (4)** *Pearsall, Tsang* Application of quantum mechanics principles and mathematical techniques to interactions of electrons, phonons, and photons. Electron states, transitions and selection rules; field quantization; coherent and incoherent interactions of radiation with matter. Prerequisite: graduate standing or permission of instructor.

**E E 531 Semiconductor Devices and Device Simulation (4)** *Darling, Lauritzen, Pearsall, Yee* Physical principles in semiconductor devices. Generation, recombination, p-n junctions, MOS, metal-semiconductor and other interface structures. Carrier transport at low and high level injection levels. Device simulation used to demonstrate physical principles and basic device operation. Project using device simulation. Prerequisite: E E 482 or graduate standing.

**E E 532 Device Modeling for Circuit Simulation (4)** *Darling* Compact modeling of semiconductor devices. Analytical models, standard SPICE models, lumped-charge models using AHDL language. Emphasis on basic diodes, MOSFET, BJTs, and other models of interest, including sensor, photonic, and power models. Compact models using AHDL language model design project. Prerequisite: E E 531 or permission of instructor.

**E E 534 Power Electronics (4)** Detailed study of DC-to-AC inverters, pulse-width modulated and resonant DC-to-DC converter topologies; drive and protection circuits for efficient switching of semiconductor devices. Includes extensive computer-aided circuit simulation and power supply control. Prerequisite: graduate standing.

**E E 535 Design of Digital Integrated Circuits and Systems (4)** *Helms, Sechen, Soma* Design of digital VLSI, system specifications, architectures, synthesis, simulation, and layout. Covering CMOS technologies with minor emphasis on ECL, GaAs. Prerequisite: E E 477.

**E E 536 Design of Analog Integrated Circuits and Systems (4)** *Helms, Soma* Design of analog VLSI: specifications, design, simulation, layout. Covering CMOS and Bi CMOS technologies. Prerequisite: E E 433 or equivalent and graduate standing in electrical or computer engineering, or permission of instructor.

**E E 537 Computation Methods for Circuit Analysis and Simulation (3)** Introduction to numerical algorithms and computer-aided techniques for the simulation of electronic circuits. Theoretical and practical aspects of important analyses: large-signal nonlinear DC, small-signal AC, nonlinear transient, and large-signal steady-state. Simulation concepts applied to the modeling and characterization of various electronic devices.

**E E 538 Topics in Electronic Circuit Design (1-5, max. 5)** *Sechen* Topics of current interest in electronic circuit and system design. Course content varies from year to year, based on current professional interests of the faculty member in charge. Prerequisite: permission of instructor.

**E E 539 Advanced Topics in Solid-State Electronics (1-5, max. 5)** Lectures or discussions of topics of current interest in the field of solid-state electronics for advanced graduate students having adequate preparation in solid-state theory. Subject matter may vary according to the interests of students and faculty. Prerequisite: permission of instructor.

**E E 540 VLSI Testing (3)** *Soma* VLSI testing and design-for-test techniques. Reliability predictions and characterizations for integrated circuits and systems. Circuits fabricated in 536 are tested as laboratory work. Prerequisite: E E 535, E E 536.

**E E 541 Automatic Layout of Integrated Circuits (4)** *Sechen* Examines the algorithms behind the following commonly used physical design automation tools: floorplanning, partitioning, placement, routing, compaction, and verification. Prerequisite: E E 371; CSE 373 or CSE 326 or equivalent.

**E E 543 Models of Robot Manipulation (3)** *Hannaford* Mathematical models of arbitrary articulated robotic (or biological) arms and their application to realistic arms and tasks, including the homogeneous coordinate model of positioning tasks, the forward and inverse kinematic models, the Jacobian Matrix, and the recursive Newton-Euler dynamic model. Prerequisite: linear algebra and graduate standing or permission of instructor.

**E E 544 Advanced Robot Manipulation (4)** *Hannaford, Meldrum* Continuation of the analysis of robot manipulation, considering kinematic redundancy, control of robot manipulators in contact with the environment, teleoperation, and grasping with multi-fingered hands. Students will perform a project and critique a research paper in the area of the project. Prerequisite: E E 543.

**E E 545 Autonomous Robots (3)** Exploration of deliberate-thinking and emergent-functionality paradigms to achieve autonomy. Exploration of hybrids incorporating elements of both of these approaches. Review of other potential approaches with assessment of successes and failures. Directed reading of current literature. Prerequisite: graduate standing or permission of instructor.

**E E 546 Advanced Topics in Control System Theory (1-5, max. 5)** Topics of current interest in control system theory for advanced graduate students with adequate preparation in linear and nonlinear system theory. Prerequisite: permission of instructor. Offered when adequate enrollment develops prior to close of advance registration.

**E E 547 Neural Communication and Control in Biological Systems (3)** Neural processing of the visual image and communication between levels of the central nervous system. Feedback and its role in movement by organisms. Description and analysis of the means by which electrochemical events generate, modulate, and demodulate neuronal signals, and the parallel interaction between these signals in transduction of images and other information. Prerequisite: advanced graduate standing or permission of instructor.

**E E 548 Linear Multivariable Control (3)** *Ly, Meldrum* Single loop feedback control theory; poles, zeros, Nyquist stability, performance, robustness of multivariable systems; multivariable control syntheses: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parametrization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 451 or M E 471 or equivalent. Offered: jointly with A A/M E 548.

**E E 549 Estimation and System Identification (3)** *Alexandro* Review of system models, model structure, model parametrization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental

variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or A A 548. Offered: jointly with A A 549/M E 549.

**E E 550 Nonlinear Optimal Control (3)** *Vagners* Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/M E 550.

**E E 551 Power System Protection (4)** *Liu* The protection of electric power systems from overcurrents and overvoltages. Analysis and design of overcurrents resulting from faults, lightning induced or otherwise, or from excessive loads or power swings. Analysis and design of overvoltages resulting from switching transients or lightning. Principal concern is with relays and lightning arrestors as protection means. Prerequisite: E E 455 or equivalent.

**E E 552 Power Systems Dynamics and Control (4)** *Damborg, El-Sharkawi* Advanced computer modeling and analysis of power systems. Application of modern systems and control theories. Prerequisite: E E 351 and E E 455 or permission of instructor. Offered: odd years; Sp.

**E E 553 Power System Economics (4)** *Christie, Damborg, Liu* Economic structure of power systems. Problem formulation, optimization methods and programming for economic analysis of power system operation and planning. Economic dispatch, load forecasting, unit commitment, interchange, planning and reliability analysis. Provides background to pursue advanced work in planning and operation. Prerequisite: graduate standing or permission of instructor.

**E E 554 Large Electric Energy Systems Analysis (4)** *Christie, Liu* Deals with problems whose solution depends upon the inversion of sparse matrices that occur in the planning and operational studies of large interconnected energy systems. Application studies include system model development, state estimation, and load flow. Prerequisite: E E 456 or permission of instructor.

**E E 559 Special Topics in Electrical Energy Systems (1-5, max. 5)** Topics of current interest in electrical power and energy devices and systems. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

**E E 562 Artificial Intelligence for Engineers (3)** *Shapiro* Covers main areas of artificial intelligence (AI) without need for extensive prerequisites. Programming languages for AI; problem solving; representations; control strategies; searching strategies; predicate calculus; rule-based deduction; goal-directed planning; knowledge-based systems. Prerequisite: E E 371 and CSE 374 or equivalents.

**E E 563 Fault-Tolerant Computing (3)** *Soma* Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with CSE 563.

**E E 564 Parallel Computer Systems (3)** *Hwang, Kim* Pipelined and vector processors; interconnection network for parallel processing, array and associative processors; multiprocessors; data-flow machines; systolic arrays and impact of the VLSI technology on parallel processors and processing. Prerequisite: E E 471, permission of instructor.

**E E 565 Computer-Communication Networks I (3)** *Azizoglu* Network architectures and protocols; Broadband-ISDN and Asynchronous Transfer Mode (ATM); performance modeling and analysis of packet-switched networks, digital switching systems. Prerequisite: E E 505 or equivalent.

**E E 566 Computer-Communication Networks II (3)** *Azizoglu* Local area, metropolitan area, satellite, and packet radio networks; routing algorithms for wide area networks; optimal design of packet-switched networks; congestion and flow control; fast packet switching; gigabit networks. Prerequisite: E E 565 or permission of instructor.

**E E 568 Image Processing Computer Systems (4)** *Haralick, Kim* All components of digital image-processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image processing operations. Selected advanced image processing topics. Individual student project. Prerequisite: permission of instructor. Offered: jointly with BIOEN 568.

**E E 570 Antenna Engineering (3)** *Kuga, Sahr* Theory of radiation; impedance characteristics and radiation patterns of thin linear antenna elements; antenna arrays; pattern synthesis; aperture antennas. Prerequisite: graduate standing or permission of instructor.

**E E 571 High Frequency Circuits and Antennas: Computation of Fields and Waves (4)** Planar microstrip structures are high frequency circuits and antennas used in communication, aerospace and computer industries. Examines the computation of fields and waves in such structures. How to calculate circuit parameters and radiation characteristics. Structures studied include microstrip lines, coupled lines, antennas, resonators, and discontinuities. Prerequisite: E E 482, E E 572, or equivalent.

**E E 572 Electromagnetic Theory and Applications I (4)** *Ishimaru* Electromagnetic waves in layered media; complex waves, leaky and slow waves, waves in periodic structures, optical fibers, ionosphere and other guiding structures; transients and dispersive media; waveguides and cavities; beam waves; eigenfunctions and eigenvalues. Prerequisite: graduate standing or permission of instructor.

**E E 573 Electromagnetic Computations and Applications I (4)** *Tsang* Fundamentals of computational electromagnetics, method of moments, integral equations, basis functions, iterative methods, periodic structures and Green's Functions finite difference time domain method, Yee's lattice, absorbing boundary conditions, variational principles, and finite element method. Applications in antennas, waveguides, and scattering problems. Prerequisite: E E 572 or permission of instructor.

**E E 574 Electromagnetic Computations and Applications (4)** *Tsang* Current topics in computational electromagnetics, fast multipole multilevel method, sparse matrix canonical grid method, wavelet based methods, recursive method, spectral time domain method. Applications in large scale problems such as array antennas, radar cross section, rough surface scattering, and dense media scattering. Prerequisite: EE 573 or permission of instructor.

**E E 575 Waves in Random Media (4)** *Ishimaru, Tsang* Propagation and scattering of electromagnetic, optical, and acoustic waves in turbulence and random media, scattering from rough surfaces and randomly distributed particles. Atmospheric turbulence, fog, rain, smog, clear-air turbulence detection, remote sensing, terrain scattering, scattering from blood cells and tissues, scattering by ocean waves. Applications to atmospheric sciences, bioengineering, geoscience, ocean engineering. Prerequisite: graduate standing or permission of instructor.

**E E 576 Image Understanding (3)** *Haralick, Shapiro, Tanimoto* Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures. Prerequisite: E E 573 or E E 562 or equivalent or permission of instructor. Offered: jointly with CSE 576.

**E E 577 Mathematical Morphology (3)** *Haralick* Theory of mathematical morphology and its application in various commercial, industrial, medical, and research applications. Contents include binary and grayscale morphologic dilation, erosion, opening, and closing, morphological sampling theorem, structuring element decomposition, thinning, skeletonizing, and relational shape description. Group project. Prerequisite: E E 568 or E E 576 or permission of instructor. Offered: jointly with CSE 577.

**E E 578 Microwave Detection and Imaging Techniques (4)** *Kuga* Discusses calibrations, SAR and ISAR imaging systems, and microwave device characterizations. Extensive use of a vector network analyzer (VNA) and MATLAB. Opportunity to work with microwave systems and devices.

**E E 579 Advanced Topics in Electromagnetics, Optics, and Acoustics (1-5, max. 5)** Topics of current interest in electromagnetics, optics, and acoustics. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

**E E 580 Volterra and Wiener Nonlinear Systems (3)** *Pinter* Methods of the Volterra and Wiener integral series for input-output description of nonlinear systems. Generalization of the linear convolution integral to multiple convolutions, transforms of kernels, derivation of kernels from parametric (differential equation) models. Orthogonalization of series. Applications. Prerequisite: E E 235.

**E E 581 Digital Control I (3)** *Alexandro, Berg, Ly, Vagners* Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: E E 471 or equivalent; recommended: E E 575 or equivalent. A A 581/M E 581.

**E E 582 Digital Control II (3)** *Alexandro, Berg, Ly, Vagners* Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: E E 581 or permission of instructor. Offered: jointly with A A 582/M E 582.

**E E 583 Nonlinear Control Systems (4)** *Hannaford* Analysis and synthesis of nonlinear controls systems. Assessment of stability by: Phase Plane and Describing Function Methods, Circle and Popov Criteria, Lyapunov Criteria. Construction of Lyapunov Functions by method of Kraasovskii and Lu're. Introduction to nonlinear control system design. Prerequisite: E E 446, E E 584, or permission of instructor. Offered: jointly with M E 583; odd years.

**E E 584 Linear Systems Theory (3)** *Campbell, Ly, Vagners* Transfer-function and state-space description. Solution of the state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith-McMillan form. System norms. System inevitability. State feedback. Output feedback and observers. Prerequisite: graduate standing or permission of instructor. Offered: jointly with M E 575 and A A 547.

**E E 586 Digital Video Coding Systems (3)** *Sun* Introduction to digital video coding algorithms and systems. Theoretical and practical aspects of important topics on digital video coding algorithms, motion estimation, video coding standards, systems issues, and visual communications. Prerequisite: graduate standing or permission of instructor.

**E E 587 Vector Quantization and Data Compression (3)** *Kim, Riskin* Introduction to data compression and information theory; vector quantization including theory, applications, design, performance criteria, variable rate systems, and reduced complexity structure including transform coding, wavelets, lossless compression algorithms, and applications of compression to images, speech, and video. Prerequisite: E E 505 or STAT 390 and computer programming experience.

**E E 588 Advanced Laser Engineering (4)** *Tsang* Electromagnetic principles and optical components important in laser engineering. Resonator design. Gain and laser rate equations (steady state and transient). Non-linear processes. The principles underlying common laser systems, including argon and krypton, diode pumped Nd:YAG, conventional and femtosecond pulse dye, and excimers. Prerequisite: E E 488 or permission of instructor.

**E E 589 Advanced Topics in Sensors and Sensor Systems (3)** Topics of current interest in sensors and sensor systems. Prerequisite: permission of instructor.

**E E 590 Advanced Topics in Digital Computers (2-5, max. 15)** Lectures or discussions of topics of current interest in the field of digital systems. Subject matter may vary from year to year. Prerequisite: permission of instructor.

**E E 591 Robotics and Control Systems Colloquium (1, max. 3)** Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Offered: jointly with A A/CHEM E/M E 591.

**E E 592 Electrical Engineering Research Survey (1)** Weekly presentations on current research activities by members of the department. Credit/no credit only.

**E E 595 Advanced Topics in Communication Theory (1-5, max. 5)** *Azizoglu* Extension of 507, 508, 518, 519, 520. Material differs each year, covering such topics as: detection theory, decision theory, game theory, adaptive communication systems, nonlinear random processes. Prerequisite: permission of instructor.

**E E 596 Advanced Topics in Signal and Image Processing (2-5, max. 5)** Topics of current interest in signal and image processing. Content may vary from offering to offering. Prerequisite: permission of instructor.

**E E 599 Selected Topics in Electrical Engineering (\*)** Prerequisite: permission of instructor. Offered: A WSp.

**E E 600 Independent Study or Research (\*)** Offered: A WSp.

**E E 700 Master's Thesis (\*)** Offered: A WSp.

**E E 800 Doctoral Dissertation (\*)** Offered: A WSp.

## Industrial Engineering

G7 Mechanical Engineering Building



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Industrial\\_Eng.html](http://www.washington.edu/students/gencat/academic/Industrial_Eng.html)



Department Web page:  
[depts.washington.edu/ie/](http://depts.washington.edu/ie/)

The formal definition of industrial engineering, as adopted by the Institute of Industrial Engineers, is as follows: industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with principles and methods of engineering analysis and design to specify, predict, and evaluate the results obtained from such systems.

Industrial engineering is set apart from other engineering disciplines by its broader scope. Industrial engineers are, by definition, specialists in designing and operating systems that make optimal use of resources when labor, materials, capital, and technology are constrained. They deal with people as well as things, looking at the "big picture" of what makes society perform best: the right combination of human resources, natural resources, and man-made structures and equipment. Bridging the gap between management and operations, they deal with and motivate people as well as determine what tools should be used and how they should be used.

Industrial engineers are the "productivity people" who must provide leadership and integrate technology. They include the human factor in finding workable, effective solutions to production problems while retaining high standards of quality. Demand for industrial engineers has grown dramatically over the past two decades for one chief reason: the need for organizations to raise their levels of productivity through thoughtful, systematic applications. The profit-making organization must have high productivity in order to compete in the domestic and world market place. The nonprofit organization must have high productivity in order to sustain its position as a useful service unit.

## Graduate Program

Graduate Program Coordinator  
G7 Mechanical Engineering, Box 352650  
(206) 543-5041  
[ieadvise@u.washington.edu](mailto:ieadvise@u.washington.edu)

Industrial Engineering offers graduate programs leading to the Master of Science in Industrial Engineering (M.S.I.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in manufacturing, operations research, large-scale assembly, experimental statistics, production planning, quality control, reliability engineering, computer-integrated manufacturing, concurrent engineering, robotics, human factors, virtual reality, and human interface technology.

For the M.S.I.E. degree, a minimum of 39 credits is required, with both a thesis and non-thesis option. Students pursuing the thesis option must complete a minimum of 9 credits of master's thesis (IND E 700).

For the Ph.D. degree, students must initially pass the departmental qualifying examination, followed by successful completion of an advanced General Examination and subsequent Final Examination in which the student defends his or her dissertation.

## Faculty

### Acting Director

Tony C. Woo

### Professors

Furness, Thomas A. \* 1989; PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics.

Kapur, Kailash C. \* 1992; PhD, 1969, University of California (Berkeley); quality/reliability engineering, system design/optimization, total quality/reliability management.

Klasterin, Theodore \* 1974, (Adjunct); PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Moizadeh, Kamran \* 1984, (Adjunct); MS, 1982, PhD, 1984, Stanford University; operations management, production management, inventory, quality and supply chain management.

Ramey, Judith A. \* 1983, (Adjunct); PhD, 1983, University of Texas (Austin); computer-assisted communication, user-centered design, usability testing.

Ramulu, M. \* 1978, (Adjunct); PhD, 1982, University of Washington; manufacturing processes, production engineering, applied mechanics, fatigue and fracture mechanics.

Rockafellar, R. T. \* 1966, (Adjunct); PhD, 1963, Harvard University; variational analysis and optimization.

Wilson, William R. D. \* 1999, (Adjunct); PhD, 1967, Queen's University of Belfast (Ireland); manufacturing and tribology, particularly friction and lubrication in metal forming.

Woo, Tony C. \* 1995; PhD, 1975, University of Illinois; manufacturing systems, computer graphics and computational geometry.

Zabinsky, Zelda \* 1985; PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

### Associate Professors

Atman, Cynthia J. \* 1998; PhD, 1990, Carnegie Mellon University; engineering and public policy.

Drui, Albert B. \* 1959, (Emeritus); MS, 1957, Washington University; industrial engineering, human factors.

Ganter, Mark \* 1986, (Adjunct); PhD, 1985, University of Wisconsin; solid modeling, computer graphics, kinematics and automated manufacturing.

Kumar, Vipin \* 1988, (Adjunct); PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.

Roberts, Norman H. \* 1953, (Emeritus); PhD, 1958, University of Washington; reliability and probability theory.

Storch, Richard L. \* 1975; PhD, 1978, University of Washington; ship vessel stability and safety, large scale assembly and manufacturing systems.

Wiker, Steven F. \* 1993, (Affiliate); MS, 1981, George Washington University; MS, 1982, PhD, 1986, University of Michigan; ergonomics and human factors engineering.

### Assistant Professors

Beamon, Benita M. 1999; PhD, 1994, Georgia Institute of Technology; production/supply chain systems, material flow systems.

Smith, Robert P. \* 1993; PhD, 1992, Massachusetts Institute of Technology; design methodology, manufacturing systems, concurrent engineering.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

**IND E 421 Statistical Quality Control (3)** *Kapur, Storch* Design of quality control and assurance systems. Statistical Process Control (SPC) design and implementation. Control charts for attributes and variables. Process capability analysis and process improvement techniques. Statistical tolerance design. Quality management and recent developments. Prerequisite: IND E 315. Offered: A.

**IND E 424 Simulation (4)** *Beamon* Discrete-event simulation methodology emphasizing model formulation and construction with modern simulation languages and environments, statistical basis for evaluating model results, design and management of simulation projects. Application to manufacturing, retail, and service industries. Prerequisite: IND E 237; IND E 325.

**IND E 426 Reliability Engineering and System Safety (3)** *Kapur* Reliability and system safety measures. Life distributions and their applications in reliability. System reliability models. Design by reliability and probabilistic design. Reliability and safety analysis through FMECA and FTA. Reliability estimation and measurement by testing for binomial, exponential, and Weibull distributions. Prerequisite: IND E 315. Offered: Sp.

**IND E 430 Manufacturing Scheduling and Inventory (4)** *Storch* Manufacturing scheduling and inventory control for different work organizations. Coverage of workforce scheduling, job- and flow-shop scheduling and order release, production line balancing, MRP II, Lean Production, and data management. Particular attention to computer-based aspects of management and scheduling for manufacturing and service industries. Prerequisite: IND E 237; IND E 325.

**IND E 431 Computer Integrated Manufacturing (4)** Design and control of computer-based production systems. Focus on selection and integration of flexible manufacturing technology, computer hardware, application and operating system software, data communication networks, data management systems. Laboratory assignments concentrate on programming and integration of system components. Current literature and recommended texts used as reference sources. Prerequisite: IND E 237; CSE 142.

**IND E 433 Introduction to Computational Manufacturing (3)** *Woo* Fundamentals in computer aided design/manufacturing. Visualization, 3-D wireframes, curves and surfaces, solid modeling. Numerical control machining, robotics, and assembly. Prerequisite: IND E 237; IND E 324. Offered: W.

**IND E 439 Plant Layout and Material Handling (4)** *Beamon, Storch* Design of new or expanding industrial facilities. Consideration of work organization and layout. Study of basic design of plant systems, including plumbing, electrical, HVAC, illumination, acoustics, and waste handling. In depth coverage of material handling system design and equipment choices.

**IND E 455 User Interface Design (3)** *Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction,

software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Prerequisite: IND E 316. Offered: jointly with T C 455; A.

**IND E 494 Design in the Manufacturing Firm (4)** *Smith* Engineering design in manufacturing firms is presented. Topics include design methodology, concurrent engineering, and project management. Focus on the relationship between product design and manufacturing (design for production and assembly). Prerequisite: IND E 237; T C 333; M E 304. Offered: W.

**IND E 495 Industrial Engineering Design (3)** *Smith* Capstone senior design project involving identification and synthesis of industrial engineering skills. Students apply their knowledge of industrial engineering to actual industrial problems. Prerequisite: IND E 494. Offered: Sp.

**IND E 496 Technology-Based Entrepreneurship (3)** Concentrates on hands-on aspects of innovation and entrepreneurial enterprise development. Examines relationships between innovation, iterative prototyping, and marketing testing. Students identify market opportunities, create new technology-based products and services to satisfy customer needs, and construct and test prototypes. Prerequisite: IND E 250. Offered: jointly with M E 496.

**IND E 498 Special Topics in Industrial Engineering (1-5, max. 9)** Lecture and/or laboratory.

**IND E 499 Special Projects (2-5, max. 9)**

## Courses for Graduates Only

**IND E 510 Applications of Optimization in Engineering Design (3)** *Zabinsky* Discussion of issues arising in applications of optimization to engineering design. Emphasis on formulating problems and selecting appropriate solution techniques. Random search methods for problems otherwise computationally intractable. Individual projects in engineering optimal design. Prerequisite: AMATH/MATH/IND E 515 and MATH 328 or permission of instructor. Offered: jointly with AMATH 510.

**IND E 511 Management Decision Models (3)** Quantitative approaches, using decision models. Topics include elements of a decision, theory of optimal decisions, resource allocation, simulated decision making, decisions under uncertainty, risk and pressure, utility theory, and game theory. Projects in manufacturing, community health, construction, and urban development. Prerequisite: IND E 324, either ENGR 250 or IND E 250, and either ENGR 315 or IND E 315, or permission of instructor.

**IND E 513 Linear Optimization Models in Engineering (3)** *Zabinsky* Advanced formulation techniques to expand applications of linear programming to large-scale models. Appreciation of role of optimization models in engineering applications through introduction of techniques such as decomposition. Individual engineering projects. Prerequisite: IND E 324 and MATH 308 or permission of instructor.

**IND E 515 Fundamentals of Optimization (5)** Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with AMATH 515/MATH 515.

**IND E 518 Seminars on Advances in Manufacturing and Management (1)** *Mescher, Ramulu, Woo* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management. Offered: jointly with M E 518 AWSp.

**IND E 521 Quality Control in Manufacturing (3)** *Kapur, Storch* Design of quality control systems in manufacturing. Use of advanced statistical process controls, sampling inspection techniques, process capability, and other statistical tools. Also included are vendor sourcing and control tools, methods for establishing specifications and tolerances, quality function deployment, and other quality control techniques. Prerequisite: graduate standing.

**IND E 524 Robust Design and Quality Engineering (3)** *Kapur* Introduction to robust design and quality engineering. Applications of design of experiments for product and process design optimization. Experimental design using orthogonal arrays and linear graphs. System models using Chebyshev's orthogonal polynomials. Robustness in design and quality improvement for complex systems including Taguchi methods for quality engineering. Prerequisite: IND E 316 or equivalent.

**IND E 526 Reliability in Product Design and Testing (3)** *Kapur* Product assurance including reliability and quality engineering. Reliability design, measurement, and optimization. Advanced topics in probabilistic design. Design of reliability test plans and analysis of test data. Design of reliability programs and their management. Prerequisite: graduate standing.

**IND E 531 Computer Integrated Manufacturing (3)** Design and analysis of advanced manufacturing systems from a strategic as well as technological perspective. Focus on information generation, management, and coordination aspects of complex manufacturing organizations. Examination of system integration alternatives and consequences for relationships with customers and suppliers. Prerequisite: IND E 431 or equivalent.

**IND E 533 Computational Methods in Design and Manufacturing (3)** *Woo* Sampling size and accuracy: uniform, random, and Hammersley. Approximation of curves and surfaces. Optimization: minima and maxima. Search and gradient techniques. Line integral for geodesic and optimal path.

**IND E 535 Engineering Simulation (3)** Advanced applications of discrete event, continuous, and combined discrete-continuous simulation modeling, detailed examination of fundamental computer programming concepts underlying the design and development of simulation languages, variance reduction techniques, and output analysis for various engineering, service systems, and manufacturing applications. Prerequisite: IND E 424 or equivalent.

**IND E 538 Large Assembly Manufacturing Systems (3)** *Storch* Presents principles of group technology, zone construction, product-oriented work breakdown structure. Application to shipbuilding, aircraft, rail-car, and truck manufacture. Techniques of production planning, scheduling and control, organization, and plant layout, as well as the role of the computer, are studied in detail. Prerequisite: graduate standing.

**IND E 541 Human Factors Engineering (3)** Focus on three-dimensional spatialized sound, stereoscopic displays, and human-computer interaction. Some discussion on hardware for producing stereoscopic images and computer synthesized spatialized sound and/or auditory and visual modalities as related to interface design. Prerequisite: IND E 351 or PSYCH 335 and one course in design of experiments.

**IND E 543 Virtual Interface Technology (1/3, max. 3)** *Furness* Explores advanced concepts and technologies for interfacing humans to complex machines, with focus on virtual interfaces. Interface design principles reviewed from psychological and technological perspectives. Hardware, software, and mindware aspects of virtual interfaces investigated. Applications postulated and designed. Prerequisite: graduate standing in College of Engineering or permission of instructor.

**IND E 569 Occupational Biomechanics (4)** Lectures and laboratories address human occupational biomechanical and physiological limits and measurement, analysis, and modeling techniques that are used by ergonomists for design of safe, healthful, and productive physical work. Prerequisite: IND E 566 or permission of instructor. Offered: jointly with ENV H 569; Sp.

**IND E 591- Seminar (0-)** Credit/no credit only. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

**IND E -592- Seminar (-0-)** Credit/no credit only. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

**IND E -593 Seminar (-1)** Credit/no credit only. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

**IND E 594 Management of Engineering Design (3)** *Smith* Examination of methods used and issues explored in research on engineering design management, a technical and organizational activity practiced in, and crucial to the financial success of, almost every industry.

**IND E 599 Special Topics in Industrial Engineering (1-5, max. 9)** Prerequisite: permission of supervisor.

**IND E 600 Independent Study or Research (\*)**

**IND E 700 Master's Thesis (\*)**

**IND E 800 Doctoral Dissertation (\*)**

## Materials Science and Engineering

302 Roberts



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Material\\_Sci.html](http://www.washington.edu/students/gencat/academic/Material_Sci.html)



Department Web page:  
[depts.washington.edu/mse/](http://depts.washington.edu/mse/)

Materials science and engineering is an interdisciplinary field that addresses the structure, processing, and property relationships in materials for engineering applications. Basic principles of chemistry and physics are applied to provide an understanding of the structure of materials and the manner in which the structure determines the properties. Scientific processing methods are then applied to yield the necessary properties, which then can be integrated with, and designed to accommodate, the needs of modern technology.

The faculty of the Department of Materials Science and Engineering recognizes that a strong graduate program is an essential component of a balanced educational effort in materials. The department's graduate programs in materials science and engineering are designed to build on and enhance the educational experience imparted in its undergraduate programs. Therefore, a related department goal is to provide coordination and balance between the undergraduate and graduate degree programs, and to ensure that each program is allocated the resources necessary to meet its goals.

Within the overall field of materials science and engineering, students are offered both broad core and in-depth options. The broad core provides the needed background and understanding of all types of engineering materials, including metals, ceramics, polymers, electronic materials, and composites.

Electronic and optical materials are utilized in a variety of modern technology, from fiber optic communications to computer technology. Semiconductor and insulating materials are utilized in many applications

from computer chips to light emitting diodes; these materials have special properties provided by structural modification, impurity incorporation, and special processing techniques. Conducting materials of high purity are needed for many electronic applications. Fiber optics depend on glass fiber of special composition and are made using specific processes. Optical materials such as those used in lasers are specially modified using crystal growth and doping techniques. The University's materials engineering programs provide students with the background and experience needed for a career in this broad area.

Ceramic materials are resistant to high temperatures, chemically durable, strong, rigid, and exhibit a broad range of functional and electronic properties. The ceramic engineering program provides students with an understanding of the chemical, electrical, optical, mechanical, and thermal properties of ceramics; of processing methods and their effects on the structure and properties; and of the feasibility and economics of manufacture of ceramic materials for engineering applications.

Metallurgical engineering is concerned with the processing, fabrication, and utilization of metals, alloys, and other engineering materials. Extractive metallurgy relates to the processing and refining of metals and their compounds. Physical metallurgy is concerned with the structure and properties of materials, the development of new materials with improved properties, and the application and performance of materials in modern engineering systems and design.

## Graduate Program

Graduate Program Coordinator  
302 Roberts, Box 352120  
(206) 543-2600  
[mse@u.washington.edu](mailto:mse@u.washington.edu)

The Department of Materials Science and Engineering offers programs of study leading to the degree of Master of Science in Materials Science and Engineering with defined options in materials science, ceramic engineering, metallurgical engineering, and engineering materials. The Doctor of Philosophy program is offered with defined pathways in ceramic engineering, metallurgical engineering, and materials science.

The materials science option or pathway is a course of study that combines the basic elements of understanding ceramics, metals, polymers, composites, and electronic materials. Many specialized courses, including engineering fracture mechanics, semiconductor devices, and polymer chemistry, may be taken in other departments to provide a broad, yet basic, materials-study program.

Ceramic engineering graduate programs are designed to develop a fundamental understanding of the physical, chemical, and structural relationships that influence the properties and applications of ceramic materials. Processing, the development of microstructure, and the relationships of microstructure to properties are considered from a basic viewpoint that is applicable to a broad range of materials.

Graduate programs in metallurgical engineering encompass a variety of courses and research programs that are related to the physical and chemical aspects of metals, alloys, and related engineering materials. Programs in the physical-metallurgy and materials-science areas include the structure and properties of alloys, phase transformations, biomaterials, lattice defects, the optical properties of nonmetallic solids, failure analysis, x-ray diffraction, and the mechanical behavior of materials. Programs include metallurgical thermodynamics, rate phenomena, and carbothermic reduction processes.

The engineering materials option is open to students with industrial experience. In this option, students take practice-oriented courses, complete an analysis, and

develop a recommended solution to an engineering-materials problem in place of a research thesis. Programs of study generally are related to a specific field of materials-engineering practice.

Graduates in material science become professionals in multiple industries, including electronics, automotive, and aerospace. They work in material design and manufacturing, including electronic and optical material and devices, microelectromechanical systems (MEMS), system design, and materials selection as related to the structure, properties, processing, and applications of materials.

## Master of Science in Materials Science and Engineering

All Master of Science degrees offered by the department require course work and the satisfactory completion of an M.S. thesis research problem, with the exception of the engineering-materials option, which requires 32 credits plus 4 credits for the problem-solution project. Of the course credits, 15 are specified to include courses on thermodynamics, crystal structure, imperfections, microstructure and phase transformations, and a graduate seminar. Other courses may be required for specific program options. The residence and grading requirements follow those of the Graduate School.

The department is authorized to supervise an option in materials science and engineering that leads to the College of Engineering Master of Science degree. This degree program is intended to accommodate students who have a strong science background but lack an undergraduate engineering degree. The required courses are the same for all of the above degrees. Students with deficiencies in their intended area of engineering specialization may be required to take undergraduate courses in addition to the normal graduate course requirements.

## Doctor of Philosophy

Students who have completed one year of graduate work must take the Ph.D. qualifying examination the next time it is offered to determine whether the faculty will advise continued study proceeding to the General Examination for the degree of Doctor of Philosophy. A critical examination of the applicant's complete academic record, recommendations, and proposed course of study will be pertinent to this decision. In addition to course work, each student is required to pass the General Examination, which is sufficiently comprehensive to demonstrate the student's ability to deal with broad aspects of materials science, as well as with a specialized subject area. Proficiency in basic research is of paramount importance. Each prospective candidate is required to present a written dissertation that makes an original and independent contribution to knowledge in the student's field of specialization.

## Research Facilities

The research laboratories in the Department of Materials Science and Engineering are well equipped for a variety of research endeavors. Facilities include equipment for electron and optical microscopy, x-ray diffraction, a variety of spectroscopies, high-temperature heat treatment and mechanical testing, specialized processing equipment, including hot and cold isostatic presses, nitrogen reaction furnaces, and automated TGA, DTA analysis systems. Equipment for analyses of particle size, surface area, and pore size is also available. Students have liberal access to the University computing facilities.

## Financial Aid

A limited number of teaching-assistant and research-assistant appointments are available. Early application and direct correspondence or interviews with faculty members who may have open positions on research projects are encouraged. Requests for application forms and financial aid should be directed to the graduate program coordinator.

## Faculty

### Chair

Rajendra Kumar Bordia

### Professors

Allan, G. Graham \* 1966, (Adjunct); PhD, 1956, University of Glasgow (UK); DSc, 1971, University of Strathclyde (UK); fiber and polymer science, creativity and innovation.

Anderson, Donald 1947, (Emeritus); BS, 1941, University of Illinois; mining and exploration.

Archbold, Thomas F. \* 1961, (Emeritus); MS, 1957, PhD, 1961, Purdue University; physical metallurgy corrosion, diffraction, oxidation, metal failures.

Cahn, John Werner 1984, (Affiliate); PhD, 1953, University of California (Berkeley); theoretical condensed-matter physics.

Fischbach, David B. \* 1969, (Emeritus); PhD, 1955, Yale University; structure and properties of carbons graphite, other non-oxide ceramics, and composite materials.

Fisher, Robert M. \* 1987, (Research); PhD, 1962, Cambridge University (UK); materials characterized by microscopy, spectroscopy, diffraction, fused quartz, polymers.

Ghose, Subrata \* 1972, (Adjunct); PhD, 1959, University of Chicago; mineralogy.

Inoue, Kanryu \* 1993, (Research); PhD, 1977, Osaka City University (Japan); mechanical and physical properties, phase transformations, smart materials.

Jen, Alex K-Y 1999; PhD, 1984, University of Pennsylvania; organic chemistry, polymer chemistry, DNA imaging, photodynamic therapy for tumors.

Kalonji, Gretchen \* 1990; PhD, 1982, Massachusetts Institute of Technology; crystalline defects, computer simulation, rapid solidification of ceramics.

Mayer, George 1998, (Affiliate); PhD, 1967, Massachusetts Institute of Technology; nondestructive evaluation of materials.

Ohuchi, Fumio \* 1992; PhD, 1981, University of Florida; nucleation and growth of thin film materials, surface science, glass, device applications.

Polonis, Douglas H. \* 1955, (Emeritus); PhD, 1955, University of British Columbia (Canada); physical metallurgy, phase transformations, mechanical properties of materials.

Rao, Y. Krishna \* 1976; PhD, 1965, University of Pennsylvania; chemical and extractive metallurgy, ore processing and environmental engineering.

Scott, William D. \* 1965, (Emeritus); PhD, 1961, University of California (Berkeley); mechanical properties of ceramics, composites, twinning in alumina, optical microscopy.

Stoebe, Thomas Gaines \* 1966; PhD, 1965, Stanford University; physics of solids, optical properties, thermoluminescence, compound semiconductors.

Taya, Minoru \* 1986, (Adjunct); PhD, 1977, Northwestern University; composite materials, electronic packaging and materials, intelligent materials.

Whittemore, Osgood J. \* 1964, (Emeritus); MS, 1941, University of Washington; PhD, 1950, Iowa State University; ceramic processing, refractories, industrial minerals.

### Associate Professors

Bordia, Rajendra Kumar \* 1991; PhD, 1986, Cornell University; processing and mechanical properties of ceramics, polymer and ceramic composites.

Brush, Lucien N. \* 1990; PhD, 1988, Carnegie Mellon University; computational modeling of solidification, modeling studies of materials processing.

Dunham, Scott T. \* 1999, (Adjunct); PhD, 1985, Stanford University; modeling of VLSI fabrication and device operation, microtechnology modeling, computational materials.

Jonsson, Hannes \* 1988, (Adjunct); PhD, 1985, University of California (San Diego); theory and simulations of atomic scale structure and dynamics in liquids, glasses, and crystals.

Miller, Alan D. \* 1967, (Emeritus); PhD, 1967, University of Washington; instrumental analysis, high-temp equilibria processing, electronic ceramics, cooperative education.

Sarikaya, Mehmet \* 1984; PhD, 1982, University of California (Berkeley); nanoscopy (TEM), imaging, diffraction and spectroscopy, phase transformations, biocrystallization.

Stang, Robert George \* 1973; PhD, 1972, Stanford University; mechanical behavior, elastic and plastic deformation, and high-temperature creep in materials.

### Assistant Professors

Cao, Guozhong \* 1996; PhD, 1991, Eindhoven University (Netherlands); inorganic materials (films) by sol-gel processing and chemical vapor deposition.

Dogan, Fatih \* 1990, (Research); PhD, 1989, Technische Universitat (Germany); ceramic processing: electronic and magnetic materials, crystal growth of high Tc superconductors.

Flinn, Brian D. \* 1991, (Research); PhD, 1991, University of California (Santa Barbara); structure-processing-property relationships in structural materials.

Xia, Younan \* 1997, (Adjunct); PhD, 1996, Harvard University; materials chemistry and nanotechnology.

Zhang, Miqin 1999; PhD, 1998, University of California (Berkeley); biomaterials, surface/protein/cell interactions, tissue engineering.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

## Ceramic Engineering

**CER E 401 Equipment and Plant Design (3)** The design process and its application in ceramic engineering. Design projects. Offered: Sp.

**CER E 411 Vitreous State (4)** Chemistry and physics of glass, glazes, and porcelain enamels; structure, properties and processing of vitreous materials. Offered: Sp.

**CER E 413 Physical Ceramics: Mechanical Properties (3)** Mechanical properties, elasticity, strength, thermal shock, and high temperature effects relative to structural design. Fracture mechanics and notch sensitivity of brittle materials. Environmental effects, plastic flow, and high temperature deformation. Offered: A.

**CER E 414 Electrical Properties of Ceramics (3)** Ionic and electronic conduction in crystalline and noncrystalline inorganic solids. Dielectric and ferroelectric behavior, magnetic properties of ferrimagnetic materials, optical properties of dielectrics. Undergraduate ceramic engineering majors must take 415 concurrently. Offered: W.

**CER E 415 Electrical Properties of Ceramics/Laboratory (1)** Ionic and electronic conduction in crystalline and noncrystalline inorganic solids. Dielectric and ferroelectric behavior, magnetic properties of ferrimagnetic materials, optical properties of dielectrics. Offered: W.

**CER E 416 Mechanical Properties Laboratory (1)** Measurements of the mechanical properties of ceramics: strength, fracture, toughness, thermal shock damage. Use of Weibull statistics to characterize strength and failure. Offered: A.

**CER E 421 Ceramic Processing (4)** Technology of ceramic fabrication processes. Material characterization at processing stages for control. Laboratory study of all operations in the manufacture of selected ceramic products. Offered: A.

**CER E 470 Refractories (3)** Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application in high-temperature processes.

## Materials Science and Engineering

**MSE 421 Thermodynamics of Solids (3)** Applications of thermodynamics to the solid state. Statistical interpretation of entropy. Heterogeneous equilibria. Theories of solutions. Thermodynamics of surfaces and of defects in solids. Offered: W.

**MSE 423 Fiber-Reinforced Composite Materials (4)** Introduction to composites in polymer, metal, or ceramic matrices. Properties of individual phases and of fiber/matrix interface; micromechanisms of load transfer from matrix to fiber; fabrication and elastic and failure properties. Laboratory studies of processing and properties of composites. Offered: W.

**MSE 433 Polymeric Materials (3)** Relationship between configuration, conformation, molecular ordering, microstructure and properties of polymeric materials. Application of materials characterization and processing techniques to polymers. Tailoring polymer molecules and microstructures for high-technology applications. Liquid crystalline polymers. Interaction between polymers and their in-service environment. Offered: A.

**MSE 442 Seminar in Ethics and Safety (1)** Deals with issues of engineering ethics and industrial safety within the context of materials science and engineering. Credit/no credit only. Offered: W.

**MSE 466 Physical Properties of Materials (4)** Introduction to elementary solid-state concepts in materials. Atom bonding, statistical mechanics, free electron and band theories, thermal properties. Application of principles to conduction in metals, insulators, semiconductors, and to magnetic and optical processes in solids. Offered: W.

**MSE 467 Electronic Materials Processing (3)** Materials and processes used in the manufacture of electronic components. Basic principles of crystal growth, deposition, doping, diffusion, component delineation, and packaging as they apply to hybrid and integrated circuits and devices. Offered: Sp.

**MSE 485 Introduction to Electronic Packaging and Materials (3)** *Kuga, Pearsall, Taya* The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermo-mechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with M E 485; W.

**MSE 487 Laboratory in Electronic Packaging and Materials (1)** *Taya, Stoebe* Laboratory course to accompany ME 485 Experiments related to design,

processing and reliability of electronic packaging used in consumer electronics. Corequisite: MSE 485. Offered: jointly with M E 487 W.

**MSE 498 Special Topics (1-5, max. 8)** Special topics in materials science and engineering offered as a course with lectures, conferences, or laboratory. Offered: AWSpS.

**MSE 499- Special Project (\*- max. 5)** Materials science and engineering field or laboratory investigations in group or individual setting. Offered: AWSpS.

## Courses for Graduates Only

**MSE 501 Advanced Processing of Inorganic Materials (3)** Discusses advanced processes of inorganic materials including metals, ceramics and electronic materials, such as high temperature processing, sintering, solidification, single crystal growth form liquid, and vapor phase deposition. Emphasizes both the fundamentals and practical approaches of these processing techniques. Offered: even years, A.

**MSE 502 Sol-Gel Processing (3)** Fundamentals of colloid science and the physics and chemistry of the sol-gel process. Emphasizes the synthesis and applications of various materials, such as multi-component oxides, nano-composites, meso- and microporous materials, organic/inorganic hybrids, and biomaterials that have important applications in both leading technologies and modern industries. Offered: odd years, A.

**MSE 510 Bonding, Symmetry, and Crystallography (4)** Atomic bonding, coordination; structures, stability of organic and inorganic compounds in the solid-state. Reciprocal lattice concept, its vectorial basis. Crystallography of solids, emphasis on point and space group symmetries. Structures of complex organic, inorganic compounds. Introduction to physical properties described by tensors: elasticity, optical magnetic, electrical, thermal properties. Offered: A.

**MSE 512 Experimental Transmission Electron Microscopy (3)** Fundamentals of electron optics as applied to microscopy; applications of contrast theories and electron diffraction with emphasis on defects and multiphase structures in crystalline solids. Prerequisite: MSE 510. Offered: W.

**MSE 513 Transmission Electron Microscopy Laboratory (2)** One four-hour laboratory and one two-hour discussion/demonstration per week; metallic, ceramic, electronic biological sample preparation techniques; diffraction, imaging, and spectroscopy techniques in electron microscopy. Prerequisite: MSE 512 which may be taken concurrently. Offered: W.

**MSE 515 Advanced Transmission Electron Microscopy (3)** Principles of image formation in crystalline and amorphous materials at the atomic resolution level; high spatial resolution electron diffraction with emphasis on convergent beam electron diffraction; quantitative elemental compositional and chemical analysis with energy dispersive x-ray spectroscopy and electron energy loss spectroscopy; high voltage electron microscopy. Prerequisite: MSE 512 and MSE 513. Offered: odd years; Sp.

**MSE 518 Advanced Mineralogy (3)** Crystal symmetry: point groups, space groups. Mathematical description of crystal structures; group theory and irreducible representations; tensor description of physical properties; stress, strain, piezoelectricity, elasticity; structural and magnetic phase transition, Landau theory, deformation and creep in crystals; elasto-viscous properties of Earth's mantle, crystal chemistry and solid state reactions. Offered: jointly with GEOL 520; even years; Sp.

**MSE 520 Seminar (1, max. 6)** Review of research problems in recent literature. Registration required for all graduate students. Credit/no credit only. Offered: AWSp.

**MSE 524 Applied Rate Phenomena (3)** Introduction to rate theory and transport processes. The principal thrust is on applications in ceramics and metallurgy. Prerequisite: basic course in transport phenomena or permission of instructor. Offered: W.

**MSE 525 Kinetics and Phase Transformations (3)** *Brush* Thermodynamic basis for kinetic processes, including diffusion and phase transformation kinetics. Diffusion problems and solution methodologies, statistical treatment of diffusion, solid-liquid and solid-solid transformations, ordering transitions. Special topics related to grain growth, sintering, martensitic transformations. Prerequisite: MSE 315 and MSE 421 or equivalent. Offered: Sp.

**MSE 530 Fundamentals and Applications of Metal Finishing (3)** Fundamentals and applications of corrosion to the finishing and processing of metals. Corrosion, electrochemical fundamentals, materials cleaning processes, electrodeposition, surface treatments, finishing processes.

**MSE 541 Theoretical Structural Metallurgy (3)** Detailed study of the general properties and effects of point, line, and surface defects in crystalline solids. Prerequisite: MET E 462.

**MSE 544 Mechanical Behavior of Materials (3)** Mechanical properties of metals, ceramics, and polymers. Elasticity and viscoelasticity. Macroscopic and microscopic aspects of deformation and fracture. Continuum plasticity and microscopic hardening mechanisms. High temperature deformation. Fracture mechanics, brittle and ductile fracture. Deformation and fracture mechanisms maps. Prerequisite: MSE 510 and MSE 541 or permission of instructor.

**MSE 553 Vacuum Science and Technology (3)** Fundamental theory and gas kinetics and treatment of gas flow, working principles of vacuum pumps and gauges, characteristics required of the vacuum components, material selection, fundamentals essential to vacuum system design. Covers both fundamental and practical aspects of modern vacuum science and technology.

**MSE 555 Biomimetics: Bioinspired Design and Processing of Materials (4)** How biological organisms produce materials with controlled structure, chemistry and hierarchy to attain physical properties far superior to traditional engineering materials. Fundamental biological building materials, their synthesis, and their self-assembly with emphasis on examples of soft and hard tissues.

**MSE 559 Thin Film Science, Engineering, and Technology (3)** The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with CHEM E 559.

**MSE 562 Introduction to Electronic Composites (3)** *Bordia, Stoebe, Taya* Fundamentals of microstructure-macro-property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 423 or M E 450. Offered: jointly with M E 562; Sp.

**MSE 563 Advanced Composites: Design and Manufacturing (3)** Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: MSE 423 or M E 450 or equivalent by permission of instructor. Offered: jointly with ME 563; Sp.

**MSE 565 Electron Theory of Materials (3)** Solid-state concepts of materials. Atomic bonding, statistical mechanics, Brillouin zone theory. Applications to conduction, optical, and magnetic properties of metals, semiconductors, and insulators. Prerequisite: MSE 466 or equivalent. Offered: A.

**MSE 571 Polymeric Materials (3)** Relationships between configuration, conformation, molecular order, microstructure, properties of polymeric materials. Concepts relevant to tailoring polymer molecules and microstructures for specific applications. Interactions between polymers and their in-service environment. Characterization and processing techniques relevant to polymeric materials. Prerequisite: one semester or two quarters of organic chemistry. Offered: jointly with BIOEN 571; A.

**MSE 590 Advanced Seminar in Materials Science and Engineering (2)** Advanced topics in material science, led by faculty with specific expertise in the area of interest. Topics to be chosen and announced quarterly. Prerequisite: graduate standing.

**MSE 598 Engineering Materials Problems (4)** Involves a concentrated project which may include the design of a system or process, or analysis of a set of data related to the materials engineering area. Requires a professional quality report and an oral presentation of the results.

**MSE 599 Special Topics in Materials Science (1-5, max. 5)** Studies of special advanced topics in materials science. Prerequisite: permission of instructor. Offered: AWSpS.

**MSE 600 Independent Study or Research (\*)** Offered: AWSpS.

**MSE 700 Master's Thesis (\*)** Offered: AWSpS.

**MSE 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Metallurgical Engineering

**MET E 421 Metallurgical Processing (4)** Principles and applications of techniques used to process metals and alloys including solidification and casting, heat treating, forming, joining and machining and their effects on microstructure and properties. Offered: A.

**MET E 432 Corrosion of Engineering Materials (3)** Applications of physical chemical principles to the reaction of materials with their environments. Prevention and control of corrosion and oxidation processes. Corrosion problems in materials applications. Offered: W.

**MET E 435 Corrosion (1)** Laboratory experiences in application of physical chemical principles to reaction of materials with their environments. To accompany 432. Offered: W.

**MET E 461 Engineering Physical Metallurgy (4)** Phase transformations and strengthening mechanisms in ferrous and nonferrous alloys; heat treatment and microstructure control; physical metallurgy of carbon and alloy steels, aluminum and titanium alloys; microstructure-property relationships and alloy design. Offered: A.

**MET E 462 Mechanical Behavior of Metals (3)** Theories of elastic and plastic deformation in materials. Application of these theories in design, stress

and strain, tensile and compression loading, yielding and plastic deformation, fracture, introduction to fracture mechanics, creep and fatigue. Offered: W.

**MET E 463 Reliability and Design in Metallurgical Systems (4)** Metallurgical design problems and failure analysis. Properties of commercially important engineering alloys. Offered: Sp.

**MET E 464 Extractive Process Analysis (3)** Extractive processes analyzed by the methods of material and energy balances, computational thermodynamics, process kinetics and reactor theory. Introduction to process optimization. Offered: Sp.

**MET E 465 Mechanical Behavior Laboratory (1)** Laboratory experience in mechanical behavior of metals. To accompany 462. Offered: W.

## Mechanical Engineering

143 Mechanical Engineering



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Mechanical\\_Eng.html](http://www.washington.edu/students/gencat/academic/Mechanical_Eng.html)



Department Web page:  
[www.me.washington.edu](http://www.me.washington.edu)

The Department of Mechanical Engineering focuses on increased productivity through modern design methods, automated manufacturing, and introduction of new materials. It also continues its strong history of involvement with conversion and management of energy. The department offers instruction and research in four principal areas: materials and manufacturing, systems and dynamics, energy and fluids, and design.

The department offers undergraduate and graduate degree programs, with courses in design, analysis, and fabrication of mechanical devices; analysis of vibration and failure; automated manufacturing; combustion and energy systems; fluid mechanics; computer-aided design; robotics; and applications of mechanical engineering to interdisciplinary fields.

## Graduate Program

Graduate Program Coordinator  
143C Mechanical Engineering, Box 352600  
(206) 543-7963  
[megrad@u.washington.edu](mailto:megrad@u.washington.edu)

The Department of Mechanical Engineering offers graduate programs leading to the degrees of Master of Science in Mechanical Engineering and Doctor of Philosophy. The department also provides an authorized option leading to the College-wide Master of Science in Engineering degree. These provide a balanced combination of formal instruction and independent research or design experience. Individual projects may be drawn from a wide spectrum of topics, which include mechanical and energy conservation systems, heat transfer, combustion, fluid mechanics, applied mechanics, computational mechanics, computer-aided design and manufacturing, production systems, materials behavior, robotics, controls, vibrations, and applications of mechanical engineering science to a variety of such interdisciplinary fields as bioengineering, ocean engineering, environmental engineering, and acoustics. Flexible requirements for course work provide opportunities both for a broad scientific and professional background and for specialty training.

## Research Facilities

The department has well-equipped laboratories for pursuing research in various disciplinary fields in mechanical engineering and for constructing specialized research equipment. These include experimental

stress analysis; materials testing; synthesis and simulation of electromechanical control systems; foundry, welding, and other metal fabrication operations; computer facilities for CAD/CAM research; wind tunnels for boundary-layer and high-speed flow analysis; combustion systems performance, exhaust emissions control, and combustion engines; acoustics, vibration, and dynamic testing and measurements and modal analysis; radiation, conduction, and convection (including multiphase) heat-transfer analysis, and a bioengineering flow facility.

## Financial Aid

Financial aid is offered to full-time graduate students as funds permit. Funds, however, are limited and the assignment of assistantships is highly competitive. This aid may be in the form of a research assistantship for sponsored programs, a fellowship provided by the University or industry, or a teaching assistantship.

## Faculty

### Chair

William R. D. Wilson

### Professors

Alexander, Daniel 1960, (Emeritus); MS, 1954, University of Washington; PhD, 1977, Washington State University; engineering design.

Balise, Peter \* 1950, (Emeritus); MS, 1950, Massachusetts Institute of Technology; systems analysis and control.

Chalupnik, James \* 1964, (Emeritus); PhD, 1964, University of Texas (Austin); sound and vibration, wave propagation.

Corlett, Richard \* 1964, (Emeritus); PhD, 1963, Harvard University; heat transfer, fire and explosions, combustion systems and energy management.

Daly, Colin H. \* 1967; PhD, 1966, University of Strathclyde (UK); bioengineering, materials, high energy physics.

Day, Emmett E. \* 1947, (Emeritus); PhD, 1962, University of California (Berkeley); materials, experimental stress analysis.

Depew, Creighton A. \* 1960, (Emeritus); PhD, 1960, University of California (Berkeley); heat transfer, fluid mechanics.

Emery, Ashley F. \* 1961; MS, 1958, PhD, 1961, University of California (Berkeley); energy and buildings, HVAC, thermal stresses, experimental design, stochastic finite elements.

Firey, Joseph C. 1983, (Emeritus); MSME, 1941, University of Wisconsin; combustion, lubrication.

Fridley, James \* 1988; PhD, 1984, University of Washington; precision forestry, forest engineering systems design, interactive computer simulation.

Galle, Kurt R. \* 1960, (Emeritus); PhD, 1951, Purdue University; instrumentation, controls, bioengineering.

Garbini, Joseph \* 1979; PhD, 1977, University of Washington; systems and controls analysis, instrumentation, manufacturing automation.

Gessner, Frederick B. \* 1967; PhD, 1964, Purdue University; fluid mechanics, turbulence.

Hyman, Barry \* 1975; PhD, 1965, Virginia Polytechnic Institute and State University; mechanical design, energy systems and policy.

Jorgensen, Jens E. \* 1973; DSc, 1969, Massachusetts Institute of Technology; systems analysis, automation, design, manufacturing, forest engineering.

Kapur, Kailash C. \* 1992, (Adjunct); PhD, 1969, University of California (Berkeley); quality/reliability engineering, system design/optimization, total quality/reliability management.

Kippenhan, Charles J. \* 1963, (Emeritus); PhD, 1948, University of Iowa; heat transfer, energy management.

Kobayashi, Albert S. \* 1958, (Emeritus); PhD, 1958, Illinois Institute of Technology; fracture mechanics; experimental, computational and structural mechanics.

Kosaly, George \* 1980; PhD, 1974, Eotvos Lorand University (Hungary); DSc, 1979, Hungarian Academy of Sciences; applications of stochastic processes in engineering, reacting turbulent flows.

Kramlich, John C. \* 1991; PhD, 1980, Washington State University; heterogeneous combustion, pollutant formation and control from thermal systems, waste remediation.

Love, William J. \* 1970, (Emeritus); PhD, 1952, University of Illinois; design, mechanics, power systems.

Malte, Philip C. \* 1979; PhD, 1971, University of Michigan; combustion and energy conversion, including environmental control and environmental consequences.

McCormick, Norman J. \* 1966; PhD, 1965, University of Michigan; thermal and optical radiative transfer, optical oceanography, reliability and risk analysis.

McFeron, Dean E. \* 1958, (Emeritus); PhD, 1956, University of Illinois; heat transfer and thermal power processes.

Morrison, James B. \* 1946, (Emeritus); MS, 1954, University of Washington; design, dynamics.

Murphy, Stanley R. 1952, (Emeritus); PhD, 1959, University of Washington.

Pratt, David T. \* 1981, (Emeritus); PhD, 1968, University of California (Berkeley); turbulent combustion, computer simulation.

Ramulu, M. \* 1978; PhD, 1982, University of Washington; manufacturing processes, production engineering, applied mechanics, fatigue and fracture mechanics.

Riley, James J. \* 1983; PhD, 1971, Johns Hopkins University; fluid mechanics, especially turbulent flows.

Sidles, John Arthur 1984, (Adjunct); PhD, 1983, University of Washington.

Taggart, Raymond \* 1959, (Emeritus); PhD, 1956, Queen's University (UK); mechanical metallurgy.

Taya, Minoru \* 1986; PhD, 1977, Northwestern University; composite materials, electronic packaging and materials, intelligent materials.

Tencer, Allan Fred \* 1988, (Adjunct); PhD, 1981, McGill University (Canada).

Tuttle, Mark E. \* 1985; PhD, 1984, Virginia Polytechnic Institute and State University; experimental stress analysis, composite materials, adhesion mechanics.

Vesper, Karl H. \* 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.

Wilson, William R. D. \* 1999; PhD, 1967, Queen's University of Belfast (Ireland); manufacturing and tribology, particularly friction and lubrication in metal forming.

Wolak, Jan \* 1965, (Emeritus); PhD, 1965, University of California (Berkeley); mechanics of materials, manufacturing processes.

Woo, Tony C. \* 1995, (Adjunct); MSEE, 1974, PhD, 1975, University of Illinois; manufacturing systems, computer graphics and computational geometry.

Zabinsky, Zelda \* 1985, (Adjunct); PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

## Associate Professors

Adee, Bruce H. \* 1970; MS, 1968, PhD, 1972, University of California (Berkeley); vessel safety and stability, floating structures, waves, ship resistance, model testing.

Berg, Martin C. \* 1986; PhD, 1986, Stanford University; digital control system design, control of structurally flexible electromechanical systems.

Bodoia, John R. \* 1964, (Emeritus); PhD, 1959, Carnegie Mellon University; fluid mechanics, heat transfer, solar energy.

Chalk, William 1957, (Emeritus); MSME, 1961, University of Washington; design graphics.

Dahl, Peter H. \* 1989, (Research); PhD, 1989, Massachusetts Institute of Technology; underwater acoustics; sound scattering from the sea surface, bubbles, marine life.

Fabien, Brian C. \* 1993; PhD, 1990, Columbia University; kinematics, dynamics, modeling and simulation of physical systems, optimal control.

Ford, Paul W. \* 1957, (Emeritus); MEng, 1959, University of Washington; manufacturing processes, metal casting.

Forster, Fred \* 1977; PhD, 1972, Stanford University; fluid mechanics, acoustics, micro-fluidics, biomedical applications.

Ganter, Mark \* 1986; PhD, 1985, University of Wisconsin; solid modeling, computer graphics, kinematics and automated manufacturing.

Holt, Richard \* 1947, (Emeritus); MSME, 1957, University of Washington; manufacturing processes, welding.

Jenkins, Michael G. \* 1992; PhD, 1987, University of Washington; thermo-mechanical behavior of monolithic/composite ceramics, standards and design code development.

Kieling, William C. \* 1956, (Emeritus); MSME, 1959, University of Washington; design, dynamics, and kinematics.

Kumar, Vipin \* 1988; PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.

Reinhall, Per G. \* 1982; PhD, 1982, California Institute of Technology; nonlinear dynamics, vibrations.

Sanders, Joan Elizabeth \* 1985, (Adjunct); PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.

Sandwith, Colin J. \* 1966, (Research); PhD, 1966, Oregon State University; corrosion, material science, design, manufacturing.

Shen, I-Yeu (Steve) \* 1993; PhD, 1991, University of California (Berkeley); linear and nonlinear vibrations; disk, spindle, and machine dynamics; damping and vibration control.

Sherrer, Robert E. \* 1960, (Emeritus); PhD, 1958, University of Wisconsin; solid mechanics.

Storti, Duane W. \* 1983; PhD, 1983, Cornell University; nonlinear dynamics and vibrations, dynamical systems, perturbations and bifurcations.

## Assistant Professors

Campbell, Mark E. \* 1997, (Adjunct); PhD, 1996, Massachusetts Institute of Technology; precision-controlled structures, autonomous aerospace vehicles, smart materials.

Cooper, Joyce S. \* 1998; PhD, 1996, Duke University; design for environment and industrial ecology methodologies and models.

Mescher, Ann M. \* 1996; PhD, 1995, Ohio State University; materials processing, thermo-fluids sciences.

Smith, Robert P. \* 1993, (Adjunct); PhD, 1992, Massachusetts Institute of Technology; design methodology, manufacturing systems, concurrent engineering.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**M E 403 Material-Removal Processes (3)** *Ramulu* Cutting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption and relative costs in the various processes. Prerequisite: M E 304 which may be taken concurrently. Offered: A.

**M E 406 Corrosion and Surface Treatment of Materials (3)** *Sandwith* Corrosion fundamentals and forms (galvanic, crevice, pitting, stress corrosion, erosion, hydrogen and leaching). Principles of design, materials selection, cathodic protection and surface treatments (coatings, carburizing, nitriding and plating) applied to reduce corrosion. Failure analysis applied to case studies. Offered: W.

**M E 409 Introduction to Numerical Control and Computer-Aided Manufacturing (3)** *Ramulu* Control system fundamentals, numerical control (NC) machine control systems, and the design aspect of NC machine tools, programming methods of NC machines, computer-aided manufacturing, CNC, DNC, and process optimization. Prerequisite: M E 304 which may be taken concurrently. Offered: Sp.

**M E 424 Combustion Systems and Pollutant Formation (4)** *Kramlich, Malte* Combustion theory, including chemical thermodynamics, chemical kinetics, mixing and diffusion, and flame structure. Combustion chamber design concepts and performance. Pollutant formation and combustion methods for minimizing pollutant formation. Weekly laboratory. Prerequisite: M E 323. Offered: even years; Sp.

**M E 425 HVAC Engineering (4)** *Elder, Emery* Heating, ventilating, and air conditioning of built environment. Human comfort, psychometric processes, load computations, fluid distribution, and controls. Design analysis of HVAC system is taught in the lectures and applied in the class project. Prerequisite: M E 323; M E 331. Offered: Sp.

**M E 426 Sustainable Energy Design (4)** *Kramlich, Malte* Renewable energy systems design; solar, wind, hydro; bio-fueled energy conversion systems of high efficiency and low emissions. Project-based learning: analysis, systems engineering, design, component characteristics, and environmental considerations. Prerequisite: CHEM E/ENVR/M E/PHYS 342 or M E 430. Offered: Sp.

**M E 430 Advanced Energy Conversion Systems (4)** *Emery, Kramlich, Malte* Advanced and renewable energy conversion systems and technologies are treated. Included are high efficiency combined cycles; renewable energy conversion involving solar, wind, and biomass; direct energy conversion and fuel cells; and nuclear energy. Environmental consequences of energy conversion and environmental control are discussed. Prerequisite: M E 323. Offered: W.

**M E 431 Advanced Fluid Mechanics (4)** *Forster, Riley* Advanced topics in fluid mechanics, including kinematics, potential theory and vortex dynamics, viscous flow, turbulence, experimental and numerical methods, and design. Prerequisite: M E 333. Offered: A.

**M E 433 Turbomachinery (4)** *Gessner, Malte* Thermodynamics, gas dynamics, and fluid mechanics of axial and centrifugal compressors, pumps, and turbines. Selection of components for engineering applications. Design problems and/or laboratory experiments to illustrate operating characteristics of turbomachines. Offered: Sp.

**M E 440 Advanced Mechanics of Materials and Solids (3)** *Daly, Jenkins, Ramulu, Taya, Tuttle* Study of mechanics of deformable bodies, including three-dimensional stress and strain tensors and their transformations. Equations of compatibility, continuity and equilibrium. Elastic constants. Failure criteria including fracture, yield and instability. Deflection relations for complex loading and shapes. Indeterminate problems. Design applications and numerical methods. Prerequisite: ME 354.

**M E 445 Science in Biomechanics (3)** *Sanders* Introduction to biomechanics research. Discusses scientific analysis tools including problem definition, hypothesis generation and evaluation, methodology development, and data analysis methods. Participation in research projects, that are direct extensions from biomechanics research in the professor's laboratory. Two lectures and project meeting with professor per week. Offered: jointly with BIOEN 445; Sp.

**M E 450 Introduction to Composite Materials and Design (3)** *Taya, Tuttle* Stress and strain analysis of continuous fiber composite materials. Orthotropic elasticity, lamination theory, failure criterion, and design philosophies, as applied to structural polymeric composites. recommended: MSE 423. Offered: W.

**M E 459 Introduction to Fracture Mechanics (3)** *Ramulu* Deformation processes leading to fracture, and the linear elastic fracture mechanics. Fatigue crack propagation. Fracture control and failure analysis. Prerequisite: M E 356. Offered: A.

**M E 460 Kinematics and Linkage Design (3)** *Ganter* Synthesis of linkage-type mechanisms using graphical and computer methods. Offered: W.

**M E 468 Air-Pollution Control Equipment Design (3)** *Pilat* Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CHEM E 468/CEE 494; W.

**M E 469 Applications of Dynamics in Engineering (4)** *Reinhall, Shen, Storti* Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods, Hamilton's principle and Lagrange equations and the design of dynamic system. Prerequisite: M E 374. Offered: A.

**M E 470 Mechanical Vibrations (3)** *Reinhall, Shen, Storti* Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-of-freedom linear systems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite: M E 373. Offered: W.

**M E 471 Automatic Control (4)** *Berg, Garbini* Dynamic system modeling; control system stability and performance analysis; compensator design by Bode and root-locus methods. Prerequisite: M E 374. Offered: A.

**M E 473 Instrumentation (4)** *Garbini* Principles and practice of industrial and laboratory measurement. Dynamics of instrument response; generalized performance analysis of sensor systems; theory of transducers for motion, force, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: M E 374. Offered: A.

**M E 474 Systems Modeling and Simulation (3)** *Fabien* Unified approach to modeling of systems, and computer simulation of systems behavior. Selecting system variables; writing state, loop, and node equations; modal response and state transition response; system functions and convolution; analogs. Applications to control, vibrations, and other problems. Prerequisite: M E 374. Offered: W.

**M E 477 Embedded Computing in Mechanical Systems (4)** *Garbini* Analysis of electromechanical systems employing microcomputers for control or data acquisition. Microcomputer architecture, memory organization, assembly language programming, interfaces, and communications. Particular emphasis on design of hardware and software interfaces for real-time interaction with mechanical systems. Weekly laboratory. Prerequisite: M E 374. Offered: W.

**M E 478 Finite Element Analysis (4)** *Reinhall* Development of theory and concepts of finite element analysis. Applications in all areas of mechanical engineering, including mechanics of solids, heat transfer, and design of dynamical systems. Weekly computer exercises. Prerequisite: M E 374; either MATH 308 or AMATH 352. Offered: Asp.

**M E 480 Introduction to Computer-Aided Technology (4)** Principles of computer-aided technology. Computer-aided design, engineering, drafting, and manufacturing; computer-aided design systems, geometry, computer graphics, hardware, computer-aided vehicle/system design synthesis. System demonstrations, laboratories, and site visits. Prerequisite: ENGR 123; CSE 142. Offered: Asp.

**M E 481 Combustion Engines and Alternatives (5)** *Kramlich, Malte* Thermodynamics, fuels, performance, combustion, and exhaust emissions control for spark ignition and compression ignition piston engines. New technologies, including hybrid combustion-electric fuel cell engines. Principles and practice. Lectures and laboratory. Prerequisite: M E 323. Recommended: M E 333. Offered: Asp..

**M E 485 Introduction to Electronic Packaging and Materials (3)** *Kuga, Pearsall, Taya* The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermomechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with MSE 485; W.

**M E 487 Laboratory in Electronic Packaging and Materials (1)** *Taya, Stoebe* Laboratory course to accompany ME 485 Experiments related to design, processing and reliability of electronic packaging used in consumer electronics. Corequisite: M E 485. Offered: jointly with MSE 487 W.

**M E 490 Naval Architecture (3)** *Adee* Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered: A.

**M E 491 Naval Architecture (3)** *Adee* Theory of naval architecture; strength, ABS rules, water waves, ship and platform motions. Offered: W.

**M E 492 Naval Architecture (3)** *Adee* Theory of naval architecture; dimensional analysis, resistance, model testing, propellers, steering. Offered: Sp.

**M E 495 Mechanical Engineering Design (4)** *Hyman* Design laboratory involving the identification and synthesis of engineering factors to plan and achieve specific project goals. Current literature and prerequisite texts are used as reference sources. Lecture and laboratory. Prerequisite: M E 395. Offered: AWSp.

**M E 498 Special Topics in Mechanical Engineering (1-5, max. 6)** Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree.

**M E 499 Special Projects (2-5, max. 9)** Written report required. Offered: AWSpS.

## Courses for Graduates Only

**M E 501 Modern Manufacturing Processes (3)** *Ramulu* General survey and introduction to modern manufacturing engineering processes. Fundamental principles and practices of modern manufacturing processes. Case studies and exercises relating the course material directly to modern industrial practice. Offered: A.

**M E 502 Plasticity and Metal Forming (3)** *Ramulu* Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of deformation. The slip-line field, load bounding, applications to frames, drawing, forging, and extrusion.. Offered: odd years; Sp.

**M E 504 Introduction to Microelectro Mechanical Systems (4)** Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered jointly with E E 502; A.

**M E 510 Mathematical Foundations of Systems Theory (4)** *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/CHEM E 510/E E 510; A.

**M E 518 Seminars on Advances in Manufacturing and Management (1)** *Mescher, Ramulu, Woo* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management Offered: jointly with IND E 518 AWSp.

**M E 519- Seminar (0-)** Credit/no credit only. Offered: W.

**M E -520 Seminar (-1, max. 6)** Credit/no credit only. Offered: Sp.

**M E 521 Thermodynamics (3)** *Emery, Kramlich, Malte* Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Introduction to statistical thermodynamics. Prerequisite: M E 323 and graduate standing in mechanical engineering or permission of instructor. Offered: A.

**M E 522 Thermodynamics (3)** *Emery, Kramlich, Malte* Topics from statistical thermodynamics, including the Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Solutions of the Schrodinger wave equation and evaluation of the partition function for translation, rotation, and vibration. Prerequisite: M E 521 or permission of instructor. Offered: by request only.

**M E 523 Energy and Environment Seminar (1)** *Kramlich, Malte* Student discussions of topics in combustion science and technology, alternative fuels, renewable energy, environmental consequences of energy conversion, and design for environment. Also, presentations by outside experts. May be repeated for credit. Credit/no credit only. Offered: AWSp.

**M E 524 Combustion (3)** *Kramlich, Malte* Chemical and physical processes of combustion with applications to design of combustors, fuel selection, and consideration of environmental effects. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: odd years; Sp.

**M E 525 Acoustics in Engineering I (3)** *Forster, Porter* Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Prerequisite: graduate standing in mechanical or electrical engineering, or permission of instructor. Offered: jointly with E E 525; W.

**M E 526 Acoustics in Engineering II (3)** *Forster, Porter* Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer design, propagation in an isotropic medium. Prerequisite: M E 525 or permission of instructor. Offered: jointly with E E 526; Sp.

**M E 530 Heat Conduction and Radiation (3)** *McCormick* Heat conduction advanced fundamentals, emphasizing microscale applications. Radiative transfer for transparent and for absorbing and scattering media, emphasizing combustion, biomedical, and atmospheric/oceanic environmental applications. Forward and inverse problems for both conduction and radiation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

**M E 531 Conductive Heat Transfer (3)** *Emery, McCormick* Analysis of steady-state and transient heat conduction in single- and multidimensional systems by mathematical, graphical, numerical, and analogical methods. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: by request only.

**M E 532 Convective Heat Transfer (3)** *Emery, Kramlich, McCormick, Mescher* Introduction to fluid flow and boundary-layer theory as applicable to forced- and natural-convection heat transfer. Condensation and boiling heat transfer. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

**M E 533 Fluid Mechanics (3)** *Gessner, Kosály, Riley* Basic conservation laws and kinematics of fluid flow constitutive relationships, Newtonian fluids, dimensional analysis, vorticity dynamics, inviscid flows, applications. Offered: A.

**M E 534 Fluid Mechanics (3)** *Gessner, Kosály, Riley* Review of basic principles, some exact solutions and their interpretation, waves (water waves, sound waves, shock waves), boundary layers, jets and wakes, flow stability, turbulence, applications. Prerequisite: M E 533 or permission of instructor. Offered: W.

**M E 535 Computational Techniques in Mechanical Engineering (3)** *Emery* Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite: permission of instructor. Offered: Sp.

**M E 537 Topics in Fluid Mechanics (3)** *Gessner, Kosály, Riley* Selected fluid mechanics relevant to current advances in research and application. Topics selected vary with faculty and student interest, but have included flow stability, special topics in turbulence, and turbulent reacting flows. Offered: even years; A.

**M E 538 Turbulent Boundary Layer Theory (3)** *Gessner, Riley* Characteristic features of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. Offered: odd years; A.

**M E 541 Fatigue of Materials (3)** *Ramulu* Macro and micro aspects of fatigue of metals and fatigue mechanisms. Analytical methods for fatigue and life assessment in advanced materials. Offered: W.

**M E 543 Fluid Turbulence (3)** *Gessner, Kosály, Riley* Methods of characterizing fluid turbulence; probability concepts; spatial and temporal velocity correlations; spectral energy transfer; turbulent diffusion; isotropic turbulence and Kolmogoroff's hypothesis; Taylor's hypothesis; hot-wire measurement techniques. Prerequisite: 3 credits of graduate level fluid mechanics or permission of instructor. Offered: even years; W.

**M E 544 Advanced Turbulence Modeling Techniques (3)** *Gessner, Riley* The Reynolds stress transport equations; plane homogeneous shear flow; modeling the pressure-strain, diffusion, and dissipation rate correlation tensors; one and two-equation turbulence models; near-wall turbulence and wall functions; limitations of length scale and eddy viscosity modeling. Prerequisite: 3 credits of turbulence related course work. Offered: even years by request only; Sp.

**M E 548 Linear Multivariable Control (3)** *Ly, Vagners* Single loop feedback control theory; poles, zeros, Nyquist stability, performance, robustness of multivariable systems; multivariable control synthesis: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parametrization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 448 or M E 471 or equivalent. Offered: jointly with A A 548/E E 548; W.

**M E 549 Estimation and System Identification (3)** *Vagners* Review of system models, model structure, model parametrization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or E E 548. Offered: jointly with A A 549/E E 549; Sp.

**M E 550 Nonlinear Optimal Control (3)** *Vagners* Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/E E 550; odd years.

**M E 551 Elasticity I: Elastostatics (3)** *Taya* Elastostatics, including general formulations of 2D and 3D elastostatic problems (stress function method, complex variable method, displacement potential method). Eth Eshelby's method is emphasized and used to solve 2D and 3D problems with special application to composite materials. Offered: A.

**M E 552 Elasticity II: Viscoelasticity and Elastodynamics (3)** *Taya* Elastodynamics includes wave propagation in linear elastic and linear viscoelastic solids where solids are monolithic materials, composite materials. Viscoelasticity part includes the stress-strain equations in terms of convolution integral, Fourier transform and Laplace transform modes. Simple and fundamental problems are solved by several techniques as demonstration. Offered: even years; W.

**M E 553 Adhesion Mechanics (3)** *Tuttle* Introduction to adhesive systems and test/evaluation techniques. Stress/strain analysis methods used with adhesive joints. Examples of practical applications. Prerequisite: graduate student status or permission of instructor. Offered: even years; Sp.

**M E 555 Thermoelasticity (3)** *Emery* Basic equations of thermoelasticity for isotropic elastic solids. Analysis of disks, cylinders, spheres, beams, and plates under steady temperature and sudden and slow heating and cooling. Introduction to thermoelastic stability. Prerequisite: M E 551 or permission of instructor. Offered: by request only.

**M E 556 Experimental Stress Analysis I (3)** *Tuttle* Theory and practice of experimental techniques including strain gages and strain gage-based devices, thermocouples, LVDTs, and transducer design. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: A.

**M E 557 Experimental Stress Analysis II (3)** *Tuttle* Theory and practice of optical mechanics, including interferometric techniques (moiré and holographic), geometric moiré methods, and photoelasticity. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: even years; W.

**M E 559 Introduction to Fracture Mechanics (3)** *Ramulu* Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and propagation fatigue life prediction of mechanical components subjected to environmental effects. Offered: W.

**M E 560 Advanced Theory of Fracture (3)** *Ramulu* Theories of linear fracture mechanics, fracture dynamics, ductile fracture, stable crack growth and mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite: M E 559 or permission of instructor. Offered: even years; Sp.

**M E 562 Introduction to Electronic Composites (3)** *Bordia, Stoebe, Taya* Fundamentals of microstructure-macro-property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 450 or MSE 423. Offered: jointly with MSE 562 Sp.

**M E 563 Advanced Composites: Design and Manufacturing (3)** Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: M E 450 or MSE 423 or equivalent by permission of instructor. Offered: jointly with MSE 563; Sp.

**M E 564 Mechanical Engineering Analysis (3)** *Kosály, Shen, Storti* Application of mathematical methods to the description and analysis of systems in mechanical engineering. Analogies in heat transfer, fluid flow, stress distribution, dynamics, and feedback control. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: A.

**M E 565 Mechanical Engineering Analysis (3)** *Kosály, Shen, Storti* Applications of vectors, matrices, and partial differential equations to mechanical engineering systems, including computational techniques and analogies. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

**M E 566 Introduction to Random Processes (3)** *Kosály, Reinhall* Probability and random variables. Ensemble averaging, probability density function, auto- and cross-correlation functions. Brownian motion, Poisson process. Ergodicity. Frequency domain analysis, auto- and cross-spectrum, transfer function. Fundamentals of digital spectral analysis. Applications in fluid mechanics, acoustics and vibrations. Offered: by request only; even years; A.

**M E 572 Methodologies for Engineering Design: Conceptual Design (3)** *Kumar* Methodologies particularly useful in the conceptual or preliminary phase of a design. The design process. Impact of formulating independent functional requirements. Physical and functional coupling in design. Case studies in conceptual design of products and processes. Prerequisite: graduate standing or permission of instructor. Offered: even years; Sp.

**M E 573 Methodologies for Engineering Design: Probabilistic Mechanical Design (3)** *Jenkins* Study and implementation of probabilistic methods to design. Loading, geometry, stress, strain/deflection described as random variables and compared to material properties/behavior in terms of random variables. Design, analysis, reliability, risk conducted on common structures with results compared to conventional deterministic approaches. Projects using probabilistic methods to optimize selected component designs. Offered: Sp.

**M E 575 Linear Systems Theory (3)** *Campbell, Ly, Vargners* Transfer-function and state-space descriptions. Solution of the state equation; state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith McMillan form. Systems invertibility. Prerequisite: graduate standing or permission of instructor. Offered: A.

**M E 579 Fluid Power Systems (3)** *Jorgensen* Design, analysis, and control of fluid power systems. Steady-state analysis of valves, actuators, and transmissions. Dynamic modeling, response, stability, and control analysis via linear element representation and computer simulation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: Sp.

**M E 581 Digital Control I (3)** *Berg, Fabien, Garbini* Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: M E 471 or equivalent; recommended: M E 575 or equivalent. A A/E E 581; W.

**M E 582 Digital Control II (3)** *Alexandro, Berg, Fabien, Garbini* Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: M E 581 or permission of instructor. Offered: jointly with A A 582/E E 582; Sp.

**M E 583 Nonlinear Control Systems (4)** *Hannaford, Noges* Analysis and synthesis of nonlinear control systems. Assessment of stability by: Phase Plane and Describing Function Methods, Circle and Popov Criteria, Lyapunov Criteria. Construction of Lyapunov Functions by method of Kraasovskii and Lu're. Introduction to nonlinear control system design. Prerequisite: M E 446, M E 584, or permission of instructor. Offered: jointly with E E 583; odd years; Sp.

**M E 584 Combustion in Airbreathing Propulsion (3)** *Gessner, Kramlich, Malte* Fundamentals of gasdynamics, mixing, and thermodynamics applies to the analysis and design of gas turbine, ramjet and scramjet engine combustors, with treatment of computer simulation. Offered: even years; Sp.

**M E 588 Dynamics and Vibrations (3)** *Reinhal, Shen, Storti* Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bodies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission of instructor. Offered: A.

**M E 589 Vibrations (3)** *Reinhal, Shen, Storti* Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Nonlinear systems are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; W.

**M E 590 Vibrations (3)** *Reinhal, Shen, Storti* Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Random inputs are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; Sp.

**M E 591 Robotics and Control Systems Colloquium (1, max. 3)** *Berg* Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Offered: jointly with A A/CHEM E/E E 591; AWSp.

**M E 598 Topics in Research (1)** Doctoral seminar. Credit/no credit only. Offered: AWSp.

**M E 599 Special Projects (1-5, max. 9)** Written report required. Prerequisite: permission of department Chairperson. Offered: AWSpS.

**M E 600 Independent Study or Research (\*)** Written report required. Offered: AWSpS.

**M E 700 Master's Thesis (\*)** Offered: AWSpS.

**M E 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Technical Communication

14 Loew



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Tech\\_Communication.html](http://www.washington.edu/students/gencat/academic/Tech_Communication.html)



Department Web page:  
[www.uwtc.washington.edu](http://www.uwtc.washington.edu)

The Industrial Revolution greatly increased the number of people who needed to communicate about technical and other specialized topics. Scientific journal articles, manuals, proposals, and other genres became familiar and important—and they remain so today. With the Information Age, gaining and sharing technological understanding and capability has become a constant and crucial human activity. We communicate in more genres, address broader (often global) audiences, and face more complex rhetorical problems.

To achieve success in their communication activities, progressive organizations employ sophisticated planning and development methods, including user-centered design and user-focused evaluation. In addition, they undertake research projects and apply existing research to their own needs. Contemporary research in technical communication ranges from controlled empirical research on the processing of text, graphics, and multimedia content to observational research on how meaning is created and negotiated in business environments and virtual communities.

The Department of Technical Communication prepares graduate students to assume positions of intellectual leadership in industry, government, and non-profit organizations. The Technical Japanese program provides a unique opportunity to develop cross-cultural experience and expertise. Science writing and Web site development are other important areas.

Whatever their professional direction, technical communication graduate students learn the newest communication technologies and practices, the most

effective information-design strategies, and the research skills appropriate to their interests. They also learn the enduring theory and principles that enable them to understand the constant changes they will encounter throughout their careers. Finally, graduate work takes place in the context of social and political issues and human needs.

## Graduate Programs

Graduate Program Coordinator  
14 Loew, Box 352195  
(206) 543-2567  
tc@uwtc.washington.edu

### Master of Science

Technical Communication offers a Master of Science (M.S.) in technical communication. A total of 45-48 credits is required for the M.S. degree, which includes 22 credits of required T C graduate courses; 14 credits of approved electives; and 9 to 12 credits of degree-completion credits. To complete their degrees, students choose from one of three options: 9 credits of thesis; 5 credits of internship and 4 credits of a project report related to the internship; or 12 credits of a linked set of courses.

In making recommendations for admission, the faculty consider the following from an applicant's record: (1) undergraduate GPA; (2) undergraduate degree program and work experience; (3) the Graduate Record Examination (GRE) Verbal score; (4) the Test of English as a Foreign Language (TOEFL) score (if applicable); (5) letters of recommendation; and (6) Statement of Goals and Career Objectives. A limited number of prerequisite undergraduate courses may be required.

### Research Facilities

The Department of Technical Communication has a well-equipped computer laboratory that effectively supports its courses and research projects. In addition, there are two specialized departmental research laboratories: the Technical Japanese Lab and the Laboratory for Usability Testing and Evaluation (LUTE). An award-winning magazine, *Northwest Science and Technology*, is produced in the department and serves as a kind of laboratory for science-writing students. Finally, technical communication graduate students can utilize significant College of Engineering and University-level research facilities.

### Financial Aid

A limited number of teaching and research assistantships and scholarships are available for the financial support of graduate students in technical communication. More information and application forms can be obtained by contacting the department.

### Master of Science in Engineering— Technical Japanese Program

The Technical Japanese Master's Program, within the College of Engineering Interengineering Program, offers a range of classes in advanced, practical Japanese for both master's and non-master's track students. Master's track students follow a two-year, 54-credit program which combines graduate work in an engineering or science field with advanced instruction in technical Japanese language. Non-master's track students may take any combination of technical Japanese oral communication or reading classes. These courses equip students with the skills necessary to read technical literature in Japanese and to work effectively with Japanese engineers, scientists, and business people in research and business environments. The complete program includes an internship in Japan in an industrial or research setting.

Master's track students are admitted to the program autumn quarter only, and the application deadline is February 15. Other students may begin any quarter.

To be admitted, master's track applicants must have a bachelor's degree in engineering or science, a minimum undergraduate GPA of 3.00, two years of college-level Japanese or equivalent training, satisfactory scores on the GRE, and satisfactory scores on the Japanese Proficiency Test (administered by the Technical Japanese Program).

## Faculty

### Chair

Judith A. Ramey

### Professors

Bereano, Philip L. \* 1975; JD, 1965, Columbia University; MRP, 1971, Cornell University; technology assessment, biotech policies, policy and technology, social values, citizen participation.

Coney, Mary B. \* 1976; PhD, 1973, University of Washington; writing style and theories of technical communication, rhetoric, reader response theory.

Farkas, David K. \* 1983; PhD, 1976, University of Minnesota; Web site design, hypertext and cybersculture, online help systems.

Furness, Thomas A. \* 1989, (Adjunct); PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics.

Haselkorn, Mark P. \* 1985; PhD, 1977, University of Michigan; information system design, human/machine interaction, managing system vulnerability.

Ramey, Judith A. \* 1983; PhD, 1983, University of Texas (Austin); computer-assisted communication, user-centered design, usability testing.

Skeels, Dell R. 1949, (Emeritus); MA, 1942, University of Idaho; PhD, 1949, University of Washington; folklore, myth, and folktales.

Spyridakis, Jan \* 1982; PhD, 1986, University of Washington; comprehension and usability, document and screen design, research methods.

Warnick, Barbara P. \* 1980, (Adjunct); PhD, 1977, University of Michigan; rhetorical theory and criticism.

White, Myron 1943, (Emeritus); PhD, 1958, University of Washington; technical editing, publications management, bibliography for document design.

Winn, William David \* 1985, (Adjunct); PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

### Associate Professors

Bowes, John E. \* 1974, (Adjunct); PhD, 1971, Michigan State University; man-machine communication, public opinion, international communication.

Dailey, Daniel J. \* 1982, (Adjunct Research); MS, 1982, PhD, 1988, University of Washington; time series modeling of physical phenomena, optimization, distributed computing, networking.

McClintock, Marshall 1997, (Affiliate); MA, 1977, PhD, 1980, State University of New York (Binghamton); MA, 1990, George Mason University; philosophy of science, human factors.

Tsutsui, Michio \* 1990; PhD, 1984, University of Illinois; computer-aided instruction, international communication, Japanese linguistics, technical Japanese.

Williams, Thomas R. \* 1976; MCP, 1981, PhD, 1988, University of Washington; visual media, document design, interactive multimedia.

### Assistant Professors

Ceccarelli, Leah M. \* 1996, (Adjunct); MA, 1992, PhD, 1995, Northwestern University; rhetoric of science, rhetorical criticism.

Illman, Deborah L. 1982; PhD, 1981, Universidad Estadual de Campinas (Brazil); science/engineering news reporting, public understanding of science and technology.

### Senior Lecturer

Plumb, Carolyn Sue \* 1986; PhD, 1991, University of Washington; cognitive dimensions of writing, reading, and the human/computer interface.

### Lecturer

Kato, Masashi 1988; MA, 1980, University of Washington; technology-enhanced instruction, distance learning, research methods, international communication.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**T C 400 Scientific and Technical Communication (3)** *Coney, Spyridakis* Principles and practices of writing to communicate scientific and technical information to a variety of readers, including the expert, general scientific and technical reader, manager, and general public. Required of technical communication majors. Prerequisite: T C 231. Offered: ASP.

**T C 401 Style in Scientific and Technical Writing (3)** *Coney, Spyridakis* Grammatical structures and stylistic strategies within specific professional contexts. Achieving clarity and conciseness through word choice and placement, using a variety of sentence structures for appropriate emphasis, handling details, establishing effective tone. Required of technical communication majors. Offered: ASP.

**T C 402 Scientific and Technical Editing (3)** *Farkas, Williams* Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Required of technical communication majors. Prerequisite: T C 401. Offered: AW.

**T C 403 Publication Project Management (3)** *Plumb* Responsibilities and practice in managing publication projects in scientific and technical organizations. Project design, coordination, production, and evaluation, including planning, organizing, staffing, and directing. Required of technical communication majors. Prerequisite: T C 402. Offered: WSp.

**T C 406 Understanding Research in Technical Communication (3)** *Spyridakis* Provides a basis for integrating knowledge acquired in other technical communication courses. Students examine the research literature of various disciplines that impact technical writing. Structured around theoretical and empirical literature as it relates to different textual issues in technical writing. Offered: W.

**T C 407 Computer Documentation (3)** *Farkas, Ramey* Concepts and skills for preparing online help systems, performance-support systems, print manuals, and other forms of computer documentation. Analysis of users, their tasks, and the product's interface. Usability testing of documentation. Relationship between documentation process and product development cycles. Recommended: T C 310. Offered: ASP.

**T C 408 Public Documents: Proposals, EISs, Assessments (3)** *Bereano* Analyzing special documents of public character: proposals, EISs, questionnaires, technology assessments. Understanding socio-political milieu in which they are planned, organized, written; the specialized audiences (e.g., agencies with their missions, guidelines, constituencies; citizen groups; commercial interests) they serve. Documents, the decision-making process. Offered: odd years; Sp.

**T C 409 Writing for Publication (3)** *Coney* Writing for professional and trade periodicals in science, engineering, and technology; examination of the publication process, including the roles of author, editor, and reviewer; selecting the appropriate periodical; organizing and writing the article. Prerequisite: T C 400; T C 401. Offered: W.

**T C 411 Visual Media in Technical Communication (3)** *VLPA/I&S Williams* Use of visuals in print and electronic communication. Topics include vision, perception, comparison of text and visual media principles for the selection and use of visual media, information graphics icons, page and screen design typography, and color. Offered: ASP.

**T C 412 Print Production (3)** *Williams* Introduction to print production for technical communicators. Topics include digital pre-press, printing, binding, and finishing. Prerequisite: T C 411. Offered: W.

**T C 415 Production Editing (4)** *Williams* The editorial role in the preparation of text and visual materials for production. The editor's responsibilities and prerogatives as they relate to those of other professionals in the production phase of the publications field. Offered: Sp.

**T C 420 Introduction to Technology as a Social and Political Phenomenon (5)** *I&S Bereano* Introductory survey presenting some of the issues pertaining to technology and social change, technology and values. Emphasis on the social, political, and economic aspects of current problems that have important technological components. Prior technical background not required; readings from diverse sources. Offered: A.

**T C 425 Technology Assessment (5)** *I&S Bereano* In-depth analysis of the concept, practice, and methods of technology assessment (policy analysis that concentrates on social consequences of technological development): social, political, economic, and environmental impacts of new technologies; options for channeling these developments; and relevant decision-making institutions and processes. Offered: W.

**T C 428 Policy Dimensions of Genetic Engineering (3)** *I&S Bereano* Explores technological discourse in public policy formation and decision-making regarding genetic engineering, analyzing a variety of media and formats to explore the contending ideological paradigms, imagery, and argumentation used by the major policy actors. No prerequisite, although prior work in biology, communication, or policy sciences is useful. Offered: W.

**T C 436 Design and Authoring of CAI (3)** *Winn* Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with EDC&I 436; A.

**T C 437 Interactive Multimedia (3)** *VLPA/I&S Farkas* Study of concepts and design principles with an emphasis on communicating technical and workplace information. Includes hypertext theory, interface design principles for content computing, and societal issues. Implementation of designs is encouraged but not required. Prerequisite: T C 411. Offered: Sp.

**T C 440 Science and Engineering News Writing (3)**

*Illman* Explores the science news publishing process, from researching topics and interviewing sources to the structure of news articles and production. Writing assignments address the press release, news brief, and news articles. Offered: A.

**T C 454 Alternative Technology (3) I&S**

*Bereano* Exploration of the evolution of technological forms that are small-scaled, decentralized, emphasizing the public policy aspects of these developments. Topics include the relationship between alternative technologies and worker-controlled enterprises, community planning, the politics of technological change, the Third World, and decentralized development. Background in engineering or technical design is not required. Offered: A.

**T C 455 User Interface Design (3)**

*Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interfaces, and research methodologies are discussed. Offered: jointly with IND E 455; A.

**T C 461 Reading in Technical Japanese I (3) VLPA**

*Kato* Students review and strengthen their basic knowledge of grammar, vocabulary, and kanji and apply this in reading authentic materials on technology related topics. Skills to analyze sentence structures for accurate interpretation are taught. Prerequisite: JAPAN 423. Offered: A.

**T C 462 Reading in Technical Japanese II (3) VLPA**

*Kato* Students improve skills for analyzing complex sentence structures, and learn skills (such as predictions) for more effective reading. Additional grammar, vocabulary, and kanji necessary for reading technology-related materials are introduced. Prerequisite: T C 461. Offered: W.

**T C 463 Reading in Technical Japanese III (3) VLPA**

*Kato* Students further improve skills introduced in previous courses. Covers the skills for understanding inter-sentential and paragraph structure. Additional grammar, vocabulary, and kanji necessary for reading technology-related materials are introduced. Prerequisite: T C 462. Offered: Sp.

**T C 471 Oral Communication in Japanese in Technical and Business Settings I (3) VLPA**

*Kato* Students review and strengthen their knowledge of grammar, vocabulary and apply this to basic technical and business communication situations. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: JAPAN 423. Offered: A.

**T C 472 Oral Communication in Japanese in Technical and Business Settings II (3) VLPA**

*Kato* Students learn the functional and situational skills necessary to communicate in technical and business settings. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: T C 471. Offered: W.

**T C 473 Oral Communication in Japanese in Technical and Business Settings III (3) VLPA**

*Kato* Students learn the functional and situational skills necessary to communicate in more complex technical and business settings. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: T C 472. Offered: Sp.

**T C 493 Senior Study (5)**

Integration of knowledge and skills acquired during major program into one paper or project. Offered: AWSpS.

**T C 495 Professional Practice (3-5, max. 10)**

*Williams* Supervised internship in a publications organization approved by the faculty adviser. A

minimum of one internship is required of students majoring in technical communication. Credit/no credit only. Offered: AWSpS.

**T C 498 Special Topics (1-5, max. 10)**

Special topics in technical communication to be offered occasionally by permanent or visiting faculty members.

**T C 499 Special Projects (1-5, max. 10)**

Individual undergraduate projects in technical communication. Offered: AWSpS.

**Courses for Graduates Only****T C 501 Theoretical Dimensions of Technical Communication (3)**

*Coney* Theories and research drawn from a variety of fields that inform such topics as the historical and social context of technical communication, the aims of technical discourse, readability, invention and audience, audience analysis, technical style, and graphics. Prerequisite: admission to an engineering master's program or permission of instructor. Offered: A.

**T C 502 Empirical Traditions in Technical Communication (4)**

*Williams* Introduction to empirical traditions that inform research and practice in field of technical communication. Topics include epistemological assumptions underlying empirical research, empirical methods, and survey of results of empirical research on effects of text and visual media on comprehension, recall, and performance. Prerequisite: graduate standing or permission of instructor. Offered: W.

**T C 505 Computer-Assisted Communication (4)**

*Ramey* Explores computer-assisted communication from three perspectives: 1) cultural roles of communication technologies; 2) relationships between communication and information including information technologies in the workplace, academe, and other settings; and 3) application to design including models for audience analysis, task analysis, and cognitive systems engineering. Prerequisite: graduate standing or permission of instructor. Offered: A.

**T C 509 Writing the Scientific Article (3)**

*Coney, Illman* Examination of principles and practice of writing research manuscripts, articles, abstracts, and oral presentations. Detailed examination of scientific publication process includes issues of style, organization, and ethics. Students draft, critique, and revise their own manuscripts and learn to review the manuscripts of others. Offered: Sp.

**T C 510 Information Design (4)**

*Farkas* Examination of the design principles and procedures underlying the creation of both print and electronic information presentations. Topics include: print vs. electronic media, designing for the page and screen, information topologies, and hypermedia. Seminar includes a design project. Prerequisite: T C 501 or permission of instructor. Offered: Sp.

**T C 512 International Technical Communication (3)**

*Spyridakis* Examines theory, research, and practice in the internationalization and localization of paper and electronic documents. Topics include cultural models and schemata, contrastive rhetoric, controlled languages, translation, visuals, and usability testing. Prerequisite: graduate standing or permission of instructor. Offered: W.

**T C 516 Research Methods in Technical Communication (3)**

*Spyridakis* Introduction to research methods in technical communication. Students examine the relationship between theory and research, hypothesis testing, experimental designs, modes of observation, sampling, validity, and data analysis and interpretation. Prerequisite: introductory statistics course. Offered: Sp.

**T C 517 Usability Testing (3)**

*Ramey* Discusses the human-computer interface (HCI) as the communicative aspect of a computer system. Analyzes

usability issues in HCI design, explores design-phase methods of predictability, and introduces evaluative methods of usability testing. Prerequisite: substantial experience with computers and graduate standing, or permission of instructor. Offered: W.

**T C 520 Technical Communication Management (3)**

Emphasizes the role and function of communication as a key to understanding organizational frameworks and managerial practices. Traditional and innovative approaches to viewing and managing technical communication. Roles, responsibilities, impact of technology. Prerequisite: T C graduate standing or permission of instructor. Offered: Sp.

**T C 521 Seminar: Current Issues in Technical Communication (1-2, max. 3)**

Presentations on current issues in technical communication. Credit/no credit only. Prerequisite: T C graduate student status or permission of instructor. Offered: AWSpS.

**T C 525 Assessing Communications Technologies (3)**

*Bereano* Analysis of development, deployment of new communication technologies; emphasis on public policy issues they present (e.g., videotelephone, mobile telephoning, hypermedia, electronic message transfer, virtual reality). Impacts explored include: access, privacy, civil liberties; power of elites; changes in social organization. Prerequisite: T C 425 or other background in policy analysis, technology, and society. Offered: even years; Sp.

**T C 536 Advanced Technical Japanese 1 (4)**

*Kato, Tsutsui* Focuses on reading and oral/aural skills in technical Japanese. Develops advanced reading skills, technical vocabulary in the student's specialty, and skills for technical presentation, discussion, and presentation comprehension. Lab work is required for oral communication and vocabulary building. Prerequisite: T C 532. Offered: W.

**T C 537 Advanced Technical Japanese 2 (4)**

*Kato, Tsutsui* Focuses on reading and oral/aural skills in technical Japanese. Further development of advanced reading skills, technical vocabulary in the student's specialty, and skills for technical presentation, discussion, and presentation comprehension. Introduction of in technical translation from Japanese to English. Lab work is required. Prerequisite: T C 536. Offered: Sp.

**T C 540 SciTech Writing Practicum I (4)**

*Illman* An advanced experience in science and engineering news writing for graduate students and upper division undergraduates. Participants serve as science writing interns on the staff of Northwest Science & Technology magazine and develop a portfolio of professional quality science/technology news articles which may be eligible for publication in the magazine. Prerequisite: T C 498 or permission of instructor. Offered: W.

**T C 597 Approaches to Teaching Technical Communication (1-2, max. 2)**

*Plumb* Readings in pedagogical theory of technical communication and discussion of practical applications. Credit/no credit only. Prerequisite: concurrent teaching appointment or permission of instructor. Offered: AWSpS.

**T C 598 Special Topics (1-5, max. 6)**

Prerequisite: permission of instructor.

**T C 599 Special Projects (1-5, max. 5)**

Written report required. Prerequisite: permission of graduate adviser or committee chair. Offered: AWSpS.

**T C 600 Independent Study or Research (\*)**

Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

**T C 601 Internship (2-10, max. 10)**

Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

**T C 700 Master's Thesis (\*)**

Prerequisite: permission of thesis adviser. Offered: AWSpS.

# College of Forest Resources

## Dean

David B. Thorud  
107 Anderson

## Associate Dean for Academic Affairs

Gordon A. Bradley  
123G Anderson

## Associate Dean for External Initiatives

Bruce R. Lipkke  
123J Anderson



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/College\\_Forest\\_Res.html](http://www.washington.edu/students/genecat/academic/College_Forest_Res.html)



College Web page:  
[www.cfr.washington.edu](http://www.cfr.washington.edu)

Founded in 1907, when professional forestry education was in its infancy, the College holds a position of national and international leadership in both instruction and research. Its location in one of the world's largest forest regions provides unique opportunities for field classes and research, experience in the management of forested lands for multiple uses, exposure to wood-based industries, and awareness of resource-use issues. Enrolled in the College are approximately 300 undergraduate and 180 graduate students, taught by more than 50 faculty members. Thus, students enjoy small classes and close association with faculty, as well as the diversity and superior facilities of a large research university.

The College of Forest Resources is dedicated to generating and disseminating knowledge for the stewardship of natural and managed environments and the use of their products and services through teaching, research, and professional and public outreach. Its vision is to be pre-eminent in teaching and advancing the frontiers of knowledge in integrated resource stewardship and utilization in natural and managed environments.

The College's goals are (1) to provide students with a premier educational and training experience in integrated natural resource management, utilization, environmental sciences, and stewardship; and (2) in a timely and efficient manner, to develop and deliver the following to the public and the professions throughout the state, region, and world:

- educational information related to the College's mission, and
- findings from the College's applied and basic research programs.

## College Facilities

The College occupies three central campus buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. In addition, the Center for Urban Horticulture is located in an east campus building complex. Overall, the College has excellent areas and equipment on the Seattle campus for scientific laboratories, classrooms, seminar rooms, special collections, and administrative offices.

The Forest Resources Library, a separate branch of the University of Washington Libraries, contains more than 50,000 books, reports, conference proceedings, and

bound journal volumes, and subscribes to more than 1,100 active journals. Disciplines covered by the collection support the programs of the College, including forestry and silviculture, forest products, forest engineering, soils, wildlife, wildland conservation, paper sciences, and urban forestry. The Forest Resources Library provides a gateway to the larger University Libraries collection of more than five-million volumes through the systemwide electronic catalog, and provides access to numerous electronic and print indices as well as Internet resources. The library is located in Bloedel Hall.

The Center for Urban Horticulture also maintains a library that serves students, faculty, landscape professionals, and the public. The Center's herbarium supports forest resources students' fieldwork in urban horticulture, restoration ecology, and dendrology. Containing representative plant material from all parts of the United States, the collection includes dried, mounted specimens of shrubs, hardwood trees, and conifers. Another herbarium, complete in plants native to the Pacific Northwest and maintained by the Department of Botany, is available for use by forest resources students.

The laboratory facilities of the College represent an extensive array of modern equipment for research. The many available research tools include optical equipment, electronic instrumentation for a wide variety of uses, gas chromatographs, spectrophotometers, and physical-test equipment. Specific laboratories are designed to study soil chemistry and soil physics, hydrology, polymer chemistry, tree physiology, genetics, wood and extractives chemistry, physics of fibrous composites, applied mechanics, wood process technology, silviculture, ecology, paleoecology, pathology, entomology, wildlife, horticultural physiology, and horticultural plant materials.

The College computing facilities include microcomputer systems dedicated to specific research areas, a microcomputer student laboratory, a geographical information systems (GIS) laboratory, and several servers offering access to the Internet and shared printers.

## Office of Student Services

### Manager, Student Services

Michelle M. Trudeau  
130 Anderson  
[cfradv@u.washington.edu](mailto:cfradv@u.washington.edu)

The Office of Student Services in the College of Forest Resources assists prospective undergraduate and graduate students with admission to the College and advises current students, including interpretation of College and University requirements and assistance in course registration to meet graduation requirements. Faculty advisers are available to assist students in choosing elective courses to help them build an appropriate academic background for their chosen professional specialty.

The Office of Student Services keeps job listings and employer resources to help students obtain summer employment and internships while in school, and permanent employment upon graduation. The office also sponsors a career fair every year. Summer work may be available through federal and state agencies and in the numerous private companies associated with the wood-using industry of the region. Although field experience is not required for graduation, students are strongly urged to seek summer employment or field experience relevant to their major and career goals.

The College has a strong scholarship and financial assistance program. Through the generous donations of alumni and friends, the College has established scholarships, fellowships, and loan programs to assist students in paying for their tuition. Information on all College scholarships is available through the Office of Student Services, 116 Anderson.

Students seeking information about financial aid offered outside the College should contact the Office of Student Financial Aid, 105 Schmitz.

## Institute of Forest Resources

### Director

David B. Thorud  
107 Anderson

### Associate Director

Gordon A. Bradley  
123G Anderson

The overall research program of the College is administered by the Institute of Forest Resources. Because of the size and complexity of this program, the institute assumes a broad scope of responsibility and provides vital support to the College administration, faculty, staff, and students. Major functions include administering all research projects funded by federal, state, and private agencies, monitoring the McIntire-Stennis research program, ensuring College compliance with federal reporting requirements, and producing College publications and special research reports.

Institute staff coordinate and facilitate the submission of research proposals for the faculty with the University administration and numerous funding agencies. Students earn research and thesis credit toward advanced degrees by working on major forest resources problems supported by grants or contracts.

Areas of current and future research cover a broad array of topics including forest policy analysis, stand management, streamside and riparian zone management, forest ecosystem analysis, international trade in forest products, forest-products marketing, forest biotechnology, wildlife science, forest soils, urban horticulture, forest engineering and hydrology, and paper science and engineering. Research projects include studies by individual faculty, as well as interdisciplinary programs, which combine the interests of College faculty with those from other academic units of the University and other institutions.

The College also collaborates with Cooperative Extension of Washington State University to undertake and promote continuing education for citizens of the state, particularly in the nonindustrial forestry area.

The Institute Publications Office provides a wide range of services in producing College research publications: technical editing, desktop-publishing systems, format and layout design, computer graphics, printing/publishing coordination, and distribution. College publications are distributed to national and international institutions and libraries, as well as to forestry professionals, to organizations in the private sector, and to the general public.

## Field Research Areas and Facilities

The College field facilities include two major forested areas covering more than 4,000 acres, an arboretum, a reserve, and several cooperative research centers and stations. These lands offer a wide variety of terrestrial and aquatic characteristics favorable to a full range of scientific investigations. They also provide a general natural-science laboratory for the many disciplines in the College specifically related to, or concerned with, the research and teaching of natural resources behavioral patterns and management.

The Charles Lathrop Pack Experimental Forest of approximately 4,200 acres is located 65 miles south of the University, near Eatonville. This forested property is the focal point for on-the-ground academic work in forest management, resource science, and forest engineering, both at the undergraduate and graduate levels. Broad forest and soil diversity has led to extensive biological, management, and engineering research, much of which may be characterized as a pioneering

effort. A full-time resident staff manages this facility, harmonizing its public-education objectives with academic and research objectives. Rustic but comfortable facilities which provide housing and support to academic and research programs are also used extensively for conferences both within and outside the University.

The Olympic Natural Resources Center (ONRC) is a 19,000-square-foot research and education facility located on the west side of the Olympic Peninsula. The mission of the Center is to conduct research and education on natural-resources management practices which integrate ecological and economic values. Innovative management methods that integrate environmental and economic interests into pragmatic management of forest and ocean resources are demonstrated. A forest management program as well as a marine program are in place to study the relationship between the terrestrial and marine environment.

The Lee Memorial Forest, approximately 160 acres, is located about 22 miles northeast of the University, near Maltby. This forested property provides valuable academic and research opportunities near the campus. Characterized by forest types and soils common to western Washington lowlands, Lee Forest is used extensively for part-day trips and for long-term research and demonstration projects especially related to changing land uses.

The Allan H. Thompson Research Center and the Joe E. Monahan Findley Lake Reserve and Research Area in the Cedar River watershed are utilized by the College in cooperation with Seattle Public Utilities for studies in forest physiology and mineral cycling in the forest ecosystem.

The Center for Urban Horticulture has offices, laboratories, public-education resources, and field sites for teaching and experimentation along the shore of Union Bay. Its 10-acre Union Bay Gardens, for research, teaching, and display, currently emphasize unusual ornamental and native woody landscape plants. The 60-acre Union Bay Natural Area, a former dumpsite now a naturalized habitat, is used by classes in four different colleges and the public to study principles and practices of restoration ecology. The Douglas Research Conservatory is a modern plant-growing facility with greenhouses, growth chambers, nursery, and classrooms. The Otis Douglas Hyde Hortorium is an herbarium dedicated to plants of urban horticultural significance. The Elisabeth C. Miller Horticultural Library is the Northwest's foremost public horticultural library, with books, journals, and other materials available to the gardening public, students, and professional horticulturists. The Center also conducts courses, lectures, and special events for the public and professionals as part of the College's Continuing and Public Education program. Cooperative programs are in place with Washington State University/King County Cooperative Extension, whose horticulture program is housed at the Center.

The Center's largest facility is the Washington Park Arboretum, a 230-acre collection of trees and shrubs growing in a naturalistic setting on the south shore of Lake Washington. Managed in cooperation with the City of Seattle Department of Parks and Recreation and the Arboretum Foundation, the arboretum contains some 5,200 different kinds of woody plants that are available for research and academic study, making it the third most diverse arboretum in the United States. Displays and programs educate students and visitors about woody plants' diversity, natural ecology, and urban landscape use, as well as conserving endangered natural and cultivated plants. Classes in botany, dendrology, horticulture, wildlife, and landscape architecture make use of the collections, while the grounds are used for studies in soil science, ecology, and various research projects, including many independent student projects. The arboretum, established in 1934, also serves as an important public-service area to the University, offering numerous formal and infor-

mal classes for the general public and, in addition, serving the community as a public park and open space.

### Summer Opportunities

During summer quarter, there are many internships and independent study courses in which a student may get credit for summer work.

In late summer, there is a four-week intensive program that combines work and study in Pacific Northwest forests with the study of English as an international language for forestry. The College and the Department of English As A Second Language schedule the program.

For more information, contact Aaron Bidelsbach, UW Educational Outreach, (206) 543-2300.

## Ecosystem Sciences Division

### Chair

Thomas M. Hinckley  
204 Winkenwerder

Courses included in the Ecosystem Sciences Division cover basic and applied subject matters in forest biology, wildlife science, and urban horticulture. Urban horticulture is concerned with the selection, management, and role of plants and ecosystems in urban environments. Subjects covered include plant and animal ecology, wildlife biology and conservation, dendrology and autecology, soils, ecosystem analysis, environmental horticulture, public horticulture, and urban forestry.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees include ecosystem analysis (ecology, tree physiology and genetics, and soils and mineral cycling), wildlife science, and urban horticulture. A Master of Forest Resources degree in urban horticulture is also available.

## Management and Engineering Division

### Chair

Richard R. Gustafson  
332 Bloedel

Courses for which the Management and Engineering Division is responsible deal with all the facets of the forest resources arena, from management of forests to the production and recycling of paper products. Multiple uses of forests including timber, water, wildlife habitat, and recreation are embraced in the forest management curriculum. Courses in the forest engineering curriculum emphasize the scientific and engineering design principles that enable graduates to find technical solutions to problems facing forest-related enterprises and rural communities. Paper science and engineering courses provide students with the skills to work as technical and management professionals in the paper and allied industries.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are offered by this division and include social sciences, forest economics, forest engineering/hydrology, forest products marketing, silviculture and forest protection, quantitative resources management, and paper science and engineering. A practice-oriented degree leading to the Master of Forest Resources in the area of silviculture is also available.

## Graduate Programs

Graduate Program Coordinator  
123G Anderson, Box 352100  
(206) 685-0881  
cfradv@u.washington.edu

Graduate programs in forest resources are designed to accommodate a wide range of education and career objectives. A student may concentrate on development of advanced professional skills and knowledge or on exploration of sciences basic to forest resources.

Graduate programs offered in forest resources lead to the degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy. Graduate students may center their graduate study in one of the special fields of study within the College divisions.

### Master of Forest Resources

The Master of Forest Resources degree is a professional degree offered for students who wish to acquire a greater competence in a specific subject area of forest resources. This is a non-thesis option open to professionals who are returning to study and to obtain expertise in areas such as silviculture and urban horticulture. Interested persons should contact the graduate program coordinator to determine eligibility for this degree program.

### Master of Science

The Master of Science degree is a learned degree, often precursory to the Doctor of Philosophy degree. Some areas of study allow non-thesis work while most areas of study require the completion of a thesis. The non-thesis program requires at least 6 credits of research; the thesis program requires a minimum of 9 credits of research. A foreign language is not required. Students must complete a set of core courses prescribed for the major area of study.

### Doctor of Philosophy

The Doctor of Philosophy degree may be preceded by education in either forest resources or another discipline. The program comprises an appropriate selection of core courses in forest resources and in the related natural and social sciences. The program requires passage of the General Examination in forest resources; research, analysis, and interpretation; and completion of a dissertation. A minimum of two years of residence at the UW also is required. The time necessary to complete the degree requirements depends upon the thoroughness and applicability of prior course work. Reading proficiency in one foreign language may be required by the supervisory committee when the language is essential to the student's program of study.

### Mid-Career Education

The College has established the National Resources Institute, a certificate program in natural resources to provide mid-career education for professionals. Participants in the mid-career program take courses to prepare themselves for new or broader responsibilities in their current career. In this certificate program, courses can be taught in a more flexible time arrangement to meet the specific career and scheduling needs of participants. Additionally, a variety of programs are offered to enhance professional education in natural resources. Interested natural resources and forest products professionals should contact the College of Forest Resources Continuing Education Office, (206) 543-0867, fax (206) 685-6705.

### Graduate Areas

Graduate education is offered through the Division of Management and Engineering and the Division of Ecosystem Science, Horticulture and Conservation. Major areas of study and emphasis include paper science

and engineering (wood chemistry, polymer and fiber science); forest engineering/hydrology; forest products marketing; forest economics; forest ecosystem analysis (forest ecosystems, forest ecology, forest genetics, biotechnology, streamside/riparian management, tree physiology, and forest soils); quantitative resources management (biometry, quantitative management, aerial photogrammetry/remote sensing); silviculture and forest protection (silviculture, forest entomology, fire management, forest pathology); social sciences (forest land use planning, forest policy and law, forest sociology and leisure studies); wildlife science; and urban horticulture (environmental horticulture, horticultural taxonomy, horticultural physiology, wetlands management).

In all areas of study, the College maintains a close working relationship with faculties of other colleges and schools throughout the University, including service on graduate committees. Faculty advisers assist graduate students in determining those courses in other departments on campus which will lend to students' intended areas of expertise.

### Admission Qualifications, Background

A student who intends to work toward an advanced degree must apply for admission to the Graduate School and must meet the requirements set forth by the Graduate School and by the College of Forest Resources.

Basic requirements for admission to the Graduate School are a baccalaureate degree from an institution of recognized standing, a minimum GPA of 3.00 in the junior and senior years of college work, approval of the Dean of the Graduate School, and approval of the faculty of the College. An applicant may obtain a graduate admission form and supplemental admission and reference forms from the College of Forest Resources Office of Student Services, 116 Anderson, (206) 543-7081, cfradv@u.washington.edu.

The Graduate Record Examination (GRE) general test is required by the College, and test scores must be submitted to the College by the applicant. Students interested in forest-products marketing may take the Graduate Management Admission Test (GMAT) or the GRE.

In addition, international students are required to take the Test of English as a Foreign Language (TOEFL). International students hoping to obtain teaching assistantships must also complete the Test of Spoken English (TSE). Please refer to the Graduate School section for minimum scores and exceptions.

Upon enrollment, the student is assigned a graduate program committee that is responsible for guidance in the early stages of the graduate program, to be followed by more formal committees as the student's program develops.

Applicants for the College are considered quarterly within the enrollment limitations for the College and the available faculty and workload limitations within the specific program area of study selected. Students with both undergraduate forestry degrees and other related fields are considered, although a prior forestry degree is normally expected of applicants for the professional Master of Forest Resources degree in silviculture.

### Financial Aid

The College has available a limited number of appointments for teaching and research assistantships. Teaching and research responsibilities allow time to pursue a full academic load. Students may contact faculty about research assistantships or the Office of Student Services about teaching assistantships.

Fellowships and scholarships without teaching or research obligations are also available. Requests for financial aid must be submitted by February 1 for priority consideration for the following academic year.

Applications are in the College's admissions packet which may be requested from the Office of Student Services.

## Teaching and Research Centers

### Center for International Trade in Forest Products

#### Director

Bruce R. Lippke  
123J Anderson

The Center for International Trade in Forest Products (CINTRAFOR) was established in 1984 to respond to opportunities and problems relating to the export and import of wood products. Through programs of research, education, and outreach, CINTRAFOR works to improve knowledge of export trade and to train professionals competent in the analysis and interpretation of trade problems, issues, and policies. The Center serves as a focal point for dissemination of information on world trade in forest products by means of seminars, conferences, workshops, and publications.

CINTRAFOR activities involve the cooperative effort of the forest-products industry, state and federal organizations, and other organizations at the University such as the School of Business Administration and the Northwest Policy Center. The research undertaken by CINTRAFOR includes country-market analyses; a global competitive-trade model; new product and market opportunities; and studies of the linkage between forest-products trade and environmental impacts, regional socioeconomic stability, and policy impact analyses.

Students interested in participating in specific research activities sponsored by CINTRAFOR may enroll for study in graduate programs in one of the College's two academic divisions or in programs offered by other academic divisions on campus.

### Center for Streamside Studies

#### Director

Susan M. Bolton  
244 Bloedel

The Center for Streamside Studies (CSS) was established in 1987 as a joint effort of the College of Forest Resources, the College of Ocean and Fishery Sciences, and the Center for Quantitative Science in Forestry, Fisheries, and Wildlife. CSS provides information for the resolution of management issues related to the production and protection of forest, fish, wildlife, and water resources associated with the streams and rivers in the Pacific Northwest.

The Center conducts research activities related to the understanding of ecological and physical processes and their relation to governmental regulations. Projects are solution-oriented, centering around biological, physical, and social aspects of management issues. Cooperative projects are undertaken with state and federal agencies, tribes, private industry, and national and international research institutions, and involve faculty and students of the College of Forest Resources, the College of Ocean and Fishery Sciences, the College of Engineering, and the College of Arts and Sciences.

To provide interdisciplinary training necessary to deal with the management of interacting resources, CSS conducts symposia, workshops, conferences, and seminar series as forums for resource-conflict discussion and resolution. Students interested in participating in specific research activities sponsored by CSS may enroll for study in graduate programs in one of the College of Forest Resources' two academic divisions or in programs offered by other academic units on campus.

## Olympic Natural Resources Center

#### Director

John M. Calhoun

The mission of the Olympic Natural Resources Center (ONRC) is to conduct research and education on natural-resource-management practices that integrate ecological and economic values. Created by the Washington State Legislature in 1989, the Center conducts biological, physical, economic, and social-science research in both terrestrial and coastal/marine systems, focusing on its strategic priorities. The Center's programs aimed at pragmatic management solutions span a spectrum from developing new knowledge through applied research to education and outreach.

Much of the Center's work is conducted cooperatively with other research institutions, state and federal agencies, resource owners, and interest groups. The Center is housed in facilities at Forks, Washington, on the Olympic Peninsula. It is well suited for education, research, and conference activities. The natural resources of the area are a major focus of the work of the Center. The Center is jointly administered by the College of Forest Resources and the College of Ocean and Fishery Sciences.

## Center for Urban Horticulture

#### Acting Director

Thomas Hinckley  
204 Winkenwerder

The Center for Urban Horticulture is dedicated to research, teaching, and public service concerning the selection, management, and role of plants and of ecosystems in urban landscapes. Urban landscapes—landscapes that are subject to direct impacts of human activity—include city streets, urban parks, public gardens, residential areas, and natural (and naturalized) areas bounded by commercial and residential development. Urban horticulture concerns those landscapes as they are used for aesthetic amenity, for amelioration and control of the physical environment, for public and professional education, for conservation of biodiversity and of natural resources, and for public recreation.

Faculty in four colleges—Forest Resources, Arts and Sciences, Architecture and Urban Planning, and Engineering—are affiliated formally and informally with the Center, participating in urban horticultural research, teaching, and collections curation. The Center serves as a primary focus of the UW's curricula in urban environmental studies, which comprise the most comprehensive program in the United States.

## Faculty

### Professors

Agee, James K. \* 1982; PhD, 1973, University of California (Berkeley); management of natural systems, forest ecology, fire ecology.

Allan, G. Graham \* 1966; PhD, 1956, University of Glasgow (UK); DSc, 1971, University of Strathclyde (UK); fiber and polymer science, creativity and innovation.

Ammirati, Joseph F. \* 1979, (Adjunct); MA, 1967, San Francisco State; PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.

Bare, B. Bruce \* 1969; MS, 1965, University of Minnesota; PhD, 1969, Purdue University; forest land management, valuation, taxation, management science.

Bradley, Gordon A. \* 1972; PhD, 1986, University of Michigan; forest land use planning, conservation area planning, urban forestry.

- Briggs, David G. \* 1973; PhD, 1980, University of Washington; operations research, forest products and wood science, wood quality, life-cycle analysis.
- Brubaker, Linda B. \* 1973; PhD, 1973, University of Michigan; dendrochronology, forest ecology, quaternary paleoecology.
- Bryant, Benjamin S. \* 1949, (Emeritus); DF, 1951, Yale University; wood utilization technology, wood gluing, plywood and board technology.
- Cole, Dale W. \* 1958, (Emeritus); MS, 1957, University of Wisconsin; PhD, 1963, University of Washington; mineral cycling in forest ecosystems, forest soils.
- Conquest, Loveday L. \* 1976, (Adjunct); PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.
- Dowdle, Barney \* 1962, (Emeritus); PhD, 1962, Yale University; markets for timber and forest products, public forest land management.
- Driver, Charles H. \* 1965, (Emeritus); PhD, 1954, Louisiana State University; processes of wood decay, forest diseases, range ecology.
- Edmonds, Robert L. \* 1973; PhD, 1971, University of Washington; forest soil microbiology, biology of forest diseases, aerobiology.
- Edwards, John S. \* 1967, (Adjunct); PhD, 1960, Cambridge University (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology.
- Erickson, Harvey D. 1947, (Emeritus); PhD, 1937, University of Minnesota; wood science and technology.
- Ford, E. David \* 1985; PhD, 1968, University College, London (UK); forest ecology and ecophysiology, crop growth, quantitative methods, philosophy of science.
- Franklin, Jerry F. \* 1986; PhD, 1966, Washington State University; forest ecosystem analysis, vegetation patterns, tree mortality in natural landscapes.
- Fridley, James \* 1988; PhD, 1984, University of Washington; precision forestry, forest engineering systems design, interactive computer simulation.
- Fritschen, Leo J. \* 1966, (Emeritus); PhD, 1960, Iowa State University; biometeorology, micrometeorology, measurement and instrumentation of the environment.
- Gara, Robert I. \* 1968; PhD, 1964, Oregon State University; bark beetle ecology, forest insect behavior, international forestry.
- Gordon, Milton \* 1959; PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants, sequence of agrobacteria.
- Greulich, Francis E. \* 1977; PhD, 1976, University of California (Berkeley); management science, statistics, operations research.
- Gustafson, Richard Roy \* 1986; PhD, 1982, University of Washington; process modeling and optimization, fiber composites.
- Hanley, Donald P. \* 1983; PhD, 1981, University of Idaho; extension forestry, small-forest management, forestry continuing education.
- Hatheway, William H. \* 1969, (Emeritus); PhD, 1956, Harvard University; quantitative ecology, physiological ecology, tropical forestry.
- Hinckley, Thomas M. \* 1980; PhD, 1971, University of Washington; forest tree physiology and autecology, subalpine ecosystems, water stress problems.
- Hrutford, Bjorn F. \* 1959, (Emeritus); PhD, 1959, University of North Carolina; wood extractive chemicals, air and water quality in forest products industries.
- Johnson, Jay A. \* 1983; PhD, 1973, University of Washington; mechanical and physical properties of wood and wood composite materials, wood quality.
- Jorgensen, Jens E. \* 1973, (Adjunct); DSc, 1969, Massachusetts Institute of Technology; systems analysis, automation, design, manufacturing, forest engineering.
- Lee, Robert G. \* 1978; PhD, 1973, University of California (Berkeley); natural resource sociology, forestry institutions, forest stewardship, environmental ethics.
- Loney, Lawrence \* 1960, (Emeritus); PhD, 1960, State College of Forestry At Syracuse; wood anatomy, micro-techniques, machining wood, photomicrography, seasoning and preservation of wood.
- Leopold, Estella B. \* 1976, (Adjunct); PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environment.
- Lettenmaier, Dennis P. \* 1973, (Adjunct); PhD, 1975, University of Washington; systems analysis and water resources planning.
- Lippke, Bruce R. \* 1990; MSEE, 1959, New Mexico State University; MSIE, 1966, University of California (Berkeley); international trade and environmental linkages, investment analysis, economics of forest industry.
- Manuwal, David \* 1972; PhD, 1962, University of California (Los Angeles); avian ecology, effects of forest management on birds.
- McCarthy, Joseph L. \* 1941, (Emeritus); PhD, 1938, McGill University (Canada); thermodynamics, lignin and cellulose, chemistry, pulp and paper science, biochemical engineering.
- McKean, William T. \* 1979; PhD, 1968, University of Washington; pulp and paper science, chemical engineering.
- Naiman, Robert J. \* 1988; PhD, 1974, Arizona State University; forest stream ecosystems, aquatic landscape dynamics.
- Oliver, Chadwick D. \* 1975; PhD, 1975, Yale University; silviculture and forest ecology, culture of single- and mixed-species forest stands.
- Peterson, David L. \* 1989; PhD, 1980, University of Illinois; mountain ecology, climatic change, environmental stress on tree growth and forest ecosystems.
- Pickford, Stewart G. \* 1976; PhD, 1972, University of Washington; forest fire science, wildland fire management.
- Richey, Jeffrey E. \* 1973; PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.
- Ricker, Neil L. \* 1978, (Adjunct); MS, 1972, PhD, 1978, University of California (Berkeley); process control and optimization.
- Schiess, Peter \* 1975; PhD, 1975, University of Washington; forest engineering, mechanical harvest operations, forest road design and construction.
- Schreuder, Gerard Fritz \* 1971; PhD, 1968, Yale University; statistical analysis in resource economics, international forestry, trade, aerial photos.
- Scott, David R. M. \* 1955, (Emeritus); PhD, 1950, Yale University; silviculture, forest ecology.
- Sharpe, Grant William \* 1966, (Emeritus); PhD, 1956, University of Washington; wildland recreation, interpretation and management of recreation areas.
- Skalski, John R. \* 1987, (Adjunct); PhD, 1985, Cornell University; environmental sampling and effects assessment on wild populations, parameter estimation.
- Sprugel, Douglas George \* 1984; PhD, 1974, Yale University; community and ecosystem ecology, tree ecophysiology, disturbance ecology, paleoecology.
- Stenzel, George 1949, (Emeritus); MF, 1939, Yale University; forest resources.
- Stettler, Reinhard F. \* 1963, (Emeritus); PhD, 1963, University of California (Berkeley); genetics of forest tree populations, biotechnology, biomass production.
- Strand, Stuart E. \* 1982, (Research); PhD, 1982, Pennsylvania State University; forest biotechnology, environmental pollution control.
- Taber, Richard D. \* 1968, (Emeritus); PhD, 1951, University of California (Berkeley); wildlife science.
- Thorud, David B. \* 1981; MS, 1960, PhD, 1964, University of Minnesota; watershed management, international forest policy and development.
- Tukey, Harold B. \* 1980, (Emeritus); PhD, 1958, Michigan State University; urban horticulture, horticultural physiology.
- Wagar, John Alan \* 1988, (Research); PhD, 1961, University of Michigan; urban forestry, urban forest inventory and cost-effective management.
- Waggener, Thomas R. \* 1969; PhD, 1966, University of Washington; policy and economics, regional impact analysis, marketing and international trade in forest products.
- Wissmar, Robert C. \* 1972; PhD, 1972, University of Idaho; ecology.
- Wott, John A. \* 1981; PhD, 1968, Cornell University; urban horticulture, public programs in horticulture, public gardens, arboreta.

### Associate Professors

- Bolton, Susan M. \* 1992; PhD, 1991, New Mexico State University; hydrology, watershed management.
- Booth, Derek B. \* 1980, (Adjunct Research); PhD, 1984, University of Washington; geomorphology, environmental geology.
- Bradshaw, Harvey D. \* 1984, (Research); PhD, 1984, Louisiana State University; plant molecular biology and genetic modification of poplars.
- Chalker-Scott, Linda \* 1997; PhD, 1988, Oregon State University; plant selection, plant management, urban ecology, plant stress physiology.
- Eastin, Ivan \* 1987; PhD, 1992, University of Washington; marketing strategies, international trade, material substitution, lesser-used tropical hardwoods.
- Ewing, Kern \* 1990; PhD, 1982, University of Washington; wetland plant ecology, urban ecology, ecosystem management.
- Ganter, Mark \* 1986, (Adjunct); PhD, 1985, University of Wisconsin; solid modeling, computer graphics, kinematics and automated manufacturing.
- Grue, Christian E. \* 1989, (Adjunct); PhD, 1977, Texas A&M University; wildlife toxicology, wildlife and fisheries science.
- Halpern, Charles \* 1991, (Research); PhD, 1987, Oregon State University; plant community ecology, plant succession, montane/subalpine meadow ecology.
- Hamilton, Clement Wilson \* 1985, (Affiliate); PhD, 1985, Washington University; landscape plant selection, taxonomy of horticultural and tropical plants.
- Harrison, Robert B. \* 1987; PhD, 1985, Auburn University; forest soil chemistry and fertility, long-term productivity, carbon sequestration.
- Henry, Charles L. \* 1982, (Research); PhD, 1989, University of Washington; sustainable resource sciences, recycling organic wastes as soil amendments.
- Hodgson, Kevin T. \* 1991; PhD, 1986, University of Washington; surface and colloid science, papermaking chemistry, secondary fiber recycling.
- Horner, Richard R. \* 1981, (Adjunct Research); PhD, 1978, University of Washington; wetland and stream conservation and storm water management.
- Marzluff, John M. \* 1997; PhD, 1987, Northern Arizona University; behavior, ecology, and conservation of birds and mammals.
- Paun, Dorothy Ann \* 1993; PhD, 1993, University of Oregon; paper industry financial analysis, product bundling, international marketing, small diameter timber.

Perez-Garcia, John \* 1990; MS, 1982, Mayaguez (Puerto Rico); DF, 1991, Yale University; forest/natural resource economics, trade modeling and policy analyses, global climate change.

Raedeker, Kenneth J. \* 1981, (Research); PhD, 1979, University of Washington; wildlife biology and conservation, population dynamics.

Robertson, Iain M. \* 1982, (Adjunct); MLA, 1975, University of Pennsylvania; planting design, planning and design of arboreta/botanical gardens, assessment of design education.

Rustagi, Krishna P. \* 1973, (Emeritus); PhD, 1973, Yale University; operations research and statistical applications in resource management, forest inventory.

Vanblaricom, Glenn R. \* 1993, (Adjunct); PhD, 1978, University of California (San Diego); aquatic wildlife, ecology of marine communities, wildlife-fisheries interactions.

West, Stephen D. \* 1979; PhD, 1979, University of California (Berkeley); vertebrate ecology and conservation, mammology.

Zabowski, Darlene \* 1992; PhD, 1988, University of Washington; forest soils and their productivity, soil genesis, biogeochemical cycling of soils.

### Assistant Professors

Edwards, Richard T. \* 1993, (Research); PhD, 1985, University of Georgia; aquatic ecology, biogeochemistry.

Jacobs-Young, Chavonda J. \* 1995; MS, 1992, PhD, 1998, North Carolina State University; integrating biotechnology and pulp processing to improve paper-making efficiency.

Newman, Lee A. \* 1993, (Research); MS, 1989, PhD, 1993, Rutgers University and Robert Wood Johnson Medical School.

Northey, Robert A. \* 1998; PhD, 1985, University of Washington; wood and pulping chemistry.

Ryan, Clare \* 1997; PhD, 1996, University of Michigan; natural resource management, policy, and law; environmental conflict management; water policy.

Turnblom, Eric \* 1994; MSc, 1986, University of British Columbia (Canada); PhD, 1994, University of Minnesota; forest biometrics, growth and yield modeling, quantitative stand dynamics, inventory and sampling.

Wasser, Samuel K. \* 1982, (Adjunct); PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Students taking undergraduate and graduate courses, structured or unstructured, that require field trips, special laboratory supplies, or special material duplications are required to pay appropriate amounts to cover such expenses. If a student fails to pay, the transcript may be withheld and the degree may not be conferred.

**CFR 400 Natural Resource Conflict Management (3) I&S/NW** *Ryan* Introduction to the causes, dynamics, and consequences of natural resource conflicts as well as the range of procedural interventions used to manage conflict. Specific cases of environmental conflict and alternative dispute resolution procedures are examined. Emphasis on developing skills to effectively analyze, manage, and resolve natural resource conflicts. Offered: W.

**CFR 425 Principles of Life Cycle Analysis (3) I&S, NW** *Briggs* Provides students with the basic understanding of the methods and issues associated with measuring the environmental performance of products and processes, with basic understanding of the principles of life cycle analysis methodology. Offered: Sp.

**CFR 429 Seminar in Streamside Studies (1, max. 6)** *Bolton, Sibley* Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Credit/ no credit grading only. Offered: jointly with FISH 429 AWSp.

**CFR 450 Senior Planning Project (3)** *Ford* How to choose a topic, develop a written plan, prepare for field or laboratory work, and write the senior project. Projects may be related to resource management, conservation, urban forestry, or scientific research. Assistance provided in selection of faculty project coordinator. Offered: A.

**CFR 480 Field Studies in Wood Utilization (1)** *Briggs* Students choose 3 of 5 full day field trips offered on alternate Fridays, beginning with the second Friday of the quarter. Visits include sawmills, plywood mills, pulp mills, wood preservers, door/window manufacturers, pallet producers, modular home producers. Field trip fee for transportation expenses. Students are required to bring hard hats and suitable field clothing. Offered: S.

### Courses for Graduates Only

**CFR 500 Graduate Orientation Seminar (1)** Introduction to graduate study. Presentations on College resources and services and current research in each College Division. Division Chairs will share teaching responsibilities. Credit/no credit only. Offered: A.

**CFR 529 Topics in Streamside Studies (1)** Discussion by invited speakers on current research related to streamside studies. Offered: jointly with FISH 529; AWSp.

**CFR 590 Graduate Studies (1-5, max. 5)** Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Offered: AWSpS.

**CFR 591 Seminar in Resource Policy and Management (1)** Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with PB AF 591.

**CFR 592 Environmental Policy Processes (3)** Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with PB AF 590.

**CFR 600 Independent Study or Research (\*)** Offered: AWSpS.

**CFR 700 Master's Thesis (\*)** Offered: AWSpS.

**CFR 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Ecosystem Science and Conservation

**ESC 402 Forest Conservation Biology (5) NW** *Hinckley, Peterson* Management strategies for conserving natural resources are examined in forest ecosystems of the Pacific Northwest and other North American bioregions. Alternative approaches to pro-

ducing and restoring sustainable flows of wildlife habitat, water, fiber, and other resources are examined in the context of forest productivity, biophysical environment, disturbance, and public policy. Offered: Sp.

**ESC 410 Forest Soils and Site Productivity (5) NW** *Harrison* Considers unique properties and processes occurring in forest soils throughout the world with emphasis on soils of Pacific Northwest and aspects of forest soils that affect productivity. Two all-day Saturday field trips and one Saturday-Sunday field trip required. Recommended: ESC 210. Offered: A; odd years.

**ESC 411 Forest Soil Microbiology (4) NW** *Edmonds* Soil organisms in forest ecosystems, decomposition, nutrient cycling. N transformation, mycorrhizae, effects of forest management. Recommended: ESC 210. Offered: even years; A.

**ESC 412 Field Survey of Wildland Soils (3) NW** *Harrison, Henry, Zabowski* Study of soils in remote sites about which little information is available. Focus is field trip in Cascade Mountains just north of Glacier Peak with prior study of hiking area, soil and ecosystem changes, and wilderness use. Offered: S.

**ESC 413 Soil Genesis and Classification (5) NW** *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and weekend field trip illustrate properties and processes of forest and grassland soils in Washington. Recommended: ESC 210. Offered: Sp.

**ESC 414 Forest Soil Fertility and Chemistry (3) NW** *Harrison* Tree growth depends, in part, on the interaction between chemical and biological activities within a given soil: the biological and chemical parameters that influence the growth; soil solution chemistry and surface reactions; reactions and processes that control essential plant nutrient levels and forms in soil solutions. Recommended: ESC 210. Offered: Sp; even years.

**ESC 416 Introduction to Bioremediation (3) NW** *Brown* Introduces bioremediation as a remediation strategy for contaminated soils and sediments, including in situ remediation with organic residuals, microbial degradation, and phytoremediation. Sources and fate of soil contaminants, conventional remediation strategies, and applications of strategies will be presented. Offered: W.

**ESC 417 Recycling: Ethics, Opportunities, and Realities (3) NW** *Henry* Introductory course on recycling as a current and future way of life in terms of waste management. Introduction to the ways waste is currently managed and discussion of public attitudes and perceptions of waste management and recycling, current and future opportunities for waste management, and true costs of recycling. Offered: W.

**ESC 418 The Science of Composting (3) NW** *Henry* Introduction to composting as a timely tool for waste management. Designed to give an understanding of the science of composting, an overview of the processes from large-scale composting, an understanding of what acceptable contaminant levels are, and an evaluation of the benefits of compost. Offered: W.

**ESC 421 Dendrochronology (4) NW** *Brubaker, Peterson* Analysis of important physiological and environmental factors controlling annual tree-ring growth and a critical review of the applications of tree-ring analysis to study forest productivity, watershed hydrology, forest fires, insect epidemics in relation to yearly weather conditions. Laboratory and field exercises construct tree-ring chronologies to study environmental histories of selected forest stands. Prerequisite: BOTANY 113. Offered: odd years; W.

**ESC 432 Forest Pathology (4) NW** *Edmonds* Ecology and management of forest diseases. Abiotic diseases caused by air pollution, adverse weather, and biotic diseases caused by bacteria, fungi, viruses, parasitic plants, and nematodes. Forest health. Disease management including silvicultural, chemical, and biological control. Disease modeling. Offered: odd years; A.

**ESC 440 Theory and Case Studies of Ecosystem Management (5) NW** *Franklin* Applying ecological principles in ecosystem management at stand and landscape levels based on observations of problems and practices during a 10-12 day field trip held prior to beginning of quarter. Students observe innovative forest management programs and experiments and prepare written and oral scientific analyses of specific topics. Offered: A.

**ESC 441 Landscape Ecology (5) NW** *Franklin* Basic landscape ecology concepts, including patches, corridors, networks, spatial dynamics; island biogeographic principles; landscape analysis methods; landscape models. Applications of landscape ecology in resources management (e.g., cumulative effects, cutting, patterns, anadromous fisheries, management of wildlife populations, and open-space planning). Recommended: ESC 326. Offered: W.

**ESC 445 Ecology of Managed Forests (3)** *Ford* Defines patterns of environmental change and habitat development occurring as forests are managed with different objectives. Particular attention is paid to changing microclimates and how they influence the physical environment and biodiversity. Worldwide occurrence of large-scale, man-made forests is described and their ecological significance. Offered: A.

**ESC 450 Wildlife Ecology and Conservation (5) NW** *West* Covers advanced principles of wildlife ecology such as habitat selection, population viability, and landscape ecology, and illustrates how they apply to wildlife conservation problems with terrestrial, aquatic, and marine wildlife. Students must share costs of field trips. Prerequisite: ESC 350. Offered: W.

**ESC 451 Biology and Conservation of Birds (3) NW** *Manuwal* Major principles of natural history, avian reproductive biology, population ecology, and national and international conservation strategies for both hunted and unhunted birds. Emphasis on western United States. Prerequisite: either BIOL 102, BIOL 202, or BIOL 203, any of which may be taken concurrently. Offered: odd years; A.

**ESC 452 Field Ornithology (3) NW** *Manuwal* Students learn field identification skills and are introduced to field methodologies through required indoor labs, field trips, and field exercises. Exercises include study of survey techniques, feeding ecology, and behavior. Students are required to share field trip costs. Prerequisite: either BIOL 102, BIOL 202, or BIOL 203, any of which may be taken concurrently. Offered: odd years; A.

**ESC 453 Biology and Conservation of Mammals (5) NW** *West* Introduction to mammalian evolution, morphology, reproduction, population biology, ecology, and conservation. Lectures address mammals worldwide. Laboratories and fieldwork focus on mammals of Pacific Northwest. Laboratories and two weekend field trips required. Students share travel costs. Prerequisite: ESC 350. Offered: even years; A.

**ESC 454 Aquatic Wildlife Ecology (3) NW** *VanBlaricom, West, Manuwal, Grue* Conceptual examination of relationships of aquatic wildlife populations (mammals, birds, reptiles, amphibians) to one another and to the aquatic realm. Application of conceptual background to contemporary high-profile issues in aquatic wildlife ecology, conservation, and management. Included is exposure to primary technical literature in the field. Offered: jointly with FISH 454; even years; Sp.

**ESC 455 Wildlife Seminar (1, max. 4) NW** *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Credit/no credit only. Prerequisite: ESC 350. Offered: AW.

**ESC 456 Dynamics of Managed Wildlife Populations (3) NW** *Raedeke* Advanced principles of managed wildlife populations dynamics. Application of harvest management models and regulations applied to ungulates, upland game birds, waterfowl, furbearers, carnivores. Topics include population models, compensatory mortality, predation role, sustained yield harvest models, measured populations characteristics, computer simulation models with emphasis on management issues. Prerequisite: ESC 350. Offered: W.

**ESC 457 Introduction to Wildlife Toxicology (3) NW** Overview of wildlife toxicology: history/development of the field, regulatory framework; methods used to assess risks contaminants pose to wildlife; major classes of contaminants and their direct, sublethal, and indirect effects; and contemporary threats of contaminants to wildlife, their habitats, and prey. Offered: jointly with FISH 455; even years; W.

**ESC 458 Management of Endangered, Threatened, and Sensitive Species (5) NW** *Marzluff* Biological underpinnings and political realities of endangered species management, including: legal issues, recovery teams, citizen rights, extinction, rarity, proactive management, captive propagation, reintroduction, species endangered in the Pacific Northwest. Students revise endangered species recovery plans. Offered: A.

**ESC 459 Wildlife Conservation in Northwest Ecosystems (3) NW** *Agee, Manuwal, West* Extended field course offers Wildlife Science students personal interactions with wildlife managers and wildlife populations in strategic public and private lands in the northwestern United States and southern Canada. Students will share costs of trip. Offered when there is sufficient student demand. Prerequisite: ESC 350. Offered: Sp.

**ESC 490 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**ESC 491 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**ESC 492 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

**ESC 494 Wildlife Senior Project Proposal (3)** Selection of research topic, literature review, and preparation of a formal research proposal. Students select a faculty advisor or a faculty committee to assist them in the proposal writing process. Prerequisite: ESC 351. Offered: AWSpS.

**ESC 495 Senior Project in Conservation of Wildland Resources (5)** Individual study of an ecosystem science and conservation problem under direction of a faculty member. Generally taken in last year of residence. Offered: AWSpS.

**ESC 496 Wildlife Senior Thesis (5)** Statistical analysis and presentation of research results and discussion of results of the senior research project. Students work with faculty advisors to complete field or laboratory research and then prepare the senior thesis. Prerequisite: ESC 494. Offered: AWSpS.

**ESC 499 Undergraduate Research (1-5, max. 15)** Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

## Courses for Graduates Only

**ESC 501 Forest Ecosystems-Community Ecology (5)** *Brubaker* Community ecology of forest ecosystems. Quantitative methods of community description. Role of limiting factors, competition and disturbance in determining community composition, structure and stability. Introduction to forest ecosystem productivity. History and application of successional theory. Prerequisite: basic ecology course or permission of instructor. Offered: A.

**ESC 507 Soils and Land Use Problems (4)** *Harrison* Environmental concerns of soils; how soil properties control potential and reasonable possibilities of land use. Includes factors controlling soil stability, hydrology, fertility, and movement of pollutants. Field trip oriented with weekly activity summaries. Students also conduct field trips to soil-use problem sites. Offered: W.

**ESC 509 Review of Forest Autecology (4)** *Hinckley* Review of concepts of soil formation, soil fertility, microclimate, hydrology, tree anatomy and morphology, physiology, water relations, mineral nutrition, and genetic and evolutionary mechanisms, as they relate to the adaptation and manipulation of forest-tree populations. For mid-career students only. Offered: A.

**ESC 510 Graduate Studies in Forest Soils (1-5, max. 5)** Offered: AWSpS.

**ESC 511 Advanced Forest Soil Microbiology (5)** *Edmonds* Detailed examination of microbial processes in forest ecosystems; types of organisms, biomass, decomposition and nutrient cycling, microbial transformations of N, impacts of management-clear-cutting, fertilization, pesticide addition. Graduate project required. Prerequisite: general biology, basic soils or permission of instructor. Offered: even years; A.

**ESC 512 Biogeochemical Cycling in Soils and Forest Ecosystems (3)** *Zabowski* Elemental cycles in forests and soils. Fundamentals of processes involved in cycling are addressed along with alterations resulting from environment, vegetation, and soil types. Consideration of cycles of nutrients, metals, and other elements. Weekly discussion section reviews literature on biogeochemical cycling. Prerequisite: one soils course or permission of instructor. Offered: W.

**ESC 513 Advanced Soil Genesis and Classification (5)** *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and field trips illustrate properties and processes of forest and grassland soils in Washington. Requires two weekend field trips and a graduate project. Prerequisite: ESC 210 or permission of instructor. Offered: Sp.

**ESC 514 Advanced Forest Soil Fertility and Chemistry (4)** *Harrison* Chemical properties of soil, nutrient and toxic elements; supply, retention, and loss of nutrients in soils; utilization of geochemical and ecosystem models such as GEOCHEM, MAGIC, TRICLE-DOWN, and ILWAS in developing a quantitative understanding of the chemical function of forest ecosystems. Prerequisite: general chemistry and geology of soils. Offered: Sp; even years.

**ESC 515 Advanced Soil and Plant Analysis (3)** *Harrison* Plants and animals must acquire nutrient elements from their environment. Quantifying the composition of samples is the first step in understanding the processes in natural and manmade systems. Sampling, handling, preparation, storage, and analysis stressed. Prerequisite: one botany or plant science course, instrumental analysis, soils. Offered: Sp.

**ESC 517 Biotransformations of Hazardous Compounds (1)** *Strand* Presentation and discussion of the current literature in biotransformation and biological degradation of organic and inorganic compounds, particularly in the microbial environment. Credit/no credit only. Offered: ASP.

**ESC 518 Microbial Degradation of Toxic Contaminants (3)** *Herwig, Strand* Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with CEE 542/MICROM 518; Sp.

**ESC 520 Graduate Studies in Ecosystem Science (1-5, max. 5)** Offered: AWSpS.

**ESC 521 Current Topics in Ecosystem Science (2, max. 6)** *Brubaker, Franklin, Hinckley* Consideration of current literature and topics in forest ecosystems and tree physiology. Offered: AWSp.

**ESC 529 Ecosystems Seminar (1)** *Sprugel* Discussion by invited speakers on current research related to ecosystems. Credit/no credit only. Offered: A.

**ESC 535 Fire Ecology (3)** *Agee* Fire regime concept as applied to fire ecology. Methodology for fire history research. History and function of forest fire in western United States with emphasis on Pacific Northwest. One weekend field trip. Prerequisite: permission of instructor. Offered: A.

**ESC 538 Graduate Studies in Forest Pathology (1-5, max. 5)** *Edmonds* Offered: AWSpS.

**ESC 547 Stream and River Ecology (5)** *Naiman* Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Recommended: general ecology, forestry-fisheries interactions. Offered: jointly with FISH 547; Sp.

**ESC 548 Special Topics in Streamside Studies (2, max. 6)** *Edwards* Contemporary problems and issues in forestry, fisheries, and wildlife management in watersheds. Topics vary, yet focus on interactions of land and water resources in the forests of the Pacific Northwest. Prerequisite: permission of instructor. Offered: jointly with FISH 548; AW.

**ESC 554 Wildlife Seminar (1-2, max. 10)** *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Prerequisite: permission of instructor. Offered: AW.

**ESC 555 Graduate Studies in Wildlife Science (1-5, max. 5)** *Manuwal, Marzluff, Raedeke, West* Offered: AWSpS.

**ESC 557 Topics in Wildlife Science (2, max. 6)** *West* Graduate seminar on applied and basic topics in wildlife ecology and conservation. Different topics selected each offering. Offered: AWSp.

**ESC 591 Graduate Teaching Practicum (1-5, max. 5)** Principles of teaching and learning applied to undergraduate instruction in Ecosystem Science and Conservation. Development, delivery, and evaluation of lectures and homework assignments. Graduate teaching experience for ESC students only. Credit/no credit only. Offered: AWSp.

**ESC 601 Graduate Internship in Ecosystem Science and Conservation (3-9, max. 9)** Credit/no credit only. Offered: AWSpS.

## Environmental Horticultural and Urban Forestry

**EHUF 401 Urban Forest Management (3) I&S** Explores issues of urban forest benefits, planning, administration, public policy, and career opportunities, utilizing Urban Forestry faculty and leaders of city, county, and state agencies. Emphasizes the urban forest's diverse managers and constituents and their varied responsibilities, values, and resources. Offered: W.

**EHUF 402 Curation and Education in Public Gardens (3) I&S** *Wott* Techniques of curatorial practice relevant to living collections of plants, including documentation, policies, conservation, and display. Aspects of establishing and implementation of a public horticulture program including assessment, program tools and methods, and funding in a public environment. Offered: W.

**EHUF 411 Plant Propagation: Principles, and Practice (3) NW** *Wott* Science and practice of plant propagation including sexual (seed) and asexual (cutting, layering, grafting) propagation. Includes discussion of physiological effects, methodology and laboratory exercises. Wide variety of plants covered. Intended for majors in urban horticulture and urban forestry and others interested in reproducing landscape plants. Offered: Sp.

**EHUF 451 Urban Plant Protection (5) NW** *Gara* Working knowledge on insects and diseases of plants growing in the urban environment. Emphasis placed on pest and damage recognition, control methods, and integrated pest management systems. Offered: Sp.

**EHUF 470 Urban Forest Landscapes (5) NW** *Bradley, Wagar, Wolf* Comprehensive view of urban forest and urban forest landscapes. Includes close examination of factors that differentiate urban forest landscapes along the urban to wildland gradient. Compare legal, social, political, administrative, physical, and biological variations. Offered: SpS.

**EHUF 471 Ecological Concepts and Urban Ecosystems (3) NW** Ecological concepts introduced in an urban context with emphasis on autecological relationships of plants in an urban environment. General framework for development of urban ecological concepts followed by case studies and exploring applications in new areas. Offered: W.

**EHUF 473 Principles of Ecological Restoration (5) NW** *Ewing* Philosophy of restoration, structural components of ecosystem degradation, analysis of restoration projects and methods, and an ecosystem by ecosystem review of how systems are restored. An ecology courses that emphasizes applied scientific knowledge of ecosystems. Recommended: BIOL 472 or BOTANY 354 or BOTANY 371. Offered: W.

**EHUF 475 Wetland Ecology and Management (5) NW** *Ewing, Harrison* Wetland types and functions, global and North American distribution, wetland plant types, soil chemistry. The influence of stresses on wetland composition and form. Autecology of wetland plants; response to and detection of stresses. Impacts of urbanization; management techniques. Recommended: either BIOL 472, BOTANY 354, or BOTANY 371. Offered: A.

**EHUF 478 Horticultural Stress Physiology (3) NW** *Chalker-Scott* Impact of environmental stresses (e.g., temperature, light, moisture, nutrients, allelopathy, salt, ultraviolet) on the performance of horticulture plant species and their subsequent physiological responses. Particular emphasis is given to problems common in urban and restored environments (e.g., pollution, soil compaction, heat). Group and individual projects. Prerequisite: BOTANY 371. Offered: W.

**EHUF 480 Selection and Management of Landscape Plant (5) NW** *Chalker-Scott* Principles of plant selection and management in urban and modified environments. Site analysis and preparation; physiological basis for plant selection; techniques for successful plant installation and aftercare; plant performance evaluation; long-term management and plant health care. Group and individual projects. Prerequisite: ESC 210; BOTANY 110. Offered: A.

**EHUF 481 Field Practicum in Plant Selection and Management (2) NW** *Chalker-Scott* Practical application of plant selection and management in urban and modified environments. Site analysis and preparation; evaluation of nurseries; techniques for successful plant installation and aftercare; plant performance evaluation; plant health care assessment. Group project. Prerequisite: EHUF 480, which may be taken concurrently. Offered: A.

**EHUF 482 Field Practicum in Plant Selection and Management (2) NW** *Chalker-Scott* Practical application of plant selection and management in urban and modified environments. Site analysis and preparation; evaluation of nurseries; techniques for successful plant installation and aftercare; plant performance evaluation; plant health care assessment. Group project. Prerequisite: EHUF 480, which may be taken concurrently. Offered: Sp.

**EHUF 490 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**EHUF 491 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**EHUF 492 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

**EHUF 495 Senior Project in Urban Forestry (5)** Individual study of an urban forestry problem under direction of a faculty member. Offered: AWSpS.

**EHUF 499 Undergraduate Research (1-5, max. 15)** Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

## Courses for Graduates Only

**EHUF 502 Data Collection, Analysis, and Presentation (3)** *Ewing* Design of scientific experiments, collection of data, and use of computers to store, analyze and present data. Limited by equipment availability to 8 students; UH students have priority. Offered: Sp.

**EHUF 503 Current Issues in Urban Horticulture (1)** Critical evaluation and discussion of published research in urban horticulture and restoration. Students and faculty present and discuss research methods and questions from current literature. Offered: AWSp.

**EHUF 531 Seminar in Horticultural Taxonomy and Landscape Plant Selection (1-3, max. 12)** Special topics in horticultural taxonomy (nomenclature and systematics of cultivated plants, evolution of diverse genera and families, methods of analysis) and landscape plant selection (natural ecology and biogeography of landscape plants, plant exploration, introduction and testing). Offered: W.

**EHUF 549 Urban Horticulture Seminar (1, max. 6)** Discussion by invited speakers on current topics in urban horticulture. Credit/no credit only. Offered: A.

**EHUF 561 Public Presentation in Urban Horticulture (2)** *Wott* Students learn to make public presentations in scientific, professional, and popular con-

texts and to interpret technical information for professional and lay audiences. Support materials, such as audiovisuals and graphics are discussed. Offered: W.

**EHUF 572 Urban Ecosystem Management Seminar (1-3, max. 9)** *Ewing* Graduate seminar in urban ecosystem management. Special topics of current importance in urban ecosystem management. Ecological aspects of ecosystem conservation, restoration, and management. Students participate in presentation and discussion of current work. Prerequisite: EHUF 471, EHUF 475. Offered: W.

**EHUF 601 Internship in Urban Horticulture (1-9, max. 9)** Credit/no credit only. Prerequisite: permission of graduate program adviser. Offered: AWSpS.

## Forest Engineering

**F E 404 Forest Engineering Field Seminar (1, max. 6)** *Bolton, Schiess* Forest engineering activities examined and discussed during three all-day site visits. Opportunity for forest engineering practitioners, faculty, and students to interact in an informal, content-rich environment. Offered: AWSp.

**F E 423 Watershed Analysis (4) NW** *Schiess* Inventory and historical analysis of the interactions between natural resources, climate, and forest management. Development of management objectives and design of forest management activities based on inventory and analysis. Includes the use of modeling and simulation in predicting the influence of forest management activities on other resources. Offered: W.

**F E 425 Wildland Hydrology (4) NW** *Bolton* Introduction to the hydrologic cycle and basic hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Offered: W.

**F E 430 Aerial Photos/Remote Sensing Natural Resources (3) NW** *Schreuder* Principles of photogrammetry, interpretation, and remote sensing; and their application to management of natural resources and wildlands. Uses for watersheds, forest resources, wildlife, point and nonpoint pollution, land-use planning, and outdoor recreation. Offered: Asp.

**F E 444 Introduction to Forest Engineering Design (4)** *Schiess* Design process and methodology; decision making; creativity; project planning and management; engineering economics; probabilistic and statistical aspects of forest engineering design; ethical and legal issues; presentation of design project results. Lecture, laboratory, and design projects. Offered: W.

**F E 445 Management Science in Forest Engineering (5)** Management science methods used in data collection, analysis, and decision making examined within a systems framework. Statistical methods of point and interval estimation and regression analysis applied to logging and construction time studies and work sampling. Linear, non-linear, and dynamic programming optimization techniques are applied to forest engineering problems. Offered: W.

**F E 450 Advanced Forest Engineering Design (15)** *Schiess* Capstone design course emphasizes application of forest engineering design principles. State-of-the-art methods and technology used to craft an implementable natural resource development plan. Prerequisite: either 1.7 in F E 341 or 1.7 in F E 346; 1.7 in F E 444. Offered: Sp.

**F E 451 GIS-based Landscape Modeling (5) I&S/NW** *Schiess* Use of GIS to investigate forest operations at the landscape scale. Focus on transportation, land-use, and environmental issues. Problem definition, data collection, and data structuring strategies. As part of a design team, students develop an

implementable, natural resources management plan for a client. Offered: Sp. Prerequisite: F E 423 or F M 425.

**F E 452 Stream-Road System Interactions (5) I&S/NW** *Schiess* Design and evaluation of road systems and stream impacts. Road locations and decommissioning are addressed meeting management objectives and minimizing sediment delivery. Modeling and field verifications of road impacts. As part of a design team, students develop an implementable, natural resources management strategy for a client. Offered: Sp. Prerequisite: F E 345 or F E 346.

**F E 465 Introduction to Photogrammetry (2)** Photogrammetric measurements from aerial photos. Aerial cameras and camera calibration. Interior orientation from ground control. Exterior orientation and derivation of ground coordinates. Ground control. Use of analytical equipment for stereoplotting. Offered: W.

**F E 470 Wood Science and Forest Products Manufacturing (3)** *Breitsprecher* Coverage of the physical and chemical properties of wood and how they relate to its use, followed by a discussion of the major manufacturing processes used to convert wood to products for society. Field trips are taken to representative processing plants. Offered: W.

**F E 480 Silvicultural Engineering Systems (3)** *Fridley* Engineering design of systems for establishing, nurturing, and culturing trees for eventual harvest and use as industrial feedstock. Lecture/discussion. Prerequisite: CSE 142; CEE 220; M E 230; IND E 250; F E 332; F E 368. Offered: A.

**F E 490 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**F E 491 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**F E 492 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

**F E 499 Undergraduate Research (1-5, max. 15)** Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

### Courses for Graduates Only

**F E 523 Advanced Watershed Analysis (4)** *Schiess* Inventory and historical analysis of interactions between natural resources, climate, and forest management. Develop management objectives and design forest management activities based on inventory and analysis. Use of modeling and simulation for predicting influence of forest management activities on other resources. Site-specific mitigation design and remediation projects. Prerequisite: F E 425. Offered: W.

**F E 524 Watershed Design (4)** *Fridley* Study of the principles and processes related to forest engineering design of watershed scale systems. Prerequisite: F E 523 and graduate standing or permission of instructor. Offered: Sp.

**F E 525 Advanced Wildland Hydrology (4)** *Bolton* Advanced treatment of hydrologic cycle and basic hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Graduate focus on a detailed field or modeling hydrologic analysis. Offered: W.

**F E 529 Current Topics in Wildland Hydrology (1)** *Bolton* Students present detailed analysis of research papers on selected topics in wildland hydrology.

Topics cover measurement techniques, experimental data, and theoretical models of hydrologic processes. Credit/no credit only. Prerequisite: senior or graduate standing and permission of instructor. Offered: AWSp.

**F E 540 Graduate Studies in Forest Engineering (1-5, max. 5)** Offered: AWSpS.

**F E 541 Advanced Forest Engineering (5)** *Fridley, Schiess* Logging organization and management; logging cost analysis and budgeting. Offered: W.

**F E 542 Advanced Logging Engineering (3)** Detailed consideration of problems of logging planning and truck road engineering, including the preparation and field layout of logging plans; location, design, and construction of forest roads. Offered: Sp.

**F E 591 Graduate Teaching Practicum (\* max. 5)** Principles of teaching and learning applied to undergraduate instruction in forest engineering. Development, delivery, and evaluation of actual lectures and homework assignments in the student's area of expertise are required. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

## Forest Management

**F M 400 Forestry in Washington (5)** *Lee* Examines the components of contemporary forestry practices and issues and their importance to the economy and quality of life in Washington state. For education majors, selected laboratory sessions provide hands-on experience for classrooms K-12 using the Project Learning Tree activity guides. One all-day field trip. Offered: S.

**F M 422 Marketing of Forest Products (3) I&S/NW** *Eastin* Introduction to forest products marketing in North America. Examines products marketing, industry structure, and strategic management issues utilizing marketing concepts. Topics include product management, distribution channels, strategic industry analysis, and marketing research techniques. Case studies used to understand forest products industry decision making. Offered: W.

**F M 423 International Marketing of Forest Products (3) I&S/NW** *Eastin* Introduction to international marketing concepts and their application to forest products. Analysis of forest products trade patterns, resource base changes, policy, industrial policies, and environmental concerns. Discussion of market distorting practices including log export bans and tariff and non-tariff barriers. Offered: Sp.

**F M 424 Forest Stand Dynamics (3) NW** *Oliver* Forest stand development and manipulation response. Forest stand dynamics and stand structure in pure and mixed species forests, response to minor and major disturbances, interactive changes with time, and patterns and response to manipulation. Offered: A.

**F M 425 Ecosystem Management (3) NW** *Oliver* Advanced concepts and practices in ecosystem management, integrating landscape management principles, inventory, planning, silviculture, objective/tradeoff/policy considerations, stand growth, adaptive management, and systems organization and management. Case study emphasizes integration. Prerequisite: F M 323. Offered: W.

**F M 435 Forest Entomology (3) NW** *Gara* Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects. Offered: A.

**F M 436 Laboratory in Forest Entomology (2) NW** *Gara* Introduction to the insect orders; identification of forest insects and their damage. One field trip to study insect problems required. Offered: A.

**F M 461 Forest Management and Economics II (4) I&S/NW** *Bare* Basic concepts of timber harvest scheduling, sustained-yield models, contemporary analytical techniques, timber supply, and forest product markets. Prerequisite: F M 360. Offered: W.

**F M 464 Economics of Conservation (3) I&S/NW** Economic principles and their use in the analysis of contemporary conservation problems. Particular emphasis directed toward the conservation of forest resources in the Pacific Northwest and related policy issues.

**F M 466 Economics of Timber Production (3) I&S/NW** Application of basic economic concepts to the production of timber as a commercial land use. Analysis of timber investments, alternative management programs, and regulation models. Prerequisite: F M 360.

**F M 469 Forest Biometry (5) NW** *Turnblom* Quantitative techniques commonly used in forecasting future forest conditions and developing volume equations: site quality assessment methods, development of site index equations, measurement of stand density and its effects on growth, growth and yield prediction, and familiarization with current computerized forest growth simulation models. Prerequisite: Q SCI 381. Offered: odd years; A.

**F M 470 Natural Resource Policy Processes (5) I&S/NW** *Ryan* Introduction to and analysis of environmental policy-making processes, with a focus on forest and land policy and law. Use of policy models to examine the interaction of agencies, interest groups, Congress, and the courts in the legislative process. Policy implementation, evaluation, and change are also addressed. Offered: A

**F M 481 Management of Wildland Recreation and Amenities (3) NW** *Lee* Introduction and overview of wildland recreation and amenities management. Agency history and objectives explored along with integration of recreation with other land uses. Water, forestry, wildlife, and wilderness resources for recreational uses discussed along with role of private enterprise in recreation and amenities. Topics of current and local interest. Offered: W.

**F M 485 Conservation Area Planning and Design (5) NW** *Bradley* Integrated consideration of the resource base, social factors, and management objectives in providing conservation, environmental education, open space, and wildland recreation opportunities. Application of contemporary resource planning processes and technology in the development of ecologically-based, multiple resource plans. Case study approach.

**F M 490 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**F M 491 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**F M 492 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

**F M 495 Senior Project in Forest Management (5)** Individual study of a forest management problem under the direction of a faculty member. Students utilize knowledge gained in field studies and required course work to present possible solutions to a specific forest management problem. Prerequisite: F E 345; F M 323; F M 362. Offered: AWSpS.

**F M 496 Forest Management Case Studies (5)** Focus on preparation and presentation of management plan for forested area. All aspects of multiple use and ecosystem health considered within multi-

licity of economic, biological, legal, social, and political constraints. Case studies to familiarize students with complexities of modern decision making. Offered: Sp.

**F M 499 Undergraduate Research (1-5, max. 15)** Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/ no credit only. Offered: AWSpS.

### Courses for Graduates Only

**F M 503 Advanced Forest Stand Dynamics (3) Oliver** Emphasizes current research and sources of knowledge about forest stand development and responses to manipulations. Development of pure and mixed species forests, even-aged and uneven-aged stands. Responses to disturbances, interactive changes with time, patterns and responses to manipulation, growth and yield quantification. Prerequisite: previous ecology courses. Offered: A.

**F M 504 Research Processes in Forest Resources (4) Lee** Comprehensive survey of research processes for entering graduate students. Diagnostic and prescriptive evaluation of student research capabilities. Problem and hypothesis formulation, study design, multi-method strategies for gathering and analyzing data, and interpretation and presentation of results. Prerequisite: graduate standing. Offered: A.

**F M 520 Fundamentals of Marketing and Management from a Forest Products Perspective (3) Paun** Overview of business concepts as they relate to the following topics in the context of the forest products industry: launching a business and entrepreneurship; marketing; human resources management; and global business. Offered: A

**F M 521 Fundamentals of Finance and Accounting from a Forest Products Perspective (3) I&S/NW Paun** Provides an overview of business concepts as they relate to the following topics in the context of the forest products industry: business economics; financial planning and management; securities and insurance; accounting; and operations management. Offered: W

**F M 522 Current Topics in Silviculture/Protection (2, max. 6) Edmonds, Gara, Oliver** Detailed study of current issues, information, and literature in silviculture/protection. Offered: AWSp.

**F M 528 International Silviculture (3) Gara, Oliver** Background of biological, social, and economic basis for silvicultural practices in different areas; case examples of silvicultural practices in different localities; consideration of selected international issues in silviculture. Prerequisite: permission of instructor. Offered: even years; W.

**F M 530 Graduate Studies in Forest Fire Control (1-5, max. 5)** Offered: AWSpS.

**F M 537 Graduate Studies in Forest Entomology (1-5, max. 5)** Offered: AWSpS.

**F M 541 Readings in Silviculture (1-5, max. 6) Oliver** Detailed study of national and international literature pertaining to silviculture. Offered: AWSpS.

**F M 545 Principles of Forest Entomology (3) Gara** Historical perspective of the discipline, introduction to general entomology and taxonomy, forest insect ecology, integrated pest management concepts for defoliators, bark beetles, wood borers, and urban forestry pests. Prerequisite: general biology, botany, zoology or permission of instructor. Offered: A.

**F M 552 Seminar in Forest Products Marketing (3) Eastin, Paun** Evaluate and discuss current research topics in marketing, marketing research, and international marketing of forest products. Presentation of a critical review of published research or administration of an empirical project. Offered: AWSp.

**F M 553 Graduate Studies in Forest Product Marketing (1-5, max. 5) Eastin, Lippke, Paun, Schreuder** Independent study and research conducted on issues related to forest products marketing. Offered: AWSp.

**F M 562 Advanced Forest Resources Management (3) Bare** Overview of concepts and procedures involved in managing forested lands for the production of commodity and amenity values. Use of systems analysis techniques for evaluating alternative land-use programs and manipulations of the forest ecosystem. Prerequisite: graduate standing. Offered: A.

**F M 563 Graduate Studies in Forest Mensuration (1-5, max. 5) Bare, Turnblom** Offered: AWSpS.

**F M 564 Advanced Forest Biometry (3/5) Turnblom** Classical problems in analysis of forest populations and growth theory, and principles of parametric analysis and estimation processes in forest biometry. Offered: odd years; Sp.

**F M 565 Graduate Studies in Forest Management (1-5, max. 5) Bare** Offered: AWSpS.

**F M 566 Graduate Studies in Forest Photogrammetry (1-5, max. 5) Schreuder** Offered: AWSpS.

**F M 568 Graduate Studies in Forest Economics (1-5, max. 5) Bare, Perez-Garcia, Schreuder** Topical issues including log export controversy, capturing value added products, economics of environmentalism, sustainable forestry, and forest products certification. Offered: AWSpS.

**F M 570 Graduate Studies in Forest Policy Analysis (1-5, max. 5) Ryan** Offered: AWSpS.

**F M 571 Policy Analysis Design (5)** Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Consideration of implications for both policy and management. Students develop a study design for course project. Offered: jointly with PB AF 592.

**F M 572 Graduate Studies in Forest Resource Planning (1-5, max. 5) Bradley** Offered: AWSpS.

**F M 573 Forest Environmental Resource Planning (3) Bradley** Origins and evolution of environmental planning in the forest environment. Discussion of the planning process and methodologies for environmental management and planning; selected case studies of environmental resource plans. Prerequisite: graduate standing. Offered: even years; A.

**F M 575 Advanced Natural Resources Sociology (3) Lee** Comparative study of institutional and organizational aspects of natural resources management, with special attention to forest resources. Development, persistence, and change of selected institutions in the context of pre-industrial, industrial, and advanced industrial societies. Implications for policy formulation, decision making, and technology transfer. Offered: even years; A.

**F M 576 Current Topics in Forest Policy and Management (1-2, max. 2) Ryan** Contemporary problems in forest policy and management. Topics vary but focus on the development of specific political or philosophical issues; empirical questions of concern to the forestry profession; or the development of new tools for management, planning, or policy analysis. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**F M 577 Global Forest Resource and Environmental Markets (3) Perez-Garcia** Economic analysis of global forest resource markets. Models of timber supply and international trade. Linkages to environmental resources including carbon, biodiversity, and climate change. Offered: Sp.

**F M 579 Graduate Studies in Forest Sociology (1-5, max. 5) Lee** Offered: AWSpS.

**F M 587 Current Topics in International Forest Products Trade: Marketing Research (2, max. 6)** *Eastin* Current research topics in marketing, market research, and technology related to the forest products sector. Presented by faculty and invited professionals, supplemented by student presentations. Offered: Sp.

**F M 588 Current Topics in International Forest Products Trade (2, max. 6)** *Perez-Garcia* Current research topics in a variety of business related areas, including international marketing of forest products, forest economics, international business and global trade modeling. Seminars by faculty and invited professionals supplemented by student presentations. Credit/no credit only. Offered: A.

**F M 589 Current Topics in International Forest Products Trade: Forest Economics (2, max. 6)** *Perez-Garcia* Current research topics in forest economics as related to forest products sector. Presented by faculty and invited professionals, supplemented by student presentations. Offered: W.

**F M 591 Graduate Teaching Practicum (1-5, max. 5)** Principles of teaching and learning applied to undergraduate instruction in Forest Management. Development, delivery, and evaluation of actual lectures and homework assignments are required in the student area of expertise. Credit/no credit only. Offered: AWSp.

**F M 601 Graduate Internship in Forest Management (\*)** Credit/no credit only. Offered: AWSpS.

## Paper Science and Engineering

**PSE 400 Wood Properties and Utilization (4) I&S/NW** *Breitsprecher, Briggs* Relationship of physical and chemical properties of wood to its use. Role of silviculture and genetics in modifying wood products and value of products. Manufacturing processes of major wood products, examining material and energy balances and environmental effects. Comparison of wood with steel, concrete, plastics, and other materials. Offered: A.

**PSE 401 Wood and Fiber Identification (2) NW** *Briggs* Laboratory in identification of wood fibers of North American species. Use of microscope and image analyzer in obtaining wood and fiber measurements. Offered: A.

**PSE 402 Paper Properties and Additives (4) NW** *McKean* Material science of paper and paperboard. Measurement and characterization of structural, mechanical, and optical properties of paper. Standard testing methods, paper colorants, effect of additives on paper properties, and relationship of fundamental paper properties to end use requirements. Offered: A.

**PSE 406 Wood Chemistry I (3) NW** Chemistry of cellulose, hemicellulose, and lignin. Pulping and bleaching chemistry of wood. Prerequisite: either CHEM 237 or CHEM 335. Offered: A.

**PSE 407 Wood Chemistry I Laboratory (2) NW** Proximate analysis of wood. Use of instrumental methods for wood component analyses. Prerequisite: PSE 406. Offered: W.

**PSE 409 Wood Extractives Chemistry (2) NW** Nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization. Prerequisite: either CHEM 237 or CHEM 335. Offered: odd years; Sp.

**PSE 450 Paper Science and Engineering Seminar (1)** Discussion of current topics in the science and technology of pulp and paper production. Emphasis on employer expectations of students in the paper science industry. Offered: AWSp.

**PSE 476 Pulping and Bleaching Processes (3)** *Gustafson* Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semi-chemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with CHEM E 471; W.

**PSE 477 Papermaking Processes (3)** *McKean* Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with CHEM E 472; A.

**PSE 478 Pulp and Paper Laboratory (2)** *Jacobs-Young* Laboratory experiments in chemical and semi-chemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with CHEM E 473; Sp.

**PSE 479 Pulp and Paper Laboratory II (3)** *McKean* Paper testing, paper additives, flocculation, drainage, retention, heat transfer, and fluid dynamics in papermaking from virgin and recycled raw materials. Prerequisite: PSE 402; PSE 477. Offered: W.

**PSE 480 Pulp and Paper Process Control (3)** *Gustafson* Control of pulp and paper processes. Sensors, actuators, interface equipment, and computer control strategies common to this industry. Prerequisite: PSE 476; PSE 477. Offered: W.

**PSE 481 Pulp and Paper Unit Operation (3)** Unit operations of particular interest in the pulp and paper industry in addition to those covered in CHEM E 330 and 340. Prerequisite: CHEM E 340. Offered: W.

**PSE 482 Paper Science and Engineering Design I (3) I&S/NW** *Briggs, Gustafson* Basic engineering economics applied to design of pulp and paper facilities. Analysis of engineering alternatives based on use cost analysis and accounting tools. Introduction to process and mill design. Prerequisite: 2.0 in PSE 406; 2.0 in PSE 476; 2.0 in PSE 477. Offered: W.

**PSE 483 Paper Coating and Converting (3)** *Barlow* Coatings and their preparation, rheology, process equipment, drying, and product evaluation. Prerequisite: PSE 477. Offered: A.

**PSE 484 Secondary Fiber (3)** *Hodgson* Recycling of paper. Sources of secondary fiber. Processing methods for contaminants and ink removal. Properties and uses of recycled fiber. Prerequisite: PSE 406; PSE 476; PSE 477. Offered: Sp.

**PSE 485- Undergraduate Research (1-, max. 3)** *Johnson* Undergraduate research or independent study project under the supervision of the faculty; usually one credit per quarter. Offered: AWSp.

**PSE 486 Environmental Management (3) I&S/NW** Effects of pollution and environmental regulations on industry and community. Sources, regulations, and control of air, water, solid waste emissions as generated by the paper science industry. Offered: W.

**PSE 487 Paper Science and Engineering Design II (5)** Comprehensive design of pulp and paper processes, including: economic feasibility studies; process equipment design, optimization, and control; and overall process integration and layout. Safety and ethics in the design process. Prerequisite: PSE 482. Offered: Sp.

**PSE 488 Polymer Chemistry (3)** *Allan* Fundamental review of synthetic and natural polymers, including kinetics of formation, molecular weight distributions, and solid-state and solution properties. Prerequisite: either CHEM 237 or CHEM 335. Offered: W.

**PSE 490 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**PSE 491 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is

not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

**PSE 492 Undergraduate Studies (1-5, max. 5)** Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

**PSE 497 Pulp and Paper Internship (1-2, max. 3)** Technical and economic analysis of commercial pulp and paper installations. Structured visits to industrial operations to observe technical aspects of pulp and paper curriculum in practice. Preparation of visitation reports and analysis in seminar setting. Offered: AWSpS.

## Courses for Graduates Only

**PSE 508 Advanced Wood Chemistry (3)** Biogenesis of lignins and isotope labeling methods. Oxidative coupling phenols. Alkaline degradation of polysaccharides and oxygen-based bleaching chemistry. Prerequisite: PSE 406. Offered: odd years; A.

**PSE 514 Pulp and Paper Process Simulation (3)** *Gustafson* Presentation of process simulation techniques currently used in the pulp and paper industry. Large-scale simulations of pulp and paper unit operations developed and analyzed. Use of simulations for control, process optimization, and statistical quality control purposes. Offered: even years; A.

**PSE 555 Surface and Colloid Science of Papermaking (3)** *Hodgson* Introduction to principles of surface and colloid science, particularly as they pertain to the wet end of the papermaking process. Surface and colloidal properties of wet end additives. Examination of specific examples and case studies in papermaking situations. Prerequisite: PSE 477 or equivalent. Offered: odd years; A.

**PSE 570 Graduate Studies in Forest Products (1-5, max. 5)** Offered: AWSpS.

**PSE 576 Microscopy and Photomicrography (3)** *Breitsprecher* Principles of microscopy as well as the techniques of using microscopes and taking photographs with them. Darkroom practice for black and white photography included. Students take photographs, develop negatives, and make enlargements. Offered: odd years; Sp.

**PSE 577 Wood and Paper Science Seminar (1, max. 6)** Discussion of current topics in the science and technology of pulp and paper production, including wood and polymer chemistry. Offered: ASP.

**PSE 579 Wood Properties and Utilization (4)** *Breitsprecher, Briggs* Biology of wood formation and basic properties of wood, processes that create wood products, performance attributes required of these products, understanding of linkages between biology, silviculture, and product technology and performance. Offered: AW.

**PSE 580 Field Studies in Wood Utilization (2)** *Briggs* Five-day field trips visiting a diverse mix of wood products industries in the Puget Sound region. Students observe manufacturing technologies for various products, learn about markets from these products, and discuss resource, market, and technical issues with management in these facilities. Offered: Sp.

**PSE 589 Wood Biosynthesis (3)** Biosynthesis of carbohydrates, phenolic and terpenoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite: PSE 406. Offered: even years, Sp.

**PSE 591 Graduate Teaching Practicum (\* max. 5)** Principles of teaching and learning applied to undergraduate instruction in paper science and engineering. Development, delivery, and evaluation of actual lectures and homework assignments. Graduate teaching experience for PSE students only. Credit/no credit only. Offered: AWSp.

# Interdisciplinary Graduate Degree Programs

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indicated. Other courses included in these programs are selected from many disciplines throughout the University and carry the prefix of the respective discipline.

## Biology Teaching



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Biology\\_Teaching.html](http://www.washington.edu/students/gencat/academic/Biology_Teaching.html)



Program Web page:  
[www.biology.washington.edu/teachers/](http://www.biology.washington.edu/teachers/)

Graduate Program Coordinator  
222 Hitchcock, Box 355320  
(206) 543-1689

The Graduate School Biology Teaching Group offers an interdisciplinary program that leads to the degree of Master of Science in biology for teachers. Although designed specifically for biology teachers in K-12 schools and community colleges, other life science educators, such as those in environmental learning centers, may find the program especially worthwhile. The program emphasizes broadening the student's understanding of the various fields of biological science, with the improvement of the student's effectiveness as a teacher as the primary goal. Opportunities for course work within the departments of the University in biological science and science education are provided. Each student is asked to perform an in-depth study of a biological science problem in the context of its relevance to the teaching of biological science. Facilities and guidance are provided by a sponsoring professor and advisory committee drawn from the Biology Teaching Group and the several biological science departments of the University.

### Special Requirements

Prospective candidates for the degree should have an initial or continuing certificate for teaching biology at the secondary level, or be able to demonstrate professional commitment in the area of biology education.

Assistantships and fellowships are generally not provided under the aegis of this program.

## Faculty

### Director

John Palka

### Professors

Ammirati, Joseph F. \* 1979; MA, 1967, San Francisco State; PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.

Boersma, P. Dee \* 1974; PhD, 1974, Ohio State University; ecology and conservation biology, reproductive strategies, colonial seabird biology.

Cleland, Robert E. \* 1964; PhD, 1957, California Institute of Technology; plant physiology, plant hormones.

Deyrup-Olsen, Ingrid J. \* 1964, (Emeritus); PhD, 1944, Columbia University; general physiology, cell-membrane phenomena.

Edwards, John S. \* 1967; PhD, 1960, Cambridge University (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology.

Hille, Merrill B. \* 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.

Laird, Charles D. \* 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Leopold, Estella B. \* 1976; PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environment.

Nester, Eugene W. \* 1962; PhD, 1959, Case Western Reserve University; genetics and biochemistry of bacterial-plant cell interactions, tumorigenesis.

Olson, Maynard V. 1992; PhD, 1970, Stanford University; large-scale genome mapping and sequencing.

Palka, John M. \* 1969; PhD, 1965, University of California (Los Angeles); neurophysiology, sensory physiology, developmental neurobiology.

Sprugel, Douglas George \* 1984; PhD, 1974, Yale University; community and ecosystem ecology, tree ecophysiology, disturbance ecology, paleoecology.

Van Volkenburgh, Elizabeth \* 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.

### Assistant Professor

Windschitl, Mark A. \* 1996; MS, 1993, PhD, 1995, Iowa State University; area of curriculum and instruction, use of technology in learning environments, constructivism.

## Global Trade, Transportation, and Logistics Studies

2 Smith



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Global\\_Trade.html](http://www.washington.edu/students/gencat/academic/Global_Trade.html)



Program Web page:  
[depts.washington.edu/gttl/](http://depts.washington.edu/gttl/)

The aim of the graduate option program in Global Trade, Transportation, and Logistics (GTTL), is to enable graduate students to augment their degree programs in preparation for careers that demand the combined knowledge of trade, transportation, and logistics. Particular attention is directed to activities involved in the flow of goods from point of origin to point of consumption across international boundaries. These activities involve maritime, aviation, and overland modes of transport, and the intermodal connections among them, as well as logistics management. The full range of activities also includes telecommunications, information, technological, environmental, energy, regulatory, and other systems that facilitate the negotiation and implementation of international trade and transportation.

The GTTL option is wide ranging and is tied to the needs of government and industry for people trained in the methods of today's global commerce. The program is overseen by the Interdisciplinary Committee on Global Trade, Transportation, and Logistics. Members come from the University and the private and public sectors. GTTL works with leaders in business and government organizations to develop internships and jobs for graduate students in the option program. The

GTTL option is based on a set of course requirements to be fulfilled in conjunction with the student's existing graduate degree program.

### Interdisciplinary Committee

The Interdisciplinary Committee oversees the core courses and recommends instructors, maintains the list of eligible electives, and coordinates with course instructors regarding scheduling and prerequisites. It periodically reviews core courses and promotes internships and placement. The committee is assisted in these tasks by the lead core-course instructor, the program director, the program manager, and the Graduate School staff, as appropriate. The committee is responsible for policy on admission to the option program. This is tailored to the desired enrollment in the core courses, employment opportunities, and other factors. Currently the option is open to all eligible graduate students. Advising is primarily the responsibility of the student's departmental representative on the committee.

## Graduate Program

Graduate Program Coordinator  
2 Smith, Box 355385  
(206) 616-5778  
[gttl@u.washington.edu](mailto:gttl@u.washington.edu)

Students associated with GTTL receive the Graduate Certificate upon completing the program's requirements and obtain their degrees through cooperating academic units. Students admitted into graduate degree programs in the following units are eligible for the GTTL option with concurrence of their faculty adviser: Aeronautics and Astronautics, Business Administration, Civil and Environmental Engineering, Communications, Economics, Education, Forest Resources, Geography, International Studies, Law, Marine Affairs, Political Science, Public Affairs, Technical Communication, and Urban Design and Planning. GTTL prepares students for careers in international trade, transportation, and logistics by offering a comprehensive program encompassing selected courses from heretofore separate disciplines. Those students completing the option receive an appropriate notation on their transcript. In addition, a Letter of Achievement is given, signed by the head of the student's academic unit and the Dean of the Graduate School.

### Option Requirements

The option consists of a minimum of 18 credits: two core courses (6 credits) and four elective courses (at least 12 credits).

The core courses—GTTL 501 and 502—provide a basic overview of the academic theories, political economic structures, industrial dynamics, public policies, and strategic issues concerning the study, business, and/or regulation of global trade, transportation, and logistics.

Students select electives from a continually updated list prepared by a curriculum committee. Most electives (and core courses) may also satisfy a student's home department requirements. At least one elective must come from outside the home department to reinforce the interdisciplinary aspects of the option. A substitution policy developed by the committee assures that an appropriate mix of electives can be found for each student.

## Faculty

### Director

Thomas Schmitt

### Professors

Beyers, William B. \* 1962; PhD, 1967, University of Washington; economic geography, regional analysis, regional development.

Caporaso, James A. \* 1988; PhD, 1968, University of Pennsylvania; international political economy, comparative politics, European Community, research methodology.

Decher, Reiner \* 1973; PhD, 1968, Massachusetts Institute of Technology; aircraft propulsion, fluid mechanics, energy conversion.

Fleming, Douglas K. \* 1963, (Emeritus); PhD, 1965, University of Washington; transportation geography (especially ocean and air), regional organization of western Europe.

Gautschi, David A. \* 1992; MBA, 1974, University of Oregon; PhD, 1979, University of California (Berkeley); marketing management, marketing strategies in the global information telecommunications industries.

Giffard, Charles A. \* 1978; PhD, 1968, University of Washington; international communication systems, news flow, editing and reporting.

Haselkorn, Mark P. \* 1985; PhD, 1977, University of Michigan; information system design, human/machine interaction, managing system vulnerability.

Hayuth, Yehuda 1990, (Affiliate); PhD, 1978, University of Washington.

Hershman, Marc \* 1976; JD, 1967, Temple University; LL.M., 1970, University of Miami (Florida); coastal zone management law.

Krumme, Gunter \* 1970; PhD, 1966, University of Washington; economic, organizational and marketing geography, location theory, regional development.

Lippke, Bruce R. \* 1990; MSEE, 1959, New Mexico State University; MSIE, 1966, University of California (Berkeley); international trade and environmental linkages, investment analysis, economics of forest industry.

Ludwig, Richard L. \* 1971; PhD, 1971, University of Pittsburgh; housing development planning, social factors in development planning.

Mahoney, Joseph P. \* 1978; PhD, 1979, Texas A&M University; construction materials, pavement systems.

Manning, Fred L. \* 1986; PhD, 1983, Massachusetts Institute of Technology; traffic flow theory, networks, econometric methods, equilibration in transportation markets.

Modelski, George \* 1967, (Emeritus); PhD, 1954, University of London (UK); international relations, international political economy.

Nihan, Nancy L. \* 1973; PhD, 1970, Northwestern University; transportation planning and systems analysis.

Nyerges, Timothy L. \* 1985; PhD, 1980, Ohio State University; GIS, collaborative decision support, growth management, transportation, environment, land use.

Olson, David J. \* 1974; PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Poznanski, Kazimierz \* 1987; PhD, 1974, University of Warsaw (Poland); comparative economic systems, technological change, political economy of Eastern Europe.

Rutherford, G. Scott \* 1981; PhD, 1974, Northwestern University; transportation planning and engineering.

Wong, Kar-Yiu \* 1983; PhD, 1983, Columbia University; international trade and commercial policy.

### Associate Professors

Anderson, C. Leigh 1984; PhD, 1989, University of Washington; international environmental policy, international development, regulatory economics.

Bachman, David M. \* 1991; PhD, 1984, Stanford University; Chinese politics and foreign policy and China's political economy (1949-present); US-China relations.

Blanco, Hilda J. \* 1996; MRP, 1984, PhD, 1989, University of California (Berkeley); comprehensive and neighborhood planning, environmental planning, infrastructure, finance.

Bowes, John E. \* 1974; PhD, 1971, Michigan State University; man-machine communication, public opinion, international communication.

Chan, Kam Wing \* 1991; PhD, 1988, University of Toronto (Canada); economic development, urbanization, migration, China, Hong Kong.

Perez-Garcia, John \* 1990; MS, 1982, Mayaguez (Puerto Rico); DF, 1991, Yale University; forest/natural resource economics, trade modeling and policy analyses, global climate change.

Schmitt, Thomas G. \* 1979; MBA, 1974, University of Cincinnati; DBA, 1979, Indiana University; management of service and manufacturing operations.

Waddell, Paul A. \* 1997; PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

### Assistant Professor

Bae, Christine \* 1996; MRP, 1986, State University of New York (Albany); PhD, 1994, University of Southern California; transportation, environment, land use, growth management, quantitative methods.

### Senior Lecturer

Salehi-Esfahani, Haideh 1990; PhD, 1985, University of Pennsylvania; international economics, economic development.

### Lecturer

Pilcher, Martha G. \* 1987; MS, 1978, PhD, 1985, Georgia Institute of Technology; operations research/operations management, health care applications and logistics.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**GTTL 501 Introduction to Global Trade, Transportation, and Logistics (3)** Provides an overview of the concepts and substance of trade, transportation, and logistics. Introduces the interdisciplinary dynamics and the relevant literature, and orients students toward appropriate elective courses. Offered: AW.

**GTTL 502 Seminar in Global Trade, Transportation, and Logistics (3)** Interdisciplinary seminar involving two or more faculty from the GTTL committee, designed to build a bridge between practitioners and researchers who are at the forefront of trade, transportation, and logistics. Topical seminar emphasizing specific issue or problem. Offered: Sp.

**GTTL 599 Special Topics in Global Trade, Transportation, and Logistics Studies (3, max. 9)** Selected topics with special emphasis on issues of pressing importance to the world trading community. Topics vary with departmental discretion. Prerequisite: Graduate students or permission of instructor.

## Health Services Administration



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Health\\_Svc\\_Admin.html](http://www.washington.edu/students/genocat/academic/Health_Svc_Admin.html)



Program Web page:  
[depts.washington.edu/mhap/](http://depts.washington.edu/mhap/)

Graduate Program Coordinator—In-Residence Program  
H672 Health Sciences, Box 357660  
(206) 616-2925

Graduate Program Coordinator—Evening/Weekend Program  
H681 Health Sciences, Box 357660  
(206) 616-2976

The Health Services Administration Group offers a two-year program of study leading to the Master of Health Administration degree. The M.H.A. degree is fully accredited by the Accrediting Commission for Health Services Administration. It provides the educational foundation for careers in management, planning, and policy analysis in ambulatory care organizations, hospitals, long-term care facilities, mental health care organizations, government agencies, planning agencies, and other organizational settings in the health field. The curriculum is designed to be interdisciplinary with a faculty drawn from the Graduate Schools of Public Health and Community Medicine, Business Administration, Public Affairs, Nursing, Medicine, and Law. Programs of study may vary according to the student's concentration of study and career objectives. In addition to academic work, students are required to participate in an internship experience in a health facility or agency under the preceptorship of the administrator or director of that organization.

A concurrent degree program combining the M.H.A. and M.B.A. degrees is also offered. This curriculum requires three years of intensive academic study and culminates in a joint M.H.A.-M.B.A. degree.

The evening/weekend Master in Health Services Administration program, launched in January 1998, is designed primarily for mid-career physicians and other clinical/medical practitioners who have demonstrated interest or competency in administration or management. It is for those who seek to gain the advanced knowledge and skills essential in planning, organizing, and implementing programs designed to address health needs and improve the cost-effectiveness and quality of patient care. The program structure allows practicing professionals to continue their careers while gaining a graduate degree.

Course listings may be found under the School of Public Health and Community Medicine, Department of Health Services.

### Special Requirements

Applicants to the in-residence program must submit, in addition to Graduate School admission requirements, a narrative statement of objectives, at least three letters of recommendation and scores from either the GRE or the GMAT. Interviews by members of the program faculty may also be required. Relevant health-field experience is preferred. Applicants are accepted only for autumn quarter of each year. The application deadline is February 15.

Applicants to the evening/weekend program must submit, in addition to Graduate School admission requirements, a letter of application/intent, a resume, three letters of recommendation, and either GRE or GMAT scores (excluding applicants with doctoral-level degrees). Priority of admission is given to applicants with medical/clinical training and professional experience. Applicants are accepted only for autumn quarter of each year. The application deadline is April 30.

## Financial Aid

The M.H.A. Alumni Association sponsors a fund-raising "phonathon" from which some of the proceeds go toward program scholarships. The Foster G. McGaw Scholarship, administered by the Association of University Programs in Health Administration, may be awarded. A scholarship sponsored by the Association of Medical Group Administrators is available for students concentrating in ambulatory care management. Health Education Assistance Loans (HEAL) monies are also available to graduate students in health services. However, students admitted should be prepared to use their own resources to finance graduate education.

The evening/weekend program does not provide financial aid.

## Research Facilities

In addition to its University facilities, the program makes extensive use of community health facilities and agencies for research and training.

## Faculty

### Director

Mary L. Richardson

### Professors

Conrad, Douglas A. \* 1977; MHA, 1973, University of Washington; MBA, 1977, PhD, 1978, University of Chicago; managed care, corporate finance in managed care.

Dowling, William L. \* 1982; MBA, 1961, University of Chicago; MA, 1970, PhD, 1971, University of Michigan; strategic management of health-care organizations, managed care.

Grembowski, David \* 1981; MA, 1975, Washington State University; PhD, 1982, University of Washington; dental care demand, fluoridation, dental health services research.

Klasterin, Theodore \* 1974; PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Madden, Carolyn Watts \* 1984; MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

Martin, Diane P. \* 1978; MA, 1972, Temple University; PhD, 1979, University of Washington; health services use and cost, alternative delivery systems and insurance.

Mitchell, Pamela H. \* 1971; MS, 1965, University of California (San Francisco); PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.

Ross, Austin Jr. 1982, (Emeritus); MPH, 1955, University of California (Berkeley); ambulatory care, health care delivery systems.

Wickizer, Thomas M. \* 1988; MSW, 1974, University of Washington; MPH, 1979, MA, 1987, PhD, 1989, University of Michigan; health promotion evaluation, workmen compensation health issues.

Wing, Kenneth \* 1990; JD, 1971, MPH, 1972, Harvard University; law; politics and policy; financing health care.

Zuckerman, Howard S. \* 1997; MBA, 1968, Xavier University; PhD, 1976, University of Michigan; health management research, health administration.

### Associate Professors

Klawitter, Mariela \* 1990; MS, 1986, PhD, 1992, University of Wisconsin; family and employment policy, sexual orientation, women's studies.

Kopjar, Branko 1997; PhD, 1996, University of Oslo (Norway); statistics and epidemiological studies.

Richardson, Mary L. \* 1977; MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.

### Lecturers

Katz, Aaron 1988; CPH, 1975, University of Toronto (Canada); health policy analysis.

Masuda, David 1997; MD, 1980, University of North Dakota; MS, 1996, University of Wisconsin; biomedical and health informatics.

## Molecular and Cellular Biology



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Molec\\_Cell\\_Biol.html](http://www.washington.edu/students/genecat/academic/Molec_Cell_Biol.html)



Program Web page:  
[depts.washington.edu/mcb/](http://depts.washington.edu/mcb/)

## Graduate Program

Graduate Program Coordinator  
T466 Health Sciences, Box 357275  
(206) 543-0253  
[mcb@u.washington.edu](mailto:mcb@u.washington.edu)

The Molecular and Cellular Biology Program (MCB) is a leader in applying the techniques of molecular and cellular biology to advance the understanding of basic biological sciences. The goal of the doctoral program is to broadly train students to think about science in a rigorous and critical manner. Since scientific methods, equipment, and knowledge are changing rapidly, students learn to focus on important issues in an evolving research environment. This program is appropriate for students interested in future careers in research and teaching in academia as well as biotechnology and pharmaceutical companies.

Thirteen departments across three schools have faculty members actively pursuing research in molecular and cellular biology. The departments participating in the program include Biochemistry, Bioengineering, Biological Structure, Botany, Environmental Health, Genetics, Immunology, Microbiology, Pathobiology, Pathology, Pharmacology, Physiology and Biophysics, and Zoology.

At the Fred Hutchinson Cancer Research Center (FHCRC), the divisions of Basic Sciences and Molecular Medicine participate in the joint Molecular and Cellular Biology graduate program. Shared FHCRC facilities are available for electron microscopy, flow cytometry, tissue culture, and image analysis. A biotechnology center for DNA and protein synthesis and sequencing, animal facilities, a biological production facility that focuses on monoclonal antibody production, extensive libraries, and a biocomputing center provide further support for the research effort.

### Faculty Interests

Over 160 faculty members from the UW and FHCRC are researching molecular and cellular biology and are skilled in the training of graduate students. Faculty research interests encompass both prokaryotic and eukaryotic cells in the following general areas: regulation of gene expression/growth factors/hormones, molecular genetics/gene structure/gene families, microbiology/microbial genetics; DNA replication/mutagenesis/repair and recombination, developmental biology/developmental genetics/cell differentiation, virus/retroviruses, immunobiology, cell division/cell proliferation/cell cycle, cell motility/cytoskeleton/biomechanics, neurobiology, cell matrix interactions/extracellular matrix, and molecular structure.

## Admission

The Molecular and Cellular Biology Program is a highly competitive interdisciplinary program which receives applications from outstanding students nationwide. MCB Program information and requirements are listed at its Web site. Applications are due January 2 each year and are available on-line via a link from the homepage. Applications can also be requested by email ([mcb@u.washington.edu](mailto:mcb@u.washington.edu)) or by calling (206) 543-0253. Applicants may apply both to the MCB Program and to any of the thirteen participating UW departments. Since application requirements or deadlines may differ, applicants should contact the participating departments for information.

In addition to the Graduate School application requirements, prospective students must submit an MCB Program application form, a personal statement of research interests and career goals, three letters of recommendation, and Graduate Record Examination scores with a subject test.

## Financial Aid

The MCB Program provides a stipend plus tuition for the first year of study. At the end of the first year of study, students choose a doctoral committee, and subsequent years of support are provided by the department of the committee chair. Students maintaining satisfactory academic progress receive funding for the duration of their graduate training.

## Ph.D. Requirements

The program, which culminates in the Ph.D. degree, includes training in laboratory research, supervised teaching experience, lectures and seminars on current research topics, rigorous course work in molecular and cellular biology, and graduate-level electives in the student's area of interest. During the first year, students participate in research rotations in three laboratories. Lab rotations offer students an opportunity to learn basic research techniques and to become familiar with the various research areas in molecular and cellular biology of participating faculty members. First-year course work includes a three quarter series of modular courses in molecular and cellular biology and a three-quarter literature review course. Selection from a large list of elective courses is based on the student's background and interests. During the summer of the first year, students choose their permanent advisor and form their Doctoral Supervisory Committee. Students may also elect to participate in a summer biotechnology externship course during their first summer.

During the second year, students generally complete their supervised teaching experience and their elective course work. Autumn quarter of the third year, students take the General Examination. Formal course work is usually completed by this time, although students may take elective courses of interest. Students continue to participate in various department seminar courses and journal clubs.

After completing their General Exam and course work, students work full-time on the dissertation research project. The final requirements for the Ph.D. degree include a written dissertation and an oral dissertation defense.

MCB Program students participate in a monthly seminar program which involves student and faculty presentations. The purpose of these seminars is to acquaint students with the research carried on in many laboratories involved in the program and to give students practical experience in making presentations before their peers. In addition, MCB Program students are invited to seminar programs in the participating departments and the Fred Hutchinson Cancer Research Center.

## Faculty

### Professors

Aderem, Alan A. \* 1996; PhD, 1979, University of Capetown (South Africa); macrophage development and differentiation, phagocytosis, signal transduction and the cytoskeleton.

Bassingthwaighe, James \* 1975; MD, 1955, University of Toronto (Canada); PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Beavo, Joseph A. \* 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Bendich, Arnold J. \* 1970; PhD, 1969, University of Washington; chromosome structure in mitochondria, chloroplasts, and bacteria.

Berger, Albert J. \* 1978; MA, 1965, PhD, 1967, Princeton University; PhD, 1976, University of California (San Francisco); neural and chemical control of respiration.

Bevan, Michael J. \* 1990; PhD, 1972, National Institute for Medical Research (UK); T lymphocyte development and specificity, response to pathogens.

Bomsztyk, Karol 1983; MD, 1977, University of Rochester; nephrology.

Bornstein, Paul \* 1967; MD, 1958, New York University; cell-matrix interactions and gene regulation.

Bothwell, Mark A. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of nerve growth factors.

Byers, Breck E. \* 1970; PhD, 1967, Harvard University; cell biology; mitosis and meiosis, mechanisms of nuclear division and crossing-over in yeast.

Byers, Peter H. \* 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion.

Campbell, Lee Ann \* 1985; PhD, 1982, Pennsylvania State University; molecular biology and pathogenic mechanisms of chlamydiae.

Carlson, Steven S. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Carter, William G. \* 1981; PhD, 1974, University of California (Davis); elucidation of components in cell attachment and cell spreading in normal cells.

Catterall, William A. \* 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Cattolico, Rose A. \* 1975; PhD, 1973, State University of New York (Stony Brook); plastid replication, nucleic acid biochemistry in synchronized unicellular algae.

Champoux, James J. \* 1972; PhD, 1970, Stanford University; DNA replication, tumor virology.

Chavkin, Charles \* 1984; PhD, 1982, Stanford University; molecular mechanisms of opiate tolerance, the physiological role of neuropeptides in brain function.

Clark, John I. 1982; PhD, 1974, University of Washington; structural and developmental basis of lens-cell transparency and cataract formation.

Cleland, Robert E. \* 1964; PhD, 1957, California Institute of Technology; plant physiology, plant hormones.

Collins, Steven J. \* 1982; MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.

Cooper, Jonathan A. \* 1987; (Affiliate); PhD, 1976, University of Warwick (UK); regulation of cellular metabolism and proliferation by protein phosphorylation.

Costa, Lucio Guido \* 1983; PharmD, 1977, University of Milan (Italy); neurotoxicology; developmental and molecular mechanisms/biological markers of neurotoxicity.

Dale-Crunk, Beverly A. \* 1972; PhD, 1968, University of Michigan; keratin biochemistry.

Detwiler, Peter B. \* 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.

Disteche, Christine M. \* 1980; PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.

Dorsa, Daniel M. \* 1981; PhD, 1977, University of California (Davis); neuropharmacology, neurochemistry.

Ebrey, Thomas 2000, (Research); PhD, 1968, University of Chicago; phototransaction in biology, halo bacteria.

Eisenman, Robert M. \* 1982, (Affiliate); PhD, 1971, University of Chicago; transcription, protein-protein interaction, cancer.

Emerman, Michael 1994, (Affiliate); PhD, 1986, University of Wisconsin; molecular biology of HIV.

Fangman, Walton L. \* 1967; PhD, 1965, Purdue University; molecular genetics: control of replication of yeast chromosomes, plasmid and mitochondrial DNA.

Faustman, Elaine M. \* 1981; PhD, 1980, Michigan State University; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds.

Fausto, Nelson \* 1994; MD, 1960, Sao Paulo State University (Brazil); liver regeneration, tumor biology, carcinogenesis, growth factors.

Fields, Stanley \* 1995; MA, 1978, PhD, 1981, Cambridge University (UK); molecular genetics.

Furlong, Clement E. \* 1977, (Research); PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.

Galloway, Denise A. \* 1982, (Research); PhD, 1976, City University of New York; viral pathogenesis and neoplasia.

Gelb, Michael H. \* 1985; PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry, molecular and cellular biology.

Gordon, Albert M. \* 1964; PhD, 1961, Cornell University; skeletal muscle physiology.

Gordon, Milton \* 1959; PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants, sequence of agrobacteria.

Gottschling, Daniel E. 1996, (Affiliate); PhD, 1984, University of Colorado; chromosome biology.

Graubard, Katherine \* 1979, (Research); PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.

Groudine, Mark \* 1982; MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity in development and transformation.

Hauschka, Stephen D. \* 1972; PhD, 1966, Johns Hopkins University; muscle gene regulation, gene therapy, stem cell phenotypic conversion.

Hille, Bertil \* 1968; PhD, 1967, Rockefeller University; ion channels of excitable membranes.

Hille, Merrill B. \* 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.

Hol, Wilhelmus G. J. \* 1992; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Howard, Jonathon \* 1989; PhD, 1983, Australian National University; biophysics of molecular motors.

Hurley, James Bryant \* 1985; PhD, 1979, University of Illinois; molecular basis of vision.

Katze, Michael Gerald \* 1987; PhD, 1980, Hahnemann Medical College; regulation of viral gene expression at the translational level.

King, Mary-Claire \* 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

Klevit, Rachel E. \* 1983; DPhil, 1981, Oxford University (UK); structure/function of breast cancer proteins; protein NMR, mass spectrometry, other spectroscopies.

Lernmark, Ake \* 1988; MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity, with emphasis on insulin-dependent diabetes.

Lidstrom, Mary E. \* 1990; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

Linal, Maxine L. \* 1982, (Research); PhD, 1970, Tufts University; retroviral replication and genetics, retroviral transformation.

Loeb, Lawrence A. \* 1978; MD, 1961, New York University; PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.

Luchtel, Daniel L. \* 1972; PhD, 1969, University of Washington; electron microscopy and cell biology, lung anatomy/pathophysiology, fiber toxicology.

Manoil, Colin C. \* 1986; PhD, 1979, Stanford University; molecular genetics, protein localization in bacteria.

Martin, George \* 1957; MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, Alzheimer's disease, Werner's syndrome.

McKnight, G. Stanley \* 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.

Miller, Arthur D. \* 1987, (Affiliate); PhD, 1982, Stanford University; retrovirus biology, gene transfer, gene therapy.

Miller, Samuel I. \* 1995; MD, 1979, Baylor University; molecular pathogenesis of bacterial diseases.

Monnat, Raymond J. Jr. \* 1982; MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.

Moody, William J. \* 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.

Moon, Randall T. \* 1985; PhD, 1982, University of Washington; Wnt signal transduction in development and disease.

Morris, David R. \* 1966; PhD, 1964, University of Illinois; cell growth, gene expression, polyamines.

Mullins, James I. \* 1994; PhD, 1978, University of Minnesota; cell biology and biochemistry.

Nathanson, Neil M. \* 1979; PhD, 1975, Brandeis University; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors.

Neiman, Paul E. \* 1971; MD, 1964, University of Washington; oncology.

Omicinski, Curtis J. \* 1983; PhD, 1980, University of Washington; molecular toxicology, genetic regulation/expression of drug/chemical metabolizing enzymes.

Overbaugh, Julie Maureen \* 1988; PhD, 1983, University of Colorado (Boulder); molecular mechanisms of virus-host cell interactions/retroviral pathogenesis/aids.

Palczewski, Krzysztof \* 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Palmiter, Richard D. \* 1982; PhD, 1968, Stanford University; genetic approaches to neuromodulator function in mammalian nervous system.

- Parsons, Marilyn \* 1981; PhD, 1979, Stanford University; molecular and cellular parasitology.
- Rabinovitch, Peter S. \* 1980; MD, 1979, PhD, 1980, University of Washington; cellular aging, preneoplastic disease, cell cycle abnormalities, DNA change.
- Reeder, Ronald H. \* 1981, (Affiliate); PhD, 1965, Massachusetts Institute of Technology; regulation of ribosomal RNA transcription by RNA polymerase I.
- Reh, Thomas A. \* 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.
- Reid, Brian J. \* 1983; PhD, 1975, MD, 1980, University of Washington; genetic and cell-cycle abnormalities in neoplastic progression in Barrett's esophagus.
- Riddiford, Lynn M. \* 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology, mechanisms of hormone action.
- Roberts, James Michael \* 1989, (Affiliate); MD, 1984, PhD, 1984, Columbia University; how cyclin-kinase complexes regulate events necessary for chromosomal DNA replication.
- Roberts, Marilyn C. \* 1981; PhD, 1978, University of Washington; antibiotic resistance genes.
- Schubiger, Gerold A. \* 1972; PhD, 1968, University of Zurich (Switzerland); developmental genetic control of *Drosophila* embryos, pattern formation in imaginal disks.
- Schwartz, Stephen Mark \* 1974; MD, 1967, Boston University; PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.
- Sibley, Carol Hopkins \* 1976; PhD, 1974, University of California (San Francisco); mammalian cell genetics and molecular parasitology.
- Smith, Gerald R. \* 1983, (Affiliate); PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.
- Staley, James T. \* 1971; PhD, 1967, University of California (Davis); microbial ecology, bacterial systematics, general microbiology.
- Stamatoyannopoulos, George 1964; MD, 1958, DMedSc, 1960, University of Athens (Greece); medical genetics.
- Steiner, Robert A. \* 1977; PhD, 1975, University of Oregon; neuroendocrinology.
- Storm, Daniel R. \* 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca<sup>2+</sup> signal transduction systems in the CNS.
- Stuart, Kenneth Daniel \* 1985; PhD, 1969, University of Iowa; molecular biology of protozoan pathogens.
- Truman, James W. \* 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect neural development, circadian rhythms.
- Van Volkenburgh, Elizabeth \* 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.
- Wakimoto, Barbara T. \* 1984; PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.
- Westrum, Lesnick E. \* 1966; MD, 1963, University of Washington; PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.
- Wight, Thomas \* 1978; PhD, 1972, University of New Hampshire; connective tissue biology and pathology, proteoglycans metabolism, atherosclerosis.
- Willows, A. O. Dennis \* 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.
- Wilson, Christopher B. \* 1980; MD, 1972, University of California (Los Angeles); T cell development, innate immunity, host defenses to infection.
- Yao, Meng Chao \* 1988, (Affiliate); PhD, 1975, University of Rochester; regulation of gene amplification and chromosome rearrangements in *Tetrahymena*.
- Young, Elton \* 1969; PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.

### Associate Professors

- Bakken, Aimee \* 1973; PhD, 1970, University of Iowa; gene regulation during oogenesis and embryogenesis, developmental, cellular and molecular biology.
- Berg, Celeste A. \* 1990; PhD, 1986, Yale University; *Drosophila* developmental genetics: cell communication and cell migration during oogenesis.
- Braun, Robert Elmer \* 1986; PhD, 1985, Tufts University; mouse molecular genetics and male germ cell development.
- Breeden, Linda 1994, (Affiliate); PhD, 1981, University of Colorado (Boulder); cell cycle regulation in budding yeast.
- Comai, Luca \* 1989; PhD, 1980, University of California (Davis); chromatin, functional genomics, polyploidy.
- Concannon, Patrick J. \* 1989, (Affiliate); PhD, 1984, University of California (Los Angeles); juvenile and adult onset diabetes, genetics of radiation sensitivity/cancer susceptibility syndromes.
- Cooper, Mark S. \* 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.
- Davis, Trisha Nell \* 1987; PhD, 1983, Yale University; cell biology, centrosomes, mitosis, cell cycle, genomic instability.
- Edwards, Scott V. 1994; PhD, 1992, University of California (Berkeley); molecular population genetics and evolution, avian comparative biology and systematics.
- Farr, Andrew G. \* 1982; PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.
- Feagin, Jean E. \* 1993; PhD, 1982, Stanford University; molecular parasitology, emphasizing organelle gene organization and expression in protozoans.
- Fink, Pamela J. \* 1990; PhD, 1981, Massachusetts Institute of Technology; T cell differentiation and self tolerance, FAS ligand-mediated costimulation in T cells.
- Geballe, Adam Philip \* 1988; MD, 1978, Duke University; virology.
- Giachelli, Cecilia \* 1982; PhD, 1987, University of Washington; adhesion molecules and vascular biology processes.
- Hahn, Steven M. \* 1994, (Affiliate); PhD, 1984, Brandeis University; the mechanism and regulation of eukaryotic transcription.
- Henikoff, Steven 1982, (Affiliate); PhD, 1977, Harvard University; chromosome organization, epigenetic effects, analysis of protein sequence information.
- Hockenbery, David M. \* 1994; MD, 1982, Washington University; gastroenterology.
- Hughes, Kelly T. \* 1989; PhD, 1984, University of Utah; genetics, gene regulation, microbial physiology, and metabolism.
- Kapur, Raj P. \* 1988; MD, 1988, University of Southern California; human embryology, birth defects.
- Kemp, Christopher, (Affiliate); PhD, 1989, University of Wisconsin; oncogenes and tumor suppressor genes in multistage carcinogenesis.
- Kimelman, David \* 1989; PhD, 1985, Harvard University; molecular regulation of early vertebrate development.
- Kruglyak, Leonid \* 1998, (Affiliate); PhD, 1990, University of California (Berkeley); genetic linkage analysis, population genetics, analysis of gene expression arrays.
- Laird, Charles D. \* 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.
- Leigh, John A. \* 1985; PhD, 1983, University of Illinois; bacterial physiology, biochemistry, genetics.
- Mandoli, Dina F. \* 1987, (Research); PhD, 1983, Stanford University; development and photomorphogenesis in giant unicell using genetics, physiology and molecular biology.
- Moseley, Stephen L. \* 1985; PhD, 1981, University of Washington; molecular basis of pathogenesis in *E. coli* diarrhea.
- Ostrander, Elaine A. \* 1994, (Affiliate); PhD, 1987, Oregon Health Sciences University; study of human cancer susceptibility genes.
- Parkhurst, Susan M. 1994, (Affiliate); PhD, 1995, Johns Hopkins University; developmental, genetic and molecular analysis of *Drosophila* embryogenesis.
- Priess, James R. \* 1993, (Affiliate); PhD, 1983, University of Colorado (Boulder); reliability models, fault trees.
- Rose, Timothy M. \* 1991; PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.
- Rosenfeld, Michael E. \* 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.
- Roth, Mark \* 1994, (Affiliate); PhD, 1988, University of Colorado (Boulder); chromosome segregation, growth control.
- Rudensky, Alexander Y. \* 1992; PhD, 1986, Gabrichevsky Institute For Epidemiology and Microbiology; antigen processing and presentation, T-cell development.
- Soriano, Philippe 1994, (Affiliate); PhD, 1978, University of Paris (France); vertebrate developmental genetics.
- Stayton, Patrick S. \* 1992; PhD, 1989, University of Illinois; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics.
- Stenkamp, Ronald E. \* 1978; PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, blood clotting proteins, streptavidin.
- Stoddard, Barry L. \* 1994, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; structure and function of enzyme catalysts, bacterial signal transduction.
- Tapscott, Stephen J. \* 1986; MD, 1982, University of Pennsylvania; neurology, molecular biology.
- Tempel, Bruce L. \* 1988, (Adjunct); PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.
- Thomas, James H. \* 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.
- Thouless, Margaret E. \* 1980; PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.
- Traxler, Beth A. \* 1992; PhD, 1987, Carnegie Mellon University; bacterial physiology, genetics, and membrane protein biochemistry.
- Van Voorhis, Wesley C. \* 1986; PhD, 1983, Rockefeller University; MD, 1984, Cornell University; infectious diseases.
- Vogel, Viola \* 1990; Dctr O, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, nonlinear optics, microscopy.

Wright, Robin L. \* 1990; PhD, 1985, Carnegie Mellon University; biogenesis of membranes, yeast cell biology.

Yablonka-Reuveni, Zipora \* 1982, (Research); MSc, 1975, Weizmann Institute For Science (Israel); PhD, 1979, University of Windsor (Canada); myogenesis during growth, development, and regeneration of skeletal muscle.

Zagotta, William N. \* 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.

Zarbl, Helmut 1996, (Affiliate); PhD, 1983, McGill University (Canada); toxicology, cancer biology, environmental carcinogenesis.

### Assistant Professors

Bajjalieh, Sandra M. \* 1995; MS, 1983, University of Illinois; PhD, 1989, University of Wisconsin; molecular neurobiology.

Baker, David \* 1993; PhD, 1989, University of California (Berkeley); protein folding.

Bix, Mark \* 1999; PhD, 1993, Massachusetts Institute of Technology; cellular differentiation: role of epigenetic mechanisms in regulating cytokine gene expression.

Bornfeldt, Karin E. \* 1991; PhD, 1991, Linköping University (Sweden); atherosclerosis, vascular biology, intercellular signaling, diabetics.

Clurman, Bruce E. 1991; PhD, 1988, MD, 1989, Cornell University; oncology.

Cunningham, Michael L. \* 1988; MD, 1988, University of Vermont; PhD, 1996, University of Washington; congenital defects.

Edgar, Bruce A. 1994, (Affiliate); PhD, 1987, University of Washington; cell cycle control in *Drosophila*.

Ferre-D'amare, Adrian Riu 2000, (Affiliate); PhD, 1995, Rockefeller University.

Foote, Jefferson \* 1994, (Affiliate); PhD, 1985, University of California (Berkeley); biophysics of immune maturation, antibody engineering and immunotherapy, x-ray crystallography.

Giniger, Edward Scott \* 1994, (Research); PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.

Goverman, Joan M. \* 1992, (Adjunct); PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.

Horwitz, Marshall S. 1983; PhD, 1988, MD, 1990, University of Washington; transcription regulation.

Lampe, Paul D. \* 1996, (Research); PhD, 1984, University of Minnesota; regulation of intercellular communication via gap junctions.

Moens, Cecilia B. \* 1998, (Affiliate); PhD, 1993, University of Toronto; molecular and medical genetics.

Murry, Charles E. \* 1989; PhD, 1989, MD, 1989, Duke University; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation.

Nelson, Peter S. \* 1993, (Adjunct); MD, 1986, University of Kansas; study of human carcinogenesis using tools of genomics and bioinformatics.

Neugebauer, Karla \* 1999; PhD, 1990, University of California (San Francisco); transcription and splicing regulators studied with high resolution light microscopy.

Pallanck, Leo J. \* 1997; PhD, 1992, Albert Einstein College of Medicine; neurogenetics.

Raible, David W. \* 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Roelink, Henk \* 1996; MSc, 1985, University of Groningen (Netherlands); PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules

in mediating neural tissue differentiation during vertebrate development.

Ruohola-Baker, Hannele \* 1993; PhD, 1989, Helsinki University (Finland); signaling, pattern formation, establishment of polarity in development.

Rutherford, Suzanne L. 1999, (Affiliate); PhD, 1995, University of California (San Diego); developmental canalization and the evolution of networks of signal transduction pathways.

Sherman, David R. \* 1998; PhD, 1987, Vanderbilt University; molecular genetics, microbiology and biochemistry of pathogenic mycobacteria.

Strong, Roland K. \* 1994, (Affiliate); PhD, 1990, Harvard University; structural molecular biology and crystallography of proteins mediating mucosal immune responses.

Swalla, Billie J. 1999; PhD, 1988, University of Iowa; evolution of invertebrates studied by comparison of gene expression and sequences.

Torii, Keiko \* 1999; PhD, 1993, University of Tsukuba (Japan); arabidopsis developmental genetics, receptor-mediated signal transduction.

Tsukiyama, Toshio \* 1999, (Affiliate); PhD, 1991, Hiroshima University (Japan).

Verlinde, Christophe L. M. \* 1992, (Research); PhD, 1988, Catholic University of Leuven (Belgium); structure-based drug design and protein crystallography.

Wang, Edith H. \* 1996; PhD, 1991, Columbia University; regulation of genes that control cellular proliferation.

White, Theodore C. \* 1996; PhD, 1984, University of Michigan; molecular mechanisms of virulence and drug resistance in pathogenic yeasts.

Wordeman, Linda \* 1994; PhD, 1988, University of California (Berkeley); mitosis and myofibril formation.

Xia, Zhengui \* 1987; MS, 1985, Wuhan University (China); PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

Xu, Wenqing \* 1999; PhD, 1995, Massachusetts Institute of Technology; structural studies of proteins involved in cancer, immune dysfunction, and neuronal diseases.

Zhang, Kam \* 1995, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; structural studies of proteins involved in apoptosis; protein folding and macromolecular phasing.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

**MCB 511 Cell Cycle Control (3)** *Breeden, Roberts, Edgar* Studies recent advances in understanding cell-cycle control, arising from genetics and biochemical studies of fission and budding yeast, marine invertebrates, *Drosophila*, amphibians, and cultured cells. Addresses the biochemical processes and molecular interactions and the rate-limiting events in the cell cycle, and the coupling of those events to physiological signals. Offered: A.

**MCB 514 Molecular and Cellular Biology Literature Review (2)** *Cooper, Moon* Emphasizes critical evaluation of the original literature orally and in writing. Subject matter coordinated with CONJ 501. Open only to first-year students in the Molecular and Cellular Biology Program.

**MCB 515 Molecular and Cellular Biology Literature Review (2)** *Cooper, Moon* Emphasizes critical evaluation of the original literature orally and in writ-

ing. Subject matter coordinated with CONJ 502. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: W.

**MCB 516 Molecular and Cellular Biology Literature Review (2)** *Cooper, Moon* Emphasizes critical evaluation of the original literature orally and in writing. Subject matter coordinated with CONJ 503. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: S.

**MCB 517 Topics in Molecular and Cellular Biology (1-5, max. 12)** Advanced in-depth coverage of specific areas of molecular and cellular biology of current interest. Lectures by University of Washington faculty and invited speakers involved in research in this area. A basic knowledge of principles of molecular and cellular biology assumed.

**MCB 519 Topics in Cancer (1, max. 6)** Examination of ways to integrate basic, clinical, and public health sciences to increase understanding of human biology and disease. Seminars in introduction to cancer research as viewed by basic, clinical, and public health sciences, origins of cancer, cancer prevention, cancer progression, and therapies for cancer. Credit/no credit only.

**MCB 520 Tutorial in Molecular and Cellular Biology (1-2, max. 2)** *Cooper* Special topics reading and discussion. Offered: A.

**MCB 521 Embryos, Genes and Development (4)** *Parkhurst, Priess, Soriano* Introduction to vertebrate and invertebrate development emphasizing cellular, genetic, and molecular mechanisms. Focuses on development of fruit flies, nematodes, and mice. Emphasizes embryological processes including induction, determination, pattern formation. Relationship between development and evolution. Technologies include transgenic animals, genetics, mosaic analysis, homologous recombination, somatic cell genetics, embryonic manipulations. Offered: W.

**MCB 532 Human Pathogenic Viruses (3)** *Galloway, Linail* Replication, regulation, and pathogenesis of several groups of human viruses, including human immunodeficiency virus and papillomaviruses. Emphasis on the unique aspects of the viral-like cycles as they relate to effects on infected cells and organisms. Guest lecturers focus on viral immunology, measles, herpes simplex virus and HHV-8. Offered: Sp.

**MCB 542 Structural Molecular Biology (3)** *Strong, Stoddard, Zhang* Overview of structure/function studies and methods, and current results in key areas of molecular biology. Introduction to the methods of structural biology, with emphasis on how to read and assess a structural paper. Analysis and discussion of recently published studies of macromolecular structure/function relationships. Extensive, interactive computer modeling and graphics tutorials. Offered: A.

**MCB 560 Biotechnology Externship (2-12, max. 12)** *Cooper, Moon* Supervised research in a biotechnology company. Prerequisite: permission of instructor and doctoral candidacy. Offered: AWSpS.

**MCB 562 Cell Signaling and Oncogenesis (3)** *Cooper, Carter, Eisenman* Discusses the roles of cell architecture, signal transduction, and the nucleus in homeostasis of normal tissues and in cancer. Regulation of cell proliferation and differentiation in normal tissues. Protooncogenes and oncogenes. Tumor suppressor genes. Cell-cell and cell-matrix interactions. The development, vascularization, metastasis of tumors. Offered: Sp.

**MCB 580 Teaching Practicum in Molecular and Cellular Biology (3, max. 6)** Supervised training in the teaching of molecular and cellular biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MCB 599 Introduction to Research in Molecular and Cellular Biology (\* max. 20)** The student rotates through one research laboratory involved in the Molecular and Cellular Biology Program per quarter. Open only to first-year students in the Molecular and Cellular Biology Program. Credit/no credit only. Offered: AWPSP.

**MCB 600 Independent Study or Research (\*)**

**MCB 700 Master's Thesis (\*)** Offered: AWPSP.

**MCB 800 Doctoral Dissertation (\*)**

## Museology



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/museology.html](http://www.washington.edu/students/genocat/academic/museology.html)



Program Web Page:  
[www.grad.washington.edu/inter/museo.htm](http://www.grad.washington.edu/inter/museo.htm)

Graduate Program Coordinator  
Burke Museum, Box 353010  
(206) 543-9680

The Museology Program is designed to provide the generalized training, knowledge, and skills necessary to pursue a professional career in museum work. The program is directed toward the training of a broad range of museum professionals interested in curation and management of collections in anthropology, art, botany, geology, history, and zoology as well as in interpretive programs and museum administration.

Courses include required core museology subjects as well as a range of classes offering students the chance to specialize in interest areas. Course work is divided between the theoretical and practical aspects of museum operations. Classes take the form of lecture courses, seminars, special lectures by guest speakers, field trips, laboratory and collection management courses, practicums and internships. Since admission to the program is highly selective, classes are small and students have close contact with faculty.

Practical experience, an essential component of the program, is provided by several museological institutions at the University of Washington, including the Thomas Burke Memorial Washington State Museum, the Henry Art Gallery, the Herbarium, the Arboretum, the Fish Collection, and the University Libraries. The Burke Museum acts as the coordinating unit of the program. Located on the campus of the University of Washington, the Burke Museum is Washington state's natural-history and anthropology museum, and is the oldest and largest natural-history museum in the Northwest. It has nationally and internationally ranked collections focusing on the anthropology, geology, and zoology of the Pacific region and Pacific Rim.

### Program Requirements

The graduate program in museology is designed to take two years to complete, consisting of six quarters of academic study and research. During the first year, students carry on average between 10 and 15 credits each quarter; during the second year, the number of credits may vary depending on research, practicum, and internship work. Students may enroll for part-time study, but this is discouraged during the first year.

Requirements for successful completion of the Master of Arts degree include: (1) Completion of a minimum of 36 quarter credits, including 27 course credits and 9 thesis or thesis-project credits, with at least 18 credits of course work numbered 500 or above, including a thesis or thesis project. (2) A minimum of three quarters of full-time residence credit or part-time equivalent. (3) Demonstration of reading competence in one foreign language, if required by the student's supervisory committee due to the student's area of specialization. (4) Completion of an internship in an off-campus museum or related agency approved by the supervisory

committee prior to submission of the student's thesis or thesis project. (5) Presentation of a thesis proposal by the beginning of the fourth quarter of study. (6) Successful completion of an oral examination, covering both the thesis topic and the field of museology in general, following submission of the thesis or thesis project. (7) Completion of all degree requirements within six years.

The following courses are required of all students unless exempted by petition to the Program Coordinating Committee or credited for relevant course work completed at other universities: MUSEUM 480, 481 or 490 or 491, 482, 483, 498, 590, 591, 592, 593 or 594, 595, 600, 700 or 710. In addition, two or more courses are required in an academic discipline relevant to the area of specialization.

The Museology Program also offers a Graduate Certificate in Museum Studies as an option for graduate students in other degree programs at the University. To qualify, students must take a specified minimum set of four key courses in areas that emphasize either collection research and management, or museum administration and interpretation, and that include hands-on work experience. Information and application materials for the certificate can be obtained from the Museology Program office.

### Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications completed and post-marked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

## Faculty

### Director

James Nason

### Professors

Anderson, Judy M. \* 1988; MA, 1977, University of California (Berkeley); graphic and informational design for business and institutions, book artist.

Kingsbury, Martha \* 1968; PhD, 1969, Harvard University; nineteenth- and twentieth-century European and American art.

Lockard, Joan S. \* 1962; PhD, 1963, University of Wisconsin; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior.

Nason, James \* 1970; PhD, 1970, University of Washington; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America.

Olstad, Roger G. \* 1964, (Emeritus); PhD, 1963, University of Minnesota; science education, teacher education.

Pietsch, Theodore W. \* 1978; PhD, 1973, University of Southern California; ichthyology.

Silbergeld, Jerome \* 1975; PhD, 1974, Stanford University; Chinese art.

Stein, Julie K. \* 1980; MA, 1976, PhD, 1980, University of Minnesota; New World archaeology, Northwest coast archaeology, geoarchaeology, shell middens.

Winn, William David \* 1985; PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

### Associate Professors

Andrews, Richard 1987, (Affiliate); MA, 1975, University of Washington.

Failing, Patricia A. \* 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Fidel, Raya \* 1982; MLS, 1976, Hebrew University of Jerusalem (Israel); PhD, 1982, University of Maryland; information retrieval systems, human information behavior, classification research.

Kahn, Miriam \* 1986; PhD, 1980, Bryn Mawr College; cultural representations, museums, concepts of place, Melanesia, Polynesia.

Minah, Galen F. \* 1970; MArch, 1968, University of Pennsylvania; design process, design, professional practice.

Wright, Robin K. \* 1990; PhD, 1985, University of Washington; Native American art, particularly Northwest coast Indian art.

### Assistant Professor

Olmstead, Richard G. \* 1996; PhD, 1988, University of Washington; plant molecular systematics, plant phylogeny and macroevolution.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### MUSEUM 480 Introduction to Museology (3) I&S

Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with ANTH 480.

### MUSEUM 481 Museum Collection Management: Ethnology (3) I&S

Lecture and work experience in museum collection management in the ethnology collections of the Burke Memorial Washington State Museum, including identification, cataloging, fumigation, storage, cleaning, inventory, and specimen preparation for exhibition of archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Offered: jointly with ANTH 481.

### MUSEUM 482 Museum Conservation (3) I&S

Lecture and demonstrations in the recognition and treatment of museum conservation problems for specimens of all types. Application of basic principles to specific preventive and active conservation and restoration problems encountered by curatorial personnel. Offered: jointly with ANTH 482.

### MUSEUM 483 Museum Operations Practicum (3, max. 9)

Provides students with the opportunity to apply their general museological training in one or more areas of supervised museum operation areas, e.g., registration, education, or exhibition through project-oriented work in the Burke Museum.

### MUSEUM 488 Special Topics in Museology (3-5)

In-depth examination of selected current issues within the field of museology.

### MUSEUM 490 Museum Curation Practicum (1-5, max. 15)

Application of museological training in curation of ethnographic, archeological, geological, or zoological collection materials in the Burke Museum. Supervised work ranges from fundamental collection documentation and research to preventive conservation, storage, and other special curation projects. Offered: jointly with ARCHY 490.

### MUSEUM 491 Museum Curation Practicum: General Collections (1-5, max. 15)

The application of museological training in the curation of art, botanical, geological, historic, zoological, or other collections. Work under the supervision of faculty curators ranges from fundamental collection documentation to preventive conservation or storage.

### MUSEUM 498 Museum Internship (3-15, max. 15)

Faculty supervised off-campus internships in museums and allied institutions. Each internship is indi-

vidually established and provides students with practical experience and the opportunity to apply and learn new professional skills. Prerequisite: permission of instructor.

**MUSEUM 590 Seminar in Museum Theory (3)**  
Fundamental theoretical issues involved in current museum administrative and operations work, including administrative structure, organizational conflicts, museum-community relations, and museum educational programming. Prerequisite: permission of instructor. Offered: jointly with ANTH 590.

**MUSEUM 591 Seminar in Museum Operations (3)**  
Designing hypothetical museums and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurring budgets, security system, records system, educational plan, and policy making. Recommended: 590. Offered: jointly with ANTH 591.

**MUSEUM 592 Seminar in Museum Specimen Documentation (3)**  
Seminar discussion of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic studies. Documentation of a collection and reference work. Recommended: 590 and 591. Offered: jointly with ANTH 592.

**MUSEUM 593 Museum Exhibition Seminar (3)**  
Review of critical issues in the planning, design, preparation, and installation of museum exhibits, including exhibit conservation, visitor-based design factors, ideological aspects of interpretation, and community relations. Readings and examination of exhibits are combined with case study work.

**MUSEUM 594 Seminar in Museum Education (3)**  
Focus on museums as educational institutions with consideration of the place of education in the mission of museums, the educational role of museums compared to that of other institutions, the museum's diverse audiences and their needs, and the educational methods and techniques museums may employ in pursuing their goals. Recommended: 480.

**MUSEUM 595 Museum Legal and Ethical Issues (3)**  
Survey of the legal and ethical issues regarding international and national museum operations, including the control and movement of cultural property, artistic and intellectual rights and copyright, concepts of patrimony and issues of repatriation, as well as other relevant policies and regulations.

**MUSEUM 600 Independent Study or Research (1-10, max. 10)**

**MUSEUM 700 Master's Thesis (1-10, max. 10)**

**MUSEUM 710 Master's Project (1-10, max. 10)**  
Credit/no credit only.

## Near and Middle Eastern Studies



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Near\\_Middle\\_East.html](http://www.washington.edu/students/genocat/academic/Near_Middle_East.html)



Program Web page:  
[www.grad.washington.edu/inter/nme.htm](http://www.grad.washington.edu/inter/nme.htm)

Graduate Program Coordinator  
200 Gerberding Hall, Box 351240  
(206) 543-6398

The interdisciplinary Ph.D. program in Near and Middle Eastern Studies is designed for students who wish to pursue research with a comparative perspective in Near Eastern languages and literature: Arabic, Hebrew, Persian (or Dari or Tajik), Turkish and Central Asian Turkic languages; Near Eastern linguistics; Islamic topics, namely, Islamic law, history, institutions,

theology, and mysticism; comparative religion: Judaism, Christianity, and Islam; and interdisciplinary investigations of modern topics using the social sciences. The program is administered by an interdisciplinary Graduate School faculty group. The program of studies includes courses offered in the Department of Near Eastern Languages and Civilization, the Jackson School of International Studies, and other departments on campus. Students in the program must take courses in both the humanities and social sciences.

### Degree Requirements and Satisfactory Progress

Specific course work and areas of concentration will be determined by the student's interests within the framework of the degree and satisfactory progress requirements listed below.

1. Within 18 months of admission, demonstration of a general knowledge of history and culture in one of the following general fields: Islamic civilization; Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic languages and literature; the modern Middle East; or comparative religion either through previous degree work or through examination administered by the program.
2. Within three years of admission, completion of two advanced courses in the humanities, one of which must be in the Department of Near Eastern Languages and Civilization (NELC), and two advanced courses in the social sciences, one of which must be in the Department of History. These courses are in addition to work the student may have done at the B.A. and M.A. level.
3. Within three years of admission, completion of a graduate seminar. Two graduate seminars are required if none was taken at the M.A. level.
4. A student will be expected to have studied three languages, two of which must be regional languages and one of which must be a "Western" European language other than English, such as French, German, Italian, Russian, or Spanish. The student's Supervisory Committee will decide whether a fourth language will be required and whether the fourth required language will be European or regional. Students pursuing language-related work may anticipate a fourth required language, whereas those pursuing social-science-related studies may not. Before the General Exam listed below may be taken, the student must complete the language requirements including the second-year level in a regional language different from the two languages offered at the time of admission if both were not regional languages.
5. Disciplinary Method and Theory Requirements. For all students conducting field work or working with documents, whether social science or humanities focused, and for all social science-oriented students, the following courses are strongly encouraged: (a) ANTH 550, Field Techniques of Anthropology, and (b) POL S 491, Political Research Design and Analysis; or (c) their equivalents in appropriate disciplines.

For those students doing both humanities-oriented research and not conducting field work, two method and theory courses in the appropriate discipline or disciplines (e.g., comparative literature, philosophy) are required.

6. Disciplinary Core Courses. Each student is required to take two disciplinary core courses in the appropriate fields. Core courses (or field courses) survey the literature, methods, and theoretical issues involved in a broad field of inquiry, as opposed to elective topical courses, which cover a much smaller area. Core courses should be chosen according to the anticipated research interests and fields for preliminary examination of each student. For example, these core disciplinary courses might focus on comparative politics, comparative religion, feminist theory, ethnicity and

nationalism, analysis of linguistic structures, seminar in cognitive anthropology, comparative legal institutions, or international political economy. Courses on a narrow field of inquiry (such as Arab-Israeli conflict) do not constitute field or core courses, though they may contribute to a student's general field.

### Annual Review

A subcommittee of the Near and Middle Eastern Studies program faculty will meet each spring to review the progress of all students in the Ph.D. program. Either the chair of the student's committee, the program's graduate adviser, or the program's director will inform students of the results of this annual review.

### Ph.D. Examinations and Dissertation

The student will be expected to take the following examinations: (1) preliminary exams consisting of an area of specialization exam and a theory and discipline exam; (2) a General Examination, consisting of a take-home part and an oral part; and (3) a Final Examination, which is the Ph.D. thesis defense.

Students must meet the general University requirements concerning admission to candidacy for the doctoral degree, the dissertation, and final examinations, including an oral examination.

A student's Ph.D. supervisory committee shall consist of no less than three members of the University of Washington's Graduate School faculty as well as a representative of the Graduate School (GSR). The chair of the committee must be an active member of the Graduate School faculty. At least two members of the committee must be members of the Near and Middle Eastern Studies faculty group. Additional members may be asked to join the committee.

Students will write a dissertation as the final requirement for the Ph.D. degree. The topic of the dissertation will be set in consultation with the Ph.D. candidate's supervisory committee.

### Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications which are completed and postmarked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

## Faculty

### Director

Jere Bacharach

### Professors

Bacharach, Jere L. \* 1967; MA, 1962, Harvard University; PhD, 1967, University of Michigan; history of the Middle East, Islam.

Brame, Michael K. \* 1974; PhD, 1970, Massachusetts Institute of Technology; syntax, phonology, structure of Arabic and English.

Cirtautas, Ilse D. \* 1968; PhD, 1958, University of Hamburg (Germany); Turkic languages and literatures.

Heer, Nicholas L. \* 1965, (Emeritus); PhD, 1955, Princeton University; Arabic language and literature, Islamic theology and philosophy.

Jaffee, Martin S. \* 1987, (Adjunct); PhD, 1980, Brown University; rabbinic religion and literature in late antiquity.

Karimi-Hakkak, Ahmad \* 1985; PhD, 1979, Rutgers University; Persian language and literature, Iranian culture and civilization.

Kartsonis, Anna D. \* 1983; PhD, 1982, New York University; Byzantine and medieval art.

MacKay, Pierre A. \* 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post-classical and Byzantine Greek literature, numismatics.

Migdal, Joel S. \* 1980; MA, 1968, PhD, 1972, Harvard University; state-society relations, rules of public space, Israel-Palestine.

Sokoloff, Naomi B. \* 1985; PhD, 1980, Princeton University; Hebrew language and literature.

Wenke, Robert J. \* 1975; PhD, 1975, University of Michigan; archaeology of Egypt, the Middle East, and quantitative methods.

Williams, Michael A. \* 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Ziadeh, Farhat J. \* 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

### Associate Professors

Deyoung, Terri L. \* 1991; PhD, 1988, University of California (Berkeley); Arabic language and literature.

Goldberg, Ellis \* 1985; PhD, 1983, University of California (Berkeley); political economy of the Middle East, comparative politics.

Kasaba, Resat \* 1985; PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Waugh, Daniel Clarke \* 1972; PhD, 1972, Harvard University; medieval Russian history.

### Assistant Professors

Close, Angela E. \* 1995; MA, 1974, PhD, 1976, Cambridge University (UK); prehistory of North Africa, lithics, paleolithic.

Noegel, Scott B. \* 1995; PhD, 1994, Cornell University; ancient Near Eastern languages.

Walker, Joel T. 1997; PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

Wheeler, Brannon M. \* 1996; PhD, 1993, University of Chicago; Islamic studies, comparative religion, late antiquity, Jewish studies, legal studies.

### Senior Lecturer

Salehi-Esfahani, Haideh 1990; PhD, 1985, University of Pennsylvania; international economics, economic development.

## Neurobiology and Behavior



General Catalog Web page:  
[www.washington.edu/students/gencat/  
academic/Neurobiology\\_Behavior.html](http://www.washington.edu/students/gencat/academic/Neurobiology_Behavior.html)



Program Web page:  
[depts.washington.edu/behneuro/](http://depts.washington.edu/behneuro/)

## Graduate Program

Graduate Program Coordinator  
K546 Health Sciences, Box 357750  
(206) 685-1647  
[neubehav@u.washington.edu](mailto:neubehav@u.washington.edu)

Understanding the brain represents both a major scientific challenge and a wonderful research opportunity. Investigations into the mechanisms of neural function require an interdisciplinary approach using the knowledge base and techniques of anatomy, biochemistry, molecular biology, physiology, pharmacol-

ogy, and the behavioral sciences. Neuroscientists and their students must use these different approaches in their research and training if they are to make inroads to solving the major questions in neuroscience.

The University of Washington has met this challenge by emphasizing neuroscience research in many departments in both the School of Medicine and the College of Arts and Sciences, and by establishing the interdisciplinary graduate program in Neurobiology and Behavior. The laboratories of more than 78 faculty members in 19 departments have combined efforts to form the doctoral training program, continuing a long history of collaborative efforts that cross both departmental and University boundaries.

The program is designed to allow students to obtain both broad training in the neurosciences and more intensive course work in specific areas of interest. The program emphasizes flexibility and encourages students to take responsibility in the design of their own curriculum. Students have the opportunity to work with faculty whose interests span the breadth of neuroscience research. Graduates of the program are well prepared for a variety of careers involving academic, research, industrial, and public policy positions.

Key aspects of the graduate program that are common to all students include (1) a year-long course which provides a core of knowledge in the neurosciences, (2) quarterly first-year laboratory rotations and rotation talks attended by all students in the program, (3) a biweekly seminar series featuring both outside and UW speakers, (4) a biweekly journal club designed to provide students with an introduction to the subsequent week's seminar, and (5) a program-wide retreat, combined with a campus-wide poster session where students and postdoctoral candidates can present their Society for Neuroscience Annual Meeting posters. Thus, the program exposes students throughout their graduate career to the most exciting and current research and concepts covering all areas of neuroscience.

### Application Process

Students who have emphasized either biological or physical sciences in their undergraduate careers are invited to apply. Applicants are requested to send a copy of their academic record; GRE scores, including, if possible, scores on a subject test such as chemistry, physics, molecular and cellular biology, psychology, or biology; and three letters of recommendation from the persons who can best evaluate their potential for success in graduate study. New students enter the graduate program September 15. Applications are considered until January 5. Applications received after January 5 are considered only in unusual circumstances.

### Research Facilities

Participating departments are located in the Health Sciences Center and in the College of Arts and Sciences. Because the program is interdisciplinary, extensive research facilities in all areas of neurosciences are available to the student. The University maintains two major natural and health-sciences libraries in addition to individual departmental libraries. Facilities in the participating departments include electronics and machine shops, instrumentation for synthesis and sequence determination of nucleic acids and proteins, calcium imaging, confocal microscopy, and computer facilities. Equipment for ultrastructural studies is readily available. The resources of the Regional Primate Research Center, the W. M. Keck Center for Advanced Studies in Neural Signaling, and the Friday Harbor Laboratories are also available to the student.

### Financial Aid

The program offers full stipend and tuition support to students through traineeships derived from NIH training grants and private foundation support and through research assistantships supported by the University or

research grant funds. Students with satisfactory academic progress can anticipate that funding will continue for the duration of their program.

## Faculty

### Director

Neil Nathanson

### Professors

Anderson, Marjorie E. \* 1971; PhD, 1969, University of Washington; physiology of basal ganglia and cerebellum.

Baskin, Denis G. \* 1979, (Research); PhD, 1969, University of California (Berkeley); histology, cytochemistry, neuroendocrinology.

Beavo, Joseph A. \* 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Beecher, Michael D. \* 1978; MA, 1965, PhD, 1970, Boston University; animal communication, animal behavior, sensory processes.

Berger, Albert J. \* 1978; MA, 1965, PhD, 1967, Princeton University; PhD, 1976, University of California (San Francisco); neural and chemical control of respiration.

Bernstein, Ilene L. \* 1974; MA, 1967, Columbia University; PhD, 1972, University of California (Los Angeles); behavioral neuroscience, mechanisms affecting appetite and taste preference.

Binder, Marc D. \* 1978; PhD, 1974, University of Southern California; organization of spinal reflexes.

Bothwell, Mark A. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of nerve growth factors.

Brenowitz, Eliot A. \* 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Byers, Margaret R. \* 1972, (Research); PhD, 1969, Harvard University; somatosensory receptor structure, cytochemistry, and pathologic reactions; neuroimmune interactions.

Carlson, Steven S. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Casseday, John H. \* 1996, (Research); MA, 1963, PhD, 1970, Indiana University; neuroethology of sensory systems, echolocation and function of auditory midbrain.

Catterall, William A. \* 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Chavkin, Charles \* 1984; PhD, 1982, Stanford University; molecular mechanisms of opiate tolerance, the physiological role of neuropeptides in brain function.

Crill, Wayne E. \* 1967; MD, 1962, University of Washington; properties of cortical neurons.

Detwiler, Peter B. \* 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.

Diaz, Jaime \* 1978; PhD, 1975, University of California (Los Angeles); brain development, developmental psychopharmacology, neurophysiology.

Dorsa, Daniel M. \* 1981; PhD, 1977, University of California (Davis); neuropharmacology, neurochemistry.

Fetz, Eberhard \* 1975; PhD, 1966, Massachusetts Institute of Technology; cortical regulation of movement.

Fuchs, Albert F. \* 1969; PhD, 1966, Johns Hopkins University; oculomotor physiology.

Graubard, Katherine \* 1979, (Research); PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.

Hille, Bertil \* 1968; PhD, 1967, Rockefeller University; ion channels of excitable membranes.

Howard, Jonathon \* 1989; PhD, 1983, Australian National University; biophysics of molecular motors.

Hurley, James Bryant \* 1985; PhD, 1979, University of Illinois; molecular basis of vision.

Kuhl, Patricia K. \* 1976; MA, 1971, PhD, 1973, University of Minnesota; speech perception.

McKnight, G. Stanley \* 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.

Moody, William J. \* 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.

Moon, Randall T. \* 1985; PhD, 1982, University of Washington; Wnt signal transduction in development and disease.

Morrison, Richard S. \* 1994; PhD, 1982, University of California (Los Angeles); genetic pathways regulating neuronal cell death in disease and injury.

Nathanson, Neil M. \* 1979; PhD, 1975, Brandeis University; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors.

Palczewski, Krzysztof \* 1992; MS, 1980, PhD, 1986, Technical University of Wrocław (Poland); visual transduction.

Palmiter, Richard D. \* 1982; PhD, 1968, Stanford University; genetic approaches to neuromodulator function in mammalian nervous system.

Ransom, Bruce Robert \* 1995; MD, 1972, PhD, 1972, Washington University; neurology, movement disorders, neuroscience research.

Reh, Thomas A. \* 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Riddiford, Lynn M. \* 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology, mechanisms of hormone action.

Rubel, Edwin W. \* 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Schwartzkroin, Philip A. \* 1978; PhD, 1972, Stanford University; mechanisms of cortical excitability.

Stahl, William L. \* 1975; PhD, 1963, University of Pittsburgh; neurochemistry of brain ATPase systems.

Steiner, Robert A. \* 1977; PhD, 1975, University of Oregon; neuroendocrinology.

Storm, Daniel R. \* 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca<sup>2+</sup> signal transduction systems in the CNS.

Teller, Davida Y. \* 1965; PhD, 1965, University of California (Berkeley); vision, color vision, development of vision in infants.

Truman, James W. \* 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect neural development, circadian rhythms.

Westrum, Lesnick E. \* 1966; MD, 1963, University of Washington; PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Willows, A. O. Dennis \* 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.

Wingfield, John C. \* 1985; PhD, 1973, University College of North Wales (UK); environmental and hormonal control of avian reproductive cycles.

Winn, H. Richard \* 1983; MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

### Associate Professors

Buck, Steven L. \* 1979; PhD, 1976, University of California (San Diego); human visual psychophysics, perception, human and animal learning.

Cooper, Mark S. \* 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.

Covey, Ellen \* 1996; MS, 1976, University of Houston; PhD, 1980, Duke University; structure and function of the central auditory system, echo location.

Dacey, Dennis M. \* 1986; PhD, 1983, University of Chicago; the neural basis of vision and the organization of primate retina.

Giniger, Edward Scott \* 1994, (Research); PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.

Olavarria, Jaime F. \* 1990; MD, 1974, State University of Chile; PhD, 1984, University of California (Berkeley); visual system: anatomy and physiology, comparative and developmental studies.

Osterhout, Lee E. \* 1991; PhD, 1990, Tufts University; psycholinguistics, cognitive psychophysiology.

Robinson, Farrel R. \* 1986; PhD, 1982, Brown University; study of the cerebellum via monkey eye movements.

Sherk, Helen \* 1982; PhD, 1978, Massachusetts Institute of Technology; neural mechanisms underlying vision, especially visual guidance during locomotion.

Spain, William \* 1981; MD, 1977, Columbia University; neurology, neurobiology.

Tempel, Bruce L. \* 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Thomas, James H. \* 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.

Zagotta, William N. \* 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.

### Assistant Professors

Bajjalieh, Sandra M. \* 1995; MS, 1983, University of Illinois; PhD, 1989, University of Wisconsin; molecular neurobiology.

Bosma, Martha \* 1987; PhD, 1986, University of California (Los Angeles); development of CNS neuronal properties, electrophysiology and imaging of single cells.

Corina, David P. \* 1993; PhD, 1991, University of California (San Diego); functional neuroimaging, cognitive neuropsychology, psycholinguistics, sign-language processing.

Fern, Robert \* 1996; PhD, 1992, University College, London (UK); cellular mechanisms of ischemic neonatal brain injury (cerebral palsy).

Jones, Theresa A. \* 1996; PhD, 1992, University of Texas (Austin); behavioral and neural plasticity after brain damage.

Moens, Cecilia B. \* 1998, (Affiliate); PhD, 1993, University of Toronto; molecular and medical genetics.

O'Carroll, David C. \* 1998; PhD, 1989, Flinders University (Australia); neuroethology, sensory systems and behavior, visual processing.

Pallanck, Leo J. \* 1997; PhD, 1992, Albert Einstein College of Medicine; neurogenetics.

Raible, David W. \* 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Rieke, Frederick Martin \* 1997; PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Roelink, Henk \* 1996; MSc, 1985, University of Groningen (Netherlands); PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules in mediating neural tissue differentiation during vertebrate development.

Shadlen, Michael N. \* 1995; PhD, 1985, University of California (Berkeley); MD, 1988, Brown University; visual perception.

Terman, Gregory W. \* 1987; MA, 1981, PhD, 1985, University of California (Los Angeles); MD, 1987, University of Miami (Florida).

Xia, Zhenguai \* 1987; MS, 1985, Wuhan University (China); PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### NEUBEH 501 Introduction to Neurobiology (3)

Survey of all aspects of neuroscience, including molecular and cellular neurobiology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: A.

### NEUBEH 502 Introduction to Neurobiology (4)

Survey of all aspects of neuroscience, including an introduction to neuroanatomy and modules on sensory and motor systems. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: W.

### NEUBEH 503 Introduction to Neurobiology (4)

Survey of all aspects of neuroscience, including a discussion of higher neural processes like learning, memory, and neuroendocrinology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: Sp.

### NEUBEH 510 Seminar in Neurobiology and Behavior (0.5)

Biweekly seminar on current topics. Required for students in the Graduate Program in Neurobiology and Behavior and for students supported on Graduate Neuroscience Program Training Grant. Credit/no credit only. Offered: AWSp.

### NEUBEH 526 Introduction to Laboratory Research in Neurobiology (4)

Students become familiar with, and assist in, the performance of research on ongoing projects in designated laboratories. Emphasis on employed methodology and techniques. Credit/no credit only. Prerequisite: first year graduate students in neurobiology. Offered: AWSpS.

### NEUBEH 527 Current Topics in Neurobiology and Behavior (1)

Presentation and discussion of current research provides exposure to diverse areas of neurobiology and behavior research. Credit/no credit only. Prerequisite: graduate student in neurobiology and behavior program or permission of instructor. Offered: AWSp.

### NEUBEH 600 Independent Study or Research (\* max. 10)

Credit/no credit only. Offered: AWSpS.

### NEUBEH 700 Master's Thesis (\* max. 10)

Offered: AWSpS.

### NEUBEH 800 Doctoral Dissertation (\* max. 10)

Offered: AWSpS.

## Nutritional Sciences



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Nutritional\\_Sci.html](http://www.washington.edu/students/genecat/academic/Nutritional_Sci.html)



Program Web page:  
[depts.washington.edu/brochure/](http://depts.washington.edu/brochure/)

Graduate Program Coordinator  
 305 Raitt, Box 353410  
 (206) 543-1730  
[brochure@u.washington.edu](mailto:brochure@u.washington.edu)

The Interdisciplinary Graduate Program in Nutritional Sciences offers programs of study leading to Master of Science (M.S.), Doctor of Philosophy (Ph.D.), and Master of Public Health Nutrition (M.P.H.) degrees. The graduate program best serves the needs of students with a strong science background who wish to pursue (1) advanced training in nutritional science or clinical research, (2) advanced training in nutritional epidemiology and diet-disease interactions, or (3) training in public health nutrition with a community focus. Additional training in clinical and community nutrition is provided to those students who wish to satisfy the didactic and internship requirements of the American Dietetic Association, prior to obtaining Registered Dietitian (R.D.) status.

The principal areas of study are biochemical and molecular nutrition, clinical nutrition, and community or public health nutrition. Members of the core faculty represent the School of Public Health and Community Medicine, the Fred Hutchinson Cancer Research Center, and the University of Washington Medical Center. The program also draws on a larger group of interdisciplinary faculty from the College of Arts and Sciences, Schools of Medicine and Nursing, other units on campus, and from affiliated institutions in the Seattle area.

Each program of study is designed by the student in consultation with, and with the approval of, a supervisory committee. Ideally, M.S. and Ph.D. students begin working on a research project under the supervision of an appropriate faculty member in the early stages of their graduate experience. Public health field placements are an integral part of the M.P.H. curriculum and generally follow required coursework. Students pursuing courses in clinical nutrition work closely with the coordinator of clinical activities and are supervised by teaching assistants.

The University of Washington has an extensive research environment. Research facilities in Raitt Hall include modern laboratories, computer facilities, and a vivarium. Students also have access to faculty mentors and research facilities through the Medical Center, the Fred Hutchinson CRC, the Clinical Research Center, and the Clinical Nutrition Research Unit. Additional clinical facilities include Harborview Medical Center, Northwest Kidney Center, Children's Hospital and Medical Center, Pacific Medical Center, and the Center for Human Development and Disabilities. Among facilities for M.P.H. placements are Seattle King County Health Department.

Students may enter the graduate degree program after completing a bachelor's or a master's degree in biological sciences. Background in chemistry, biochemistry, and human physiology is especially desirable. Students who wish to supplement their degree program with ADA-approved training leading to R.D. status must complete all didactic requirements before being admitted to the supervised dietetic internship.

The internship specialty areas are clinical and community nutrition. Applicants should contact Program Director for detailed admission requirements.

## Faculty

### Director

Adam Drewnowski

### Professors

Beresford, Shirley A. \* 1987; PhD, 1981, University of London (UK); nutritional and cancer epidemiology, health promotion.

Chait, Alan \* 1977; MBChB, 1967, MD, 1974, University of Capetown (South Africa); clinical nutrition with special emphasis on lipid metabolism.

Drewnowski, Adam \* 1998; PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.

Kristal, Alan R. \* 1987; DPH, 1983, Columbia University; nutritional epidemiology, relationship between diet and cancer.

Monsen, Elaine R. \* 1969; MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.

### Associate Professors

Dong, Faye M. \* 1982; PhD, 1976, University of California (Davis); fish nutrition, seafood quality.

Leboeuf, Renee C. \* 1977; State University of New York (Buffalo); genetic and nutritional regulation of proteins involved in lipid transport.

Patterson, Ruth E. \* 1994, (Research); PhD, 1992, University of North Carolina; dietary assessment in adult populations, vitamin supplements in cancer prevention.

Rosenfeld, Michael E. \* 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

### Assistant Professors

Cheney, Carrie L. \* 1990; PhD, 1989, University of Washington; role of nutrition in cancer prognosis and secondary prevention.

Lampe, Johanna W. \* 1998, (Research); MS, 1982, PhD, 1990, University of Minnesota; dietary modulation of chronic disease: biomarkers of intake and risk.

### Lecturers

Rees, Jane \* 1973; MS, 1972, University of Washington; nutritional support of adolescent health, especially during pregnancy; eating disorders.

Trahms, Cristine M. \* 1973; MS, 1972, University of Washington; growth and development of young children: metabolic disorders, special health care needs.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**NUTR 301 Nutrition and Nursing (3) NW** Dong Basic principles of nutrition and their relationship to health problems. Normal nutrition needs of individuals at various age levels; environmental influences on nutrition; assessment of nutritional status; nutritional values of foods; dietary modifications as appropriate in the nutritional component of medical treatment. Recommended: CHEM 220, CHEM 223, CHEM 237, CHEM 335, or ZOOL 118. Offered: A.

**NUTR 441 Chemistry of Foods (3) Breummer** Principles of food science integrated with laboratory sessions that observe the effects of various parameters of food composition, and applied sensory

evaluation. Explores current trends in the culinary sciences to promote pleasurable eating. Recommended: general and organic chemistry.

**NUTR 445 Food Policy and Food Safety (3-5) Breummer** Presentation of emerging issues in food safety, food policy, including food and nutrition regulatory and legal issues, labeling; sanitation; biotechnology; and consumer perception of nutritional risk. Lab element examines objectives of management in the delivery of safe food; receiving systems; inventory control, menu planning, and cost control. Recommended: microbiology.

**NUTR 465 Nutritional Anthropology (3) I&S/NW Shell-Duncan** Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with BIO A 465.

**NUTR 500 Graduate Seminar: Current Issues in Nutrition (1, max. 4)** A review of current topics in nutritional science and public health nutrition. Provides a forum for student and faculty presentation, and review of current research efforts. Prerequisite: graduate student in nutrition. Offered: AWSp.

**NUTR 514 Animal Models and Public Health Genetics (2) LeBoeuf** Contributions of animal models to studies of human diseases. Concepts of multigenic diseases, chromosomal mapping, quantitative traits with emphasis on diseases of major public health impact. Interaction between inheritance and nutrition. Focus on mouse genetics. Prerequisite: GENET 371, PHG 513, or permission of instructor. Offered: jointly with PHG 514 and PABIO 514; Sp.

**NUTR 520 Protein and Carbohydrate Nutrition (4) Rosenfeld** Metabolic/physiological concepts related to protein and carbohydrate nutrition. Areas addressed include composition of foods, requirements through the life cycle, quality of protein, vegetarianism, protein deficiency, carbohydrates of physiological importance, low carbohydrate diets, glycemic response to foods, carbohydrates and dental caries, inborn errors in carbohydrate and protein metabolism. Prerequisite: biochemistry. Offered: A.

**NUTR 521 Lipid Nutrition (4) Monsen, Rosenfeld** Normal lipid components of animal fluids and tissues, with review of their metabolism and physiological functions. Effect of diet and the normal development during the life span of these lipid metabolism. Changes of lipids with various types of disease states and means of nutritional modification of these changes. Prerequisite: biochemistry. Offered: W.

**NUTR 522 Vitamin and Mineral Nutrition (4) Monsen, Rosenfeld** Advanced study of biologically essential minerals and vitamins. To include absorption, transport, function, storage, excretion; imbalance, deficiency and toxicity; dietary sources; role of these nutrients in prevention diseases directly on indirectly (such as cancer, dental caries); role of modern food technology on availability of these nutrients in our food supply. Prerequisite: biochemistry. Offered: Sp.

**NUTR 525 Evaluation of Nutritional Status (3) Monsen** Dietary, clinical, and biochemical components in the assessment of nutritional status. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Prerequisite: human nutrition and biochemistry. Offered: odd years; A.

**NUTR 526 Maternal and Infant Nutrition (3) Johnson** Influence of maternal and infant nutrition on the health of populations. Nutrition-related physiological, psychological, and social factors in pregnancy, lactation, and infancy. Application of evi-

dence-based approaches to maternal and infant nutrition recommendations and interventions for populations and high-risk individuals. Prerequisite: human nutrition and human physiology. Offered: A.

**NUTR 527 Nutrition: Childhood Through Adolescence (3)** *Rees, Trahms* Interactions of nourishment with behavior, growth, and development of children, from infancy through adolescence. Critical evaluation of normative data and special problems, as well as strategies for individual and public health interventions. Prerequisite: graduate student in nutritional sciences or permission of instructor. Offered: even years; Sp.

**NUTR 528 Nutrition in Aging (3)** *Drewnowski, Monsen* Physiological, psychological, social, cultural, and economic factors affecting nutrition in the middle and later years. Prerequisite: human nutrition and human physiology. Offered: odd years; Sp.

**NUTR 529 Nutrition Research Design (3)** *Cheney* Critical review of selected nutrition literature. Evaluation of experimental design, research protocols, data analyses, and application in nutritional science. Prerequisite: BIOST 511. Offered: even years; W.

**NUTR 530 Nutrition for Children with Special Health Care Needs (3)** *Johnson* Principles of nutrition screening and assessment, clinical nutritional care, family-centered care, and health services as applied to meeting nutritional needs of children with special health care needs. Both population-based and individual care concepts are explored for children with a variety of chronic conditions. Offered: Sp, odd years.

**NUTR 531 Community Nutrition (3)** *Johnson* Public health nutrition program planning: assessment, setting priorities/goals/objectives, implementation, managing, assuring cultural competency, monitoring, and evaluation. Public health functions as applied to nutrition: National Nutrition Monitoring System, food security, and state and national legislation, regulation, programs, and policy. Offered: W.

**NUTR 532 Fieldwork in Public Health Nutrition (2-12, max. 12)** *Johnson* Observation and participation in community agency nutrition programs. Prerequisite: public health internship student. Offered: AWSpS.

**NUTR 536 Nutrition Education Principles and Practice (3)** *Johnson* Integrated course designed to prepare students of the practical application of nutrition education theories and principles in diverse behavioral change settings for a variety of learner-population groups. Prerequisite: permission of instructor. Offered: even years; Sp.

**NUTR 537 Laboratory Rotation (1-4, max. 6)** *Drewnowski, LeBoeuf, Rosenfeld* Exposure to research being conducted in the laboratories of the graduate nutrition faculty. Provides hands-on experience in laboratory research. Introduces the student to on-going research for preparation of dissertation topics. Prerequisite: permission of instructor. Offered: AWSpS.

**NUTR 538 Nutritional Epidemiology (3)** *Beresford, Drewnowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 and BIOST 511 or permission of instructors. Offered: jointly with EPI 538; A.

**NUTR 551 Nutrition and Gene Expression (3)** *LeBoeuf, Rosenfeld* Lectures, student presentations, and discussions of current research on nutrient:gene interactions. Focus on how dietary factors act both directly as transcriptional regulators or indirectly as inducers of signal transduction cascades leading to alterations in expression of proteins associated with cellular nutrient metabolism. Prerequisite: NUTR 520,

NUTR 521, NUTR 522, or permission of instructor. Offered: odd years; W.

**NUTR 561 Dietetics Internship (10, max. 30)** *Bruemmer* Focuses on the competencies for entry-level practice in dietetics. Autumn and winter quarters include core experiences in wellness, public health, food service, ambulatory care, home health, and clinical services. Spring quarter activities are devoted to either nutrition therapy or public health, depending on student's career goals. Prerequisite: clinical students only. Offered: AWSp.

**NUTR 562 Nutrition and Chronic Disease (4-6)** *Bruemmer* Epidemiology/pathophysiology of chronic disease related to nutrition (e.g., obesity, cardiovascular disease, osteoporosis, hypertension, diabetes). Examines nutritional risk/protective factors in relation to public health, individual nutrition, and clinical intervention. Lab focuses on medical nutrition therapy/application of nutrition interventions related to chronic disease prevention/management. Prerequisite: general nutrition, physiology, biochemistry. Offered: A.

**NUTR 563 Nutrition in Acute Care (4-6)** *Bruemmer* Assessment of the nutritional demands and hypermetabolic response of trauma, surgery, organ failure, burns, AIDS, and neoplastic disease. Examines specialized nutritional support and substrate requirements in the acute care setting. Lab explores medical nutrition therapy and application of nutrition interventions related to acute care. Prerequisite: NUTR 562. Offered: W.

**NUTR 564 Management of Nutrition Services (4)** *Bruemmer* Policy and administrative issues that impact delivery of nutrition services in health care environments. Topics include organization behavior, productivity, financial environments, clinical management, and human resources. Offered: S.

**NUTR 600 Independent Study or Research (\*)** Offered: AWSpS.

**NUTR 700 Master's Thesis (\*)** Offered: AWSpS.

**NUTR 800 Doctoral Dissertation (\*)** Credit/no credit only. Prerequisite: permission of program adviser. Offered: AWSpS.

## Quantitative Ecology and Resource Management



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Quant\\_Ecology.html](http://www.washington.edu/students/genocat/academic/Quant_Ecology.html)



Program Web page:  
[depts.washington.edu/qerm/](http://depts.washington.edu/qerm/)

Graduate Program Coordinator  
415 Bagley, Box 351720  
(206) 616-9571  
qerm@cqs.washington.edu

The graduate program offered by the Quantitative Ecology and Resource Management (QERM) interdisciplinary group provides a unique opportunity for students to study the application of statistical, mathematical, and decision sciences to a broad array of terrestrial and marine ecology, natural resource management, and biometrical and mathematical biology problems. The QERM program of study leads to Master of Science and Doctor of Philosophy degrees, and is designed to attract mathematically trained students interested in working on contemporary ecological or resource-management problems from a quantitative perspective.

Faculty associated with this interdisciplinary program come from thirteen campus units, including Statistics, Applied Mathematics, Forest Resources, Fisheries, Zoology, Biostatistics, and Marine Affairs. This pool of faculty talent is available to enrich the academic experience of all QERM students.

### Degree Requirements

Students entering the QERM program are expected to have either a strong mathematical or biological (ecological) background. Master of Science course-work requirements include two courses in statistical theory; one course in optimization; one applied statistical methods course; two courses in either applied quantitative ecology or quantitative resource management; a seminar in quantitative ecology; plus approved electives. All master's degree holders must pass a first-year qualifying examination, prepare and defend a thesis, take a total of at least 18 graded quarter credits, and satisfy all Graduate School requirements.

Students passing the first-year qualifying examination at the Ph.D. level are eligible to enter the doctoral program of study. Course requirements equivalent to the master's program also must be completed. Doctor of Philosophy degree requirements include a minimum of 18 credits of graded course work beyond the master's; a minimum of 27 credits of dissertation research; and satisfaction of all Graduate School requirements. The 18 credits of course work must be taken from an approved list of courses.

### Admission Requirements

Students entering this graduate program are expected to perform well on the quantitative and analytical sections of the Graduate Record Examination. Background in a biological or ecological field is also highly desirable. To enter the Ph.D. program, students must pass the first-year qualifying examination at the Ph.D. level. In addition, all course requirements equivalent to the master's program must be completed. At least three letters of recommendation and a brief narrative statement of objectives must accompany each application for admission. Applications are accepted only for autumn quarter. The application deadline is February 1.

### Financial Aid

Fellowships, teaching assistantships, and research assistantships are available each year. These come from either the Graduate School or one of the campus units contributing faculty to the QERM program. They generally cover the nine-month academic year, although provisions can be made for summer support. Tuition is normally included as part of the financial package. Funding decisions are made yearly, but attempts are made to continue support for students making satisfactory progress.

## Faculty

### Director

James J. Anderson

### Professors

Bare, B. Bruce \* 1969; MS, 1965, University of Minnesota; PhD, 1969, Purdue University; forest land management, valuation, taxation, management science.

Bassingthwaight, James \* 1975; MD, 1955, University of Toronto (Canada); PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Briggs, David G. \* 1973; PhD, 1980, University of Washington; operations research, forest products and wood science, wood quality, life-cycle analysis.

Brown, Gardner \* 1965; PhD, 1964, University of California (Berkeley); resource and environmental economics.

Conquest, Loveday L. \* 1976; PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Faaland, Bruce H. \* 1971; PhD, 1971, Stanford University; manufacturing, networks, production scheduling, mathematical programming, forestry.

Felsenstein, Joseph \* 1968; PhD, 1968, University of Chicago; evolution and population genetics.

Ford, E. David \* 1985; PhD, 1968, University College, London (UK); forest ecology and ecophysiology, crop growth, quantitative methods, philosophy of science.

Francis, Robert C. \* 1983; PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.

Gallucci, Vincent \* 1976; PhD, 1971, North Carolina State University; biomathematics and population dynamics.

Greulich, Francis E. \* 1977; PhD, 1976, University of California (Berkeley); management science, statistics, operations research.

Guttorp, Peter \* 1980; PhD, 1980, University of California (Berkeley); point processes, stochastic models, applications in hydrology, atmospheric and environmental science.

Hilborn, Ray \* 1987; PhD, 1974, University of British Columbia (Canada); population dynamics and resource policy.

Johnson, Jay A. \* 1983; PhD, 1973, University of Washington; mechanical and physical properties of wood and wood composite materials, wood quality.

Kingsolver, Joel \* 1986; PhD, 1981, Stanford University; physiological ecology and evolutionary morphology of insects.

Sampson, Paul D. \* 1981, (Research); PhD, 1979, University of Michigan; spatial statistics and environmental metrics, morphometrics, applied multivariate analysis.

Schreuder, Gerard Fritz \* 1971; PhD, 1968, Yale University; statistical analysis in resource economics, international forestry, trade, aerial photos.

Skalski, John R. \* 1987; PhD, 1985, Cornell University; environmental sampling and effects assessment on wild populations, parameter estimation.

Swartzman, Gordon Leni \* 1973, (Research); PhD, 1969, University of Michigan; ecological modeling, quantitative natural resource management.

Thompson, Elizabeth A. \* 1985; PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, statistics of conservation.

van Belle, Gerald \* 1974; MA, 1964, PhD, 1967, University of Toronto (Canada); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication.

Zeh, Judith \* 1982, (Research); PhD, 1979, University of Washington; estimation of whale population size and dynamics, statistics in infectious disease research.

### Associate Professor

Anderson, James J. \* 1981; PhD, 1977, University of Washington; fisheries and oceanography.

### Assistant Professors

Cullen, Alison \* 1995; DSc, 1992, Harvard University; environmental policy and management, quantitative decision analysis, risk analysis.

Turnblom, Eric \* 1994; MSc, 1986, University of British Columbia (Canada); PhD, 1994, University of Minnesota; forest biometrics, growth and yield modeling, quantitative stand dynamics, inventory and sampling.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**QERM 502 Statistical Consulting for the Life Sciences (1-4)** *Conquest* Consulting experience in data analysis, applied statistics, experimental design, parameter estimation, and sampling. Student provides consultation services to students and faculty. Students spend one classroom hour per week under faculty supervision discussing problems encountered. Prerequisite: QERM 482, QERM 483, STAT 421, STAT 423, or BIOST 514, BIOST 515, or equivalents, and permission of instructor. Offered: W.

**QERM 514 Analysis of Ecological and Environmental Data I (4)** *Conquest* Factors affecting optimal growth of individuals in their habitat. Estimation of growth and mortality parameters. Response of organisms to changes in environment (bioassay, environmental monitoring). Stochastic viewpoint emphasized. Research design issues for ecological or environmental studies. Analysis of unwieldy data sets. Prerequisite: calculus and either STAT 341, STAT 342 or STAT 512. Offered: Sp.

**QERM 521 Scientific Method in Resource Management (4)** *Ford* Describes process of scientific discovery and strategies used for problems in ecology and natural resources management. Relationships between growth and use of objective knowledge in natural resources management is explored through case studies.

**QERM 550 Applied Ecological Modeling (5)** *Ford* Methods of applied ecological modeling at individual community and ecosystem levels. Analysis of ecological problems suitable for modeling and assessment of models. Students construct a model of their own. Offered: A.

**QERM 551 Modeling Organism Dynamics (3)** *Anderson* Application of techniques of stochastic differential equations, time series analysis, and simulating dynamic processes to plant and animal growth.

**QERM 552 Spatial Processes in Ecology (3)** *Ford* Spatial distribution of organisms, the mechanisms that produce different distributions, and how they may be described mathematically and modeled. Spatial distribution of communities, how this arises, and what its consequences are. Prerequisite: QERM 482, QERM 483, QERM 550.

**QERM 597 Seminar in Quantitative Ecology (2)** Current topics in quantitative ecology and resource management. Fisheries, forestry, and marine resources. Offered: Asp.

**QERM 598 Special Topics in Quantitative Resource Management (1-3, max. 12)** Population and community ecology, systems ecology, and physical processes in ecosystems. Prerequisite: permission of instructor.

**QERM 599 Research in Quantitative Resource Management and Ecology (\* max. 12)** Topics can be theoretical in nature or combined theory and experimental. Research might be a prelude to thesis or dissertation research. Credit/no credit only.

**QERM 600 Independent Study or Research (\*)**

**QERM 700 Master's Thesis (\*)**

**QERM 800 Doctoral Dissertation (\*)**

## Quaternary Research Center

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General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Quaternary.html](http://www.washington.edu/students/genecat/academic/Quaternary.html)



Program Web page:  
[depts.washington.edu/qrc/](http://depts.washington.edu/qrc/)

Quaternary studies focus on the processes that presently shape the natural environment and have operated over approximately the past two and a half million years (Quaternary period). A knowledge of Quaternary events facilitates an understanding of earth history in relation to the modern environment and has predictive value with regard to present-day and future environmental changes.

Quaternary research is typically interdisciplinary, and thus it commonly involves related interests of two or more academic units. The Quaternary Research Center was established in 1967 to foster such interdisciplinary studies on a cooperative basis.

The center has the following goals: (1) To understand environments and climate changes of the past two and a half million years in the context of modern surface processes, which include historical changes, prehistoric postglacial environments, and Ice Age events. (2) To serve as an effective catalyst in fostering interdisciplinary studies in the fields of atmospheric sciences, archaeology/anthropology, botany, engineering, fisheries, forestry, geology, geophysics, oceanography, pedology, and zoology. (3) To provide a scientific perspective on the scale of modern and man-made environmental changes, including climate changes, in the context of recent earth history. (4) To conduct a curriculum jointly with other disciplines in the training of graduate students in Quaternary-oriented studies. (5) To seek applications of Quaternary studies to modern environmental problems that will help predict consequences of policy decisions.

## Graduate Program

Students associated with the center obtain their degrees through cooperating departments. Students interested in graduate work at the center should apply to the department of their choice but plan to do their research in a Quaternary-related subject.

## Research Facilities

The research laboratories of the center provide an array of modern facilities for investigation of Quaternary problems.

*Periglacial Laboratory.* The laboratory contains cold rooms equipped for manipulating and studying the freezing and thawing of soils, rocks, and building materials. A large, unique tilt table permits the study of soils under controlled conditions of slope, temperature, and moisture. Research stress is placed on frost action in arctic and alpine environments.

*Quaternary Palynology and Paleoecology Laboratories.* These facilities foster studies of the biotic environment through time and of the uses of plant and animal fossils in Quaternary environmental and ecological reconstruction. Studies of vegetational changes are supported by an extensive modern pollen and plant reference collection from Asia and western North America.

*QRC Library.* This specialized collection, dealing with a wide range of Quaternary topics, is among the most extensive in North America. It includes books, monographs, theses, journals, and maps, and houses a large, diverse reprint collection. Searches for library material can be conducted via the QRC Web page.

## Faculty

### Director

Bernard Hallet

### Professors

Atwater, Brian F. \* 1986, (Affiliate); MS, 1974, Stanford University; PhD, 1980, University of Delaware; paleoseismology, neotectonics, regional geology, seismic hazards.

Brubaker, Linda B. \* 1973, (Adjunct); PhD, 1973, University of Michigan; dendrochronology, forest ecology, quaternary paleoecology.

Gillespie, Alan R. \* 1985; PhD, 1982, California Institute of Technology; landscape evolution, paleoclimate, geochronology, and applications of remote sensing.

Grayson, Donald K. \* 1975, (Adjunct); PhD, 1973, University of Oregon; North American prehistory, paleoecology, European paleolithic, zooarchaeology.

Hallet, Bernard \* 1980; PhD, 1975, University of California (Los Angeles); glaciology, permafrost studies, geomorphology.

Heath, G. Ross \* 1984, (Adjunct); PhD, 1968, University of California (San Diego); geochemistry of sediments.

Leopold, Estella B. \* 1976, (Adjunct); PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environment.

Nittrouer, Charles \* 1998, (Adjunct); PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.

Porter, Stephen C. \* 1962, (Adjunct); PhD, 1962, Yale University; Quaternary geology and geomorphology.

Quay, Paul D. \* 1977; PhD, 1977, Columbia University; chemical oceanography, stable isotope geochemistry, ocean tracers and mixing.

Raymond, Charles F. \* 1969, (Adjunct); PhD, 1969, California Institute of Technology; glaciology, glacier and ice sheet dynamics.

Richey, Jeffrey E. \* 1973, (Adjunct); PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.

Stein, Julie K. \* 1980, (Adjunct); MA, 1976, PhD, 1980, University of Minnesota; New World archaeology, Northwest coast archaeology, geoarchaeology, shell middens.

Stuiver, Minze \* 1969, (Emeritus); PhD, 1958, University of Groningen (Netherlands); geochronology, isotope geology.

Tsukada, Matsuo \* 1969, (Adjunct); PhD, 1961, Osaka City University (Japan); interpretation of Quaternary events from palynological and kindred data.

Waddington, Edwin D. \* 1984, (Adjunct); PhD, 1981, University of British Columbia (Canada); glacier and ice sheet modeling, interpretation of ice sheet stratigraphy.

Warren, Stephen G. \* 1981, (Adjunct); MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow, and sea ice, Antarctic climate.

Washburn, A. Lincoln 1974, (Emeritus); PhD, 1942, Yale University; geomorphology, periglacial processes and environments.

### Associate Professors

Anderson, Patricia M. \* 1982, (Research); MA, 1976, PhD, 1982, Brown University; paleoecology, paleoclimatology, Quaternary studies, biogeography, North American archaeology.

Bourgeois, Joanne \* 1980, (Adjunct); PhD, 1980, University of Wisconsin; sedimentology, sedimentary geology.

Close, Angela E. \* 1995, (Adjunct); MA, 1974, PhD, 1976, Cambridge University (UK); prehistory of North Africa, lithics, paleolithic.

Eck, Gerald G. \* 1974, (Adjunct); PhD, 1977, University of California (Berkeley); primate paleontology, especially African Pliocene-Pleistocene monkeys and hominids.

Montgomery, David R. \* 1991, (Adjunct); PhD, 1991, University of California (Berkeley); earth surface processes, especially those occurring in mountain drainage basins.

### Assistant Professors

Fitzhugh, J. Ben \* 1997, (Adjunct); PhD, 1996, University of Michigan; archaeology, evolutionary ecology, archaeological method and theory, arctic/subarctic, Alaska.

Sletten, Ronald S. 1983, (Research); MS, 1987, PhD, 1995, University of Washington; aquatic geochemistry, polar soils.

Stone, John O. H. \* 1998; PhD, 1986, Cambridge University (UK); Quaternary dating and geomorphical studies with cosmic-ray-produced isotopes.

### Lecturer

Swanson, Terry W. 1988; MA, 1989, University of California (Davis); PhD, 1994, University of Washington; cosmogenic isotopes, Quaternary studies.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**QUAT 417 Environmental Change in the Glacial Ages (3) NW Porter** Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with GEOL 417.

**QUAT 501 Seminar/Conference in Quaternary Environments (1, max. 6)** Interdisciplinary seminar or conference in the changing natural environments of the Quaternary Period, with emphasis on climatic changes and their effects. Speakers from the University and elsewhere present lectures on their specialties, followed by discussion. Credit/no credit only.

**QUAT 502 Interdisciplinary Quaternary Investigations (2, max. 6)** Research course for interdisciplinary investigation of Quaternary problems. Student attends sessions of QUAT 501 and pursues a problem-oriented case study concurrently under faculty direction. Required paper on case study. Credit/no credit only. Prerequisite: graduate standing.

**QUAT 504 Special Topics in Quaternary Sciences (1-3, max. 3)** Environments and climate changes of past two million years (Quaternary Period) in context of modern surface processes, including historical changes, prehistorical environments of postglacial period, and Ice Age events. Provides scientific perspective on scale of modern and man-made environmental changes, including those of climate, in context of recent earth history. Credit/no credit only. Prerequisite: background courses in earth sciences and ecology.

## Urban Design and Planning



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Urban\\_Design.html](http://www.washington.edu/students/genocat/academic/Urban_Design.html)



Program Web page:  
[www.grad.washington.edu/inter/urbdp.index.htm](http://www.grad.washington.edu/inter/urbdp.index.htm)

Graduate Program Coordinator  
410 Gould, Box 355740  
(206) 543-4190

The Interdisciplinary Group for Urban Design and Planning offers the Doctor of Philosophy degree. The program offers a course of study for those seeking to pursue academic or research careers in the public or private sector. The program is concerned with research in urban design and planning and focuses on five areas of concentration: history of urban development, planning, and design; urban design; land-use planning; transportation planning; and environmental planning. Please write for a more detailed description of these areas of concentration.

The research focus of the program is aimed at achieving a better understanding of cities and of urban regions, city planning and urban design as manifestations of society and culture, and at developing better tools to plan for future physical development. It includes the development of new methods and the application of methods from other disciplines to expand knowledge of urbanization processes. The program stresses the link which exists between urban planning, its legislative context, and the resulting built environment. Objectives of the program are to help students and researchers master general knowledge, to train them to be scholars and researchers in a particular subject area, and to guide them in the development of original research. The program of study is divided into three phases.

Phase one provides advanced knowledge in major aspects of planning and design. Included are three doctoral seminars, as well as elective courses from a structured list. Each student must prepare and present a research paper.

Phase two prepares the student in the interdisciplinary content of the field and involves the development of two areas of concentration. These areas must be matched with the interests and experience of faculty on the student's supervisory committee. The supervisory committee members, most of whom will be from the interdisciplinary group, have primary responsibility for student progress and evaluation. Students are expected to develop knowledge in at least one area outside urban design and planning. Completion of phase two is marked by passage of the General Examination.

Phase three focuses on original work which is presented as a dissertation.

### Admission Criteria

Applicants must possess a Master of Urban Planning degree or its equivalent in urban design and practice. Students may be asked to complete appropriate background work. Admission into the program is very limited and is based on evidence of promise for high scholarly achievement. The applicant's statement of purpose, prior course work, GRE examination scores, letters of recommendation, and examples of past written work are all considered. Students may begin the program autumn quarter only. Application deadline is February 1.

## Financial Aid

A very limited number of fellowships and assistantships are available each year. Tuition is normally included as part of the financial package.

## Faculty

### Director

Anne Vernez Moudon

### Professors

Beysers, William B. \* 1962; PhD, 1967, University of Washington; economic geography, regional analysis, regional development.

Bradley, Gordon A. \* 1972; PhD, 1986, University of Michigan; forest land use planning, conservation area planning, urban forestry.

Chrisman, Nicholas R. \* 1987; PhD, 1982, University of Bristol (UK); geographic information systems, spatial error analysis, science and technology studies.

Findlay, John M. \* 1987; PhD, 1982, University of California (Berkeley); history of the American West, Pacific.

Guest, Avery \* 1972; MS, 1964, Columbia University; MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Hancock, John L. \* 1969, (Emeritus); PhD, 1964, University of Pennsylvania; urban and planning history, society, planning and environmental policy.

Harrington, James W. \* 1997; PhD, 1983, University of Washington; economic change and labor processes in sub-national, regional economic development.

Hershman, Marc \* 1976; JD, 1967, Temple University; LLM, 1970, University of Miami (Florida); coastal zone management law.

Hodge, David C. \* 1975; MS, 1973, PhD, 1975, Pennsylvania State University; urban geography, urban transportation geography, equity, gender.

Krumme, Gunter \* 1970; PhD, 1966, University of Washington; economic, organizational and marketing geography, location theory, regional development.

Lee, Robert G. \* 1978; PhD, 1973, University of California (Berkeley); natural resource sociology, forestry institutions, forest stewardship, environmental ethics.

May, Peter J. \* 1979; PhD, 1979, University of California (Berkeley); policy analysis, quantitative methods, federal disaster policy.

Miller, Donald H. \* 1970; PhD, 1972, University of California (Berkeley); land use and urban spatial structure, data analysis and forecasting, planning theory.

Miller, Marc \* 1979; PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology, tourism, and social/cultural change.

Morrill, Richard L. \* 1955, (Emeritus); PhD, 1959, University of Washington; spatial organization, migration, population, diffusion, regional planning/development, inequality.

Nyerges, Timothy L. \* 1985; PhD, 1980, Ohio State University; GIS, collaborative decision support, growth management, transportation, environment, land use.

Ochsner, Jeffrey K. \* 1987; MArch, 1976, Rice University; history, preservation design, urban design.

Olson, David J. \* 1974; PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Rutherford, G. Scott \* 1981; PhD, 1974, Northwestern University; transportation planning and engineering.

Streatfield, David C. \* 1974; MLA, 1965, University of Pennsylvania; history, historic landscape preservation, landscape theory, urban landscape design.

Sutton, Sharon E. \* 1998; MArch, 1973, Columbia University; PhD, 1982, City University of New York; effect of the environment on learning and community well-being.

Vernez Moudon, Anne \* 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Zerbe, Richard O. \* 1975; PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental policy.

### Associate Professors

Blanco, Hilda J. \* 1996; MRP, 1984, PhD, 1989, University of California (Berkeley); comprehensive and neighborhood planning, environmental planning, infrastructure, finance.

Dubrow, Gail Lee \* 1989; MA, 1979, University of Oregon; PhD, 1991, University of California (Los Angeles); preservation, urban design, public art, public history, gender, multiculturalism.

Waddell, Paul A. \* 1997; PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

### Assistant Professors

Alberti, Marina \* 1996; PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Bae, Christine \* 1996; MRP, 1986, State University of New York (Albany); PhD, 1994, University of Southern California; transportation, environment, land use, growth management, quantitative methods.

Hill, Kristina \* 1997; PhD, 1997, Harvard University; spatial patterns of land use, GIS mapping, land classification techniques, landscape ecology.



# Interschool or Intercollege Programs

## Bioengineering

309 Harris Hydraulics Laboratory



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Bioengineering.html](http://www.washington.edu/students/genocat/academic/Bioengineering.html)



Department Web page:  
[depts.washington.edu/bioe/](http://depts.washington.edu/bioe/)

The Department of Bioengineering provides a comprehensive, multidisciplinary program of education and research. The concepts and techniques of engineering are applied to the challenges in biology and medicine. Major areas of current bioengineering research include distributed diagnostics and home health care, molecular bioengineering and nanotechnology, engineered biomaterials, biomedical imaging and image-guided therapy, and computational bioengineering.

## Graduate Program

Graduate Program Coordinator  
 309 Harris, Box 357962  
 (206) 685-2021

The Department of Bioengineering offers programs of study which lead to the Master of Science (M.S.), Master of Science in Engineering (M.S.E.), and Doctor of Philosophy (Ph.D.) degrees.

### Master of Science

The Master of Science degree program provides essential training in the engineering sciences, which aids students with strong backgrounds in the biological sciences to prepare for careers in research and development in either basic medical sciences or clinical investigations. A thesis is required.

### Master of Science in Engineering

The Master of Science in Engineering degree program provides essential training in the life sciences that assists students with sound engineering backgrounds to prepare for careers in academic, industrial, or hospital environments. A thesis is required.

### Doctor of Philosophy

The objective of the Ph.D. program is to train individuals for careers in bioengineering research and teaching. The training has three major components: (1) acquisition of a breadth of knowledge about engineering, biology, and medicine, and the interdisciplinary interface between these quite disparate fields; (2) development of a depth of knowledge and expertise in a particular scientific specialty; (3) development of a potential for independent bioengineering research that can be demonstrated. The objectives are fulfilled through use of a combination of research and teaching experiences. The program is designed to be rigorous while maintaining sufficient flexibility to accommodate qualified students with diverse backgrounds. Entrance to the Ph.D. program may be made directly after the B.S. or following completion of the M.S. or M.S.E.

## Medical Scientist Program

A Medical Scientist Program exists for the support of individuals interested in coordinated graduate school/medical school study leading to both the M.D. and Ph.D. degrees. Students entering this highly competitive program are given an opportunity to pursue a flexible, combined course of study and research. Early inquiry regarding this program is urged since admission to the Graduate School and to the School of Medicine must be secured independently.

## Research Facilities

Offices and laboratories are located in the College of Engineering and the School of Medicine. Students have access to the University of Washington Medical Center, Vivarium, Primate Center, Computer Center, and libraries, as well as to all engineering and health-sciences departments and facilities. A wide range of technologies and virtually all aspects of biomedical science are available. Cellular and molecular bioengineering are strong components of the research programs of the center. State-of-the-art facilities are available to support both research and instructional activities. Computer resources are abundant, and their use is an integral part of most laboratory and course work.

## Admission Requirements

Applicants for the M.S. degree should have a baccalaureate degree in a science or the equivalent; applicants for the M.S.E. degree should have a baccalaureate degree in engineering or the equivalent. Preparation for both programs must include, at minimum, one year each of calculus, physics, and chemistry, and a course in differential equations, and backgrounds in instrumentation, signal processing, engineering systems analysis, thermodynamics, or physical chemistry and biology. Applicants to the Ph.D. program should have strong academic credentials, a bachelor's degree in science or engineering, and demonstrated potential for advanced study. Admission to the program is highly selective.

In addition to completing the application requirements for the Graduate School, an applicant should also forward the following items to the Academic Counselor, Department of Bioengineering, Box 357962, University of Washington, Seattle, WA 98195: (1) a one- or two-page written statement outlining academic and professional goals; (2) official copies of Graduate Record Examination scores for the general tests; (3) three letters of recommendation from persons acquainted with the applicant's background; and (4) a departmental information form.

## Financial Aid

Financial aid is available to qualified graduate students in the form of traineeships, fellowships, and assistantships. Funding is derived from federal research and training programs, the Graduate School Fund for Excellence and Innovation, and programs sponsored by private agencies. Information concerning these fellowships is available from the Department of Bioengineering.

## Faculty

### Chair

Yongmin Kim

### Professors

Afromowitz, Martin \* 1975, (Adjunct); MS, 1966, PhD, 1969, Columbia University; microtechnology, solid-state and fiber-optics sensors, biomedical instrumentation.

Auth, David C. \* 1969, (Affiliate); PhD, 1969, Georgetown University; lasers and electro-optical system design, electrophysics, medical instrumentation.

Bashein, Gerard \* 1974, (Adjunct); PhD, 1969, Carnegie Mellon University; MD, 1974, University of New Mexico.

Bassingthwaight, James \* 1975; MD, 1955, University of Toronto (Canada); PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Beach, Kirk Watson \* 1976, (Adjunct Research); MSChE, 1968, PhD, 1971, University of California (Berkeley); MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Bruckner, Adam \* 1972, (Adjunct); PhD, 1972, Princeton University; propulsion, mission design, resource utilizations; hypervelocity accelerators.

Caldwell, James H. 1983, (Adjunct); MD, 1970, University of Missouri; cardiology.

Callis, James B. \* 1973, (Adjunct); PhD, 1970, University of Washington; instrumentation development, process analytical chemistry, non-invasive clinical chemistry.

Crum, Lawrence A. \* 1992, (Research); PhD, 1967, Ohio University.

Dager, Stephen R. \* 1979, (Adjunct); MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Foster, David M. \* 1980, (Research); PhD, 1969, University of British Columbia (Canada).

Guy, Arthur W. \* 1955, (Emeritus); PhD, 1966, University of Washington; biological effects and medical applications of electromagnetic fields.

Hannaford, Blake \* 1989, (Adjunct); MS, 1982, PhD, 1985, University of California (Berkeley); human and robotic movement control, bioengineering, controls, human-machine interaction.

Haralick, Robert M. \* 1986, (Adjunct); MS, 1967, PhD, 1969, University of Kansas; computer vision, artificial intelligence, pattern recognition, image processing.

Hlastala, Michael P. \* 1972, (Adjunct); PhD, 1969, State University of New York (Buffalo); respiratory physiology, inert gas analysis of respiratory function.

Hoffman, Allan S. \* 1970; DSc, 1957, Massachusetts Institute of Technology; polymer materials science and engineering.

Hol, Wilhelmus G. J. \* 1992, (Adjunct); PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Horbett, Thomas A. \* 1973; PhD, 1970, University of Washington; interfacial proteins, cell interactions, insulin delivery systems.

Huntsman, Lee L. \* 1968; PhD, 1968, University of Pennsylvania; mechanics of heart and heart muscle, cardiovascular system assessment, new measurement techniques.

Kim, Yongmin \* 1982; MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, media processors, imaging and video systems, medical imaging modeling.

Kushmerick, Martin J. \* 1988; MD, 1963, PhD, 1966, University of Pennsylvania; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy.

Lai, Henry C. 1981, (Research); PhD, 1978, University of Washington; cellular effects of electromagnetic fields.

Martin, Roy W. \* 1971, (Research); PhD, 1975, University of Washington; bioinstrumentation, ultrasonic Doppler, echo, tissue characterization, signal processing.

Matsen, Frederick A. III \* 1973, (Adjunct); MD, 1968, Baylor University; orthopaedics, bone and joint research, robotics.

Pollack, Gerald H. \* 1968; PhD, 1968, University of Pennsylvania; muscular contraction.

Ratner, Buddy D. \* 1972; PhD, 1972, Polytechnic Institute of Brooklyn; synthesis and characterization of polymeric biomaterials.

Richards, Todd L. \* 1985, (Adjunct); PhD, 1984, University of California (Berkeley); nuclear magnetic resonance imaging, spectroscopy of the brain in demyelinating diseases.

Rushmer, Robert F. \* 1947, (Emeritus); MD, 1939, University of Chicago; health care delivery systems, technology transfer.

Schwartz, Stephen Mark \* 1974, (Adjunct); MD, 1967, Boston University; PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.

Soma, Mani \* 1982, (Adjunct); MS, 1977, PhD, 1980, Stanford University; IC design and testing, mixed signal testing, bioengineering.

Spelman, Francis A. \* 1961; PhD, 1975, University of Washington; biophysics of implanted cochlea, instrumentation for primate research.

Stewart, Brent K. \* 1993, (Adjunct); PhD, 1988, University of California (Los Angeles); medical physics, informatics.

Trask, Barbara J. \* 1992, (Adjunct); PhD, 1985, University of Leiden (Netherlands); molecular cytogenetics, large-scale genome organization and polymorphism, genomics of olfaction.

Van Den Engh, Ger \* 1992, (Adjunct); PhD, 1976, University of Leiden (Netherlands); flow cytometry, quantitative cytogenetics, instrument design and development.

Verdugo, Pedro \* 1974; MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.

Yager, Paul \* 1987; PhD, 1980, University of Oregon; physical chemistry and applications of biomembranes.

### Associate Professors

Baneyx, Francois \* 1992, (Adjunct); PhD, 1991, University of Texas (Austin); biotechnology, protein technology, biochemical engineering.

Barrett, P. Hugh R. \* 1988, (Affiliate); PhD, 1989, University of Adelaide (Australia); biomathematics and modeling methodology, simulation analyses, lipid and lipoprotein metabolism.

Castner, David G. \* 1986, (Research); PhD, 1979, University of California (Berkeley); polymer surfaces, metal-organic interfaces, catalytic materials.

Conley, Kevin E. \* 1988, (Adjunct); PhD, 1983, University of Wisconsin; muscle physiology.

Giachelli, Cecilia \* 1982; PhD, 1987, University of Washington; adhesion molecules and vascular biology processes.

Kalet, Ira J. \* 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Kunzelman, Karyn S. \* 1991, (Affiliate); PhD, 1991, University of Texas (Dallas); biomedical engineering, cardiac; anatomy and physiology.

Linker, David T. 1993, (Adjunct); MD, 1976, Stanford University; cardiology.

Lybrand, Terry Paul \* 1990; PhD, 1984, University of California (San Francisco); molecular modeling, computer simulation of biomacromolecules, development of simulation analysis.

Martyn, Donald A. \* 1978, (Research); PhD, 1975, University of Southern California; regulation and mechanical properties of contraction in skeletal and cardiac muscle.

Meldrum, Deirdre R. \* 1992, (Adjunct); MS, 1985, Rensselaer Polytechnic Institute; PhD, 1992, Stanford University; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots.

Nelson, Alan C. \* 1986, (Affiliate); PhD, 1980, University of California (Berkeley); biomedical imaging using image analysis for tissue and tumor studies.

Nickerson, Deborah A. \* 1992, (Adjunct); PhD, 1978, University of Tennessee; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics.

Sanders, Joan Elizabeth \* 1985; PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.

Stayton, Patrick S. \* 1992; PhD, 1989, University of Illinois; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics.

Vogel, Viola \* 1990; Dctr O, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, nonlinear optics, microscopy.

Yuan, Chun 1991, (Adjunct); PhD, 1988, University of Utah; medical biophysics, MRI.

### Assistant Professors

Baker, David \* 1993, (Adjunct); PhD, 1989, University of California (Berkeley); protein folding.

Ching, Randal Preston \* 1986, (Adjunct); PhD, 1992, University of Washington; orthopaedic biomechanics.

Folch, Robert 2000; PhD, 1994, University of Barcelona (Spain); cell-based microfabricated devices, microscale engineering, high-throughput biological measurements.

Li, Zheng 1994, (Research); MS, 1991, PhD, 1995, State University of New York (Buffalo); nonlinear kinetic modeling, cardiac metabolism, PET functional imaging.

Qian, Hong 1997, (Adjunct); PhD, 1989, Washington University; physical biochemistry of biological macromolecule, mathematical and computational biology.

Regnier, Michael \* 1995, (Research); PhD, 1991, University of Southern California; mechanics, kinetics and computational modeling of cardiac/skeletal muscle contraction.

Schenkman, Kenneth A. 1990, (Adjunct); MD, 1986, Indiana University; pediatric anesthesia.

Singh, Narendra Pal 1993, (Research); MBBS, 1972, King George's Medical College (India); changes in human DNA with age, adverse effects of drugs and environmental chemicals on DNA.

Vaezy, Shahram \* 1983, (Research); PhD, 1991, University of Washington; therapeutic ultrasound, image-guided therapy, three-dimensional visualization and computation.

Vicini, Paolo 1996, (Research); PhD, 1996, Polytechnic of Milan (Italy); biomathematics and modeling methodology, mathematical models of biological systems.

Yates, John R. III \* 1992, (Adjunct); PhD, 1987, University of Virginia; biological mass spectrometry, protein sequencing, computational methods for data analysis.

Zachariah, Santosh, George 1995, (Research); PhD, 1995, University of Strathclyde (United Kingdom); biomechanics and rehabilitation engineering.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### BIOEN 436 Medical Instrumentation (4) Spelman

Introduction to the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For juniors, seniors, and first-year graduate students who are preparing for careers in bioengineering, both research and industrial. Offered: jointly with E E 436; Sp.

### BIOEN 445 Science in Biomechanics (3) Sanders

Introduction to biomechanics research. Discusses scientific analysis tools including problem definition, hypothesis generation and evaluation, methodology development, and data analysis methods. Participation in research projects, that are direct extensions from biomechanics research in the professor's laboratory. Two lectures and project meeting with professor per week. Offered: jointly with M E 445 Sp.

### BIOEN 450 Molecular Biology for Engineers I (4) Medina

Basic foundation in DNA biochemistry, description of molecular processes within the eukaryotic nucleus, and basic techniques in molecular biology. Offered: A.

### BIOEN 451 Molecular Biology for Engineers II (4) Medina

Utilization of recombinant DNA technology in research disciplines, including medicine, agriculture, forensics, anthropology, and embryology. Discussion of future research directions and increasing role of bioethics in the research community. Offered: W.

### BIOEN 467 Biochemical Engineering (3) Baneyx

Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: either CHEM 223 with CHEM E 340 or either CHEM 237 or CHEM 335; recommended: CHEM E 465. Offered: jointly with CHEM E 467; W.

### BIOEN 490 Engineering Materials for Biomedical Applications (3) Hoffman

Combined application of principles of physical chemistry and biochemistry, materials engineering, to biomedical problems and products. Applications include implants and medical devices, drug delivery systems, cell culture processes, diagnostics, and bioseparations. Offered: jointly with CHEM E 490; odd years; W.

### BIOEN 491 Controlled-Release Systems: Principles and Applications (3) Hoffman

Mechanisms for controlled release of active agents and the development of useful drug delivery systems for this purpose. Release mechanisms considered include diffusive, convective, and erosive driving forces. Delivery routes include topical, oral and in vivo. Some special case studies covered in detail. Offered: jointly with CHEM E 491; even years; W.

### BIOEN 492 Surface Analysis (3) Ratner

Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials, science wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 458; W.

**BIOEN 499 Special Projects (2-6, max. 6)** Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interests as announced. Offered: A/WSpS.

## Courses for Graduates Only

**BIOEN 508 Physical Aspects of Medical Imaging (4)** *Stewart* Quantitative physical principles of medical imaging are presented for electromagnetic and sonic radiation. Methods of image formation and analysis are discussed for conventional film radiography, CT, DSA, PET, B-mode ultrasound and Doppler ultrasound. Offered: jointly with RADGY 508/ENV H 528; W.

**BIOEN 510- Bioengineering Seminars ([1-2]-, max. 3)** Topics of current bioengineering interests presented by resident and visiting faculty members and students. Graduate students actively involved in bioengineering research are eligible to enroll for credit and can be expected to attend regularly, participate in discussions, and make presentations. Credit/no credit only. Offered: AW.

**BIOEN 511 Biomaterials Seminar (1)** *Hoffman, Horbett, Ratner* Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 511; A/WSp.

**BIOEN 512 Biomechanics Seminar (1)** *Sanders* Designed to expose students to current research topics in the area of biomechanics and permit them the opportunity to present their work for discussion. Subjects include presentations of on-going laboratory research, as well as related topics, journal article review, and summaries of national meetings. Credit/no credit only.

**BIOEN 520 Orthopedic Biomechanics (4)** *Tencer* Mechanical engineering applied to musculoskeletal system with emphasis on techniques in orthopedic surgery. Measurement of mechanical properties of tissues, mechanics of bone, soft tissue, and muscle, mechanics of upper extremity, spine, and lower extremity. Engineering in surgery, gait analysis, joint replacement, fracture fixation. Prerequisite: M E 556 and M E 557 or permission of instructor. Offered: odd years; W.

**BIOEN 534 Introduction to Biomedical Instrumentation: Analog (4)** *Spelman* Techniques of biological systems analysis using Fourier and Laplace transforms. Electronic circuit analysis techniques applied to biological problems. Operational amplifiers as interfaces to transducers and as signal processors. Computer-aided design used in both homework and weekly laboratory. Prerequisite: MATH 307, PHYS 121-123, or equivalents. Offered: A.

**BIOEN 535 Introduction to Biomedical Instrumentation: Digital (4)** Instrumentation systems (power supplies, transducers, amplifiers, recording and display devices); techniques of signal/noise enhancement (grounding, shielding, averaging); digital logic and instrumentation; A/D and D/A conversion; use of laboratory computers and laboratory experience in these areas. Biomedical applications. Prerequisite: permission of instructor. Offered: W.

**BIOEN 537 Case Studies in Biomedical Instrumentation (3)** *Spelman* Current applications of medical instrumentation to neural prosthesis, microscopy, and the interaction of electromagnetic fields with biological tissues. Prerequisite: BIOEN 436, BIOEN 534, and BIOEN 535 or permission of instructor. Offered: W.

**BIOEN 540 Problem Solving in Bioengineering (3)** *Foster* Introduction to techniques of mathematical modeling. How to use computer methods to solve selected bioengineering problems in data analysis

and modeling, and use models to test hypotheses. Hands-on computer experience. Prerequisite: permission of instructor.

**BIOEN 545 Fractals in Biology and Medicine (3)** *Bassingthwaight* Introduction to fractal and chaos. Conceptual approaches to using fractals for characterizing structures and growth processes, describing heterogeneities, and evaluating properties of tissues. The behavior of non-linear systems, often chaotic, describes physiological homeodynamics, regulation without set points in feedback control. Offered: A.

**BIOEN 550 Mass Transport and Exchange in Biological Systems (3)** *Bassingthwaight* Review of basic mechanisms of transport; transport through vascular system and blood-tissue exchange processes in organs; integrated system analysis of closed systems and applications to physiological regulation, medical imaging, and pharmacokinetics. Prerequisite: calculus, introduction to differential equations; cardiovascular physiology; E E network analysis or systems analysis, chemical engineering transport. Offered: W.

**BIOEN 555 Introduction to Biomechanics (3)** *Pollack* Mechanical properties of biological tissues, with emphasis on the underlying histological bases. Bones, joints, cartilage, blood vessels, connective tissue, muscle, heart. Many laboratory sessions. Offered: odd years; Sp.

**BIOEN 560 Ultrasound in Bioengineering (4)** *Martin* Fundamentals of ultrasonic generation, formation, reception, and treatment of absorption, scattering, and transmission. Conventional and new methodology. (A, B, T-M mode, imaging, Doppler, tissue characterization, and nonlinear effects.) Prerequisite: E E/M E 525 for nonbioengineering students or permission of instructor. Offered: odd years; A.

**BIOEN 561 Biomedical Optics (4)** Advanced theories of optical and spectroscopic measurement with emphasis on biomedical laser applications. Laser principles, instrumentation, and current practice in various biomedical uses, covering such areas as medicine, surgery, and biology. Prerequisite: E E 381 or permission of instructor.

**BIOEN 565 Nuclear Magnetic Resonance in Biomedicine (2)** *Hayes, Kushmerick, Richards, Yuan* Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with RADGY 550; odd years; W.

**BIOEN 568 Image-Processing Computer Systems (4)** *Haralick, Kim* Components of digital processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image-processing operations. Selected advanced image-processing topics introduced. Individual student project. Prerequisite: permission of instructor. Offered: jointly with E E 568; W.

**BIOEN 571 Polymeric Materials (3)** *Ratner* Relationships between configuration, conformation, molecular order, microstructure, properties of polymeric materials. Concepts relevant to tailoring polymer molecules and microstructures for specific applications. Interactions between polymers and their in-service environment. Characterization and processing techniques relevant to polymeric materials. Prerequisite: one semester or two quarters of organic chemistry. Offered: jointly with MSE 571; odd years; A.

**BIOEN 573 Biosensors and Biomedical Sensing (3)** *Yager* In-depth overview of the principal types of biosensors. Topics include: how biological molecules are used in sensing, how the sensors operate, how different sensors compare, under what circum-

stances sensors can be useful, and the applicability of sensors to biomedical sensing. Prerequisite: BIOEN 436 or BIOEN 534 and BIOEN 535 or permission of instructor. Offered: even years; A.

**BIOEN 575 Molecular Modeling Methods (4)** *Lybrand* Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with CHEM 575; W.

**BIOEN 576 Laboratory Techniques in Protein Engineering (4)** *Stayton* Practical introduction to fundamentals of recombinant DNA technology and protein engineering. Gene design, bacterial molecular biology, genetic engineering strategy. Laboratory project focused on making site-directed protein mutations. Techniques include the Polymerase Chain Reaction, DNA sequencing, DNA cutting/splicing, protein expression. Prerequisite: background in biochemistry or molecular biology or consent of instructor. Offered: W.

**BIOEN 577 Cell and Protein Reaction with Foreign Materials (3)** *Horbett* Study of ways in which cell and protein interactions with foreign materials affect the biocompatibility of biomaterials. Description of the phenomenology and mechanisms of protein adsorption, mammalian cell adhesion, and cell receptor biology and of methods used to study these phenomena. Surface properties of materials discussed in context of the course. Prerequisite: permission of instructor.

**BIOEN 578 Biomembranes (3)** *Yager* Develops an understanding of the molecular principles that underlie the self-assembly of surfactants into natural and model membranes; in particular, on the relationship between the chemical structure of lipid molecules and the three-dimensional aggregates that they form in water. Offered: A.

**BIOEN 590 Advanced Topics in Biomaterials (3)** *Ratner, Hoffman, Horbett, Yager* Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: BIOEN 490 or CHEM E 490. Offered: jointly with CHEM E 590; even years; Sp.

**BIOEN 592 Surface Analysis (3)** *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 558; W.

**BIOEN 599 Special Topics in Bioengineering (1-6, max. 15)** Offered at a graduate level periodically by faculty members within the Center for Bioengineering; concerns areas of research activities with current and topical interest to bioengineers. Prerequisite: undergraduate or graduate courses (or equivalent) determined individually for each special topic. Offered: A/WSpS.

**BIOEN 600 Independent Study or Research (\*)** Credit/no credit only. Offered: A/WSpS.

**BIOEN 700 Master's Thesis (\*)** Credit/no credit only. Offered: A/WSpS.

**BIOEN 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: A/WSpS.

## Program on the Environment

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ENVIR 439 Attaining A Sustainable Society (1/3, max. 3) NW** *Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with FISH 439; A.

**ENVIR 450 Special Topics in Environmental Studies (1-5, max. 5)** Format may range from seminar/discussion to formal lectures to laboratory or modeling work.

**ENVIR 451 Comparative Historical and Social Ecology of the Tropics (3) I&S** *Sivaramakrishnan* Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Offered: jointly with ANTH 451. Prerequisite: ANTH 210.

**ENVIR 459 Culture, Ecology and Politics (5) I&S** *Pena* Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ANTH 459.

**ENVIR 470 Communications and the Environment (5) I&S** Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with CMU 470.

**ENVIR 477 Marine Conservation (3) NW** *Parrish* Terrestrially based concepts of conservation biology applied to marine systems: human activities affecting the marine environment including fishing and pollution, influence of legal and cultural frameworks, and ecosystem management. Offered: jointly with BIOL 477; W.

**ENVIR 480 Marine Resource Conservation and Management (3) I&S/NW** *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480 and SMA 480.

**ENVIR 490 Capstone Experience I (1)** Preparation for ENVIR 491. Students attend presentations and critiques given by students who are taking or have completed 492 and will make arrangements for their own capstone experience (internship, group or individual project). Credit/no credit only. Recommended: 15 credits of ENVIR 201/202/203. Offered: AWSpS.

**ENVIR 491 Capstone Experience II (2-8, max. 8)** Internship, group project, or individualized project in Environmental Studies. May be taken in a single quarter or distributed over two or three quarters of the student's final year. Recommended: ENVIR 490 and 15 credits ENVIR 201/202/203. Offered: AWSpS.

**ENVIR 492 Capstone Experience III (2)** Critique and discussion of projects undertaken in 491. May be taken concurrently with the final quarter of 491. Credit/no credit only. Prerequisite: ENVIR 491. Offered: AWSpS.

**ENVIR 498 Independent Study (1-3, max. 5)** Independent reading and/or research. Limited to majors and minors in Environmental Studies.

### Courses for Graduates Only

**ENVIR 500 Graduate Seminar in Environmental Studies (1-5, max. 15)**

## University Conjoint Courses

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Each of the following courses is administered by two or more schools or colleges within the University. No degree program is offered.

**UCONJ 411 Psychology of Aging (3) Kiyak** Focuses on developing the skills necessary for critically evaluating current psychological theories of aging, research findings in this area, and the implications of findings on the aging person. Special consideration given to the effects of socioeconomic, sex, and ethnic differences in the psychology of aging. Open to upper-division undergraduates and beginning graduate students interested in the field of gerontology.

**UCONJ 420 Biological Safety Practices (1) Kenny** General introduction to appropriate laboratory procedures used for handling potentially hazardous biological agents. Particular focus on laboratory safety and appropriate protocols that should be employed by those engaged in infectious disease and recombinant DNA research. Credit/no credit only.

**UCONJ 422 Sexually Transmitted Diseases: An Overview (2) Gardner** Clinically oriented course designed to provide a knowledge base for upper division health science students to participate effectively in community outreach programs for the prevention of sexually-transmitted diseases. Offered cooperatively by the departments of Pharmacy and Medicine. Credit/no credit only.

**UCONJ 440 Biological Aspects of Aging (3)** Introductory course on aspects of the biology of human aging and of functional changes associated with normal aging and with those illnesses that may be present in the elderly. Focus on the relationship between changes in physical function, environment, and quality of life. Includes theoretical perspective on aging as well as the aging process in specific physiological systems. Designed for upper-level undergraduate students with an interest in aging.

**UCONJ 442 Social and Cultural Aspects of Aging (3)** Involves faculty members from the various social science fields examining the range and variation of relationships among age-linked attitudes and cultural values related to aging; the social and economic factors that influence the elderly in contemporary society; the effects of ethnic and sex differences in sociocultural aging. Open to upper-division undergraduates and beginning graduate students interested in gerontology.

**UCONJ 443 Interdisciplinary Seminar on Aging (1-6, max. 15) Borgatta** Interdisciplinary examination of the contemporary theoretical literature on gerontology and long-term care. For upper-level undergraduate and graduate students with an interest in aging. Quarterly offerings available from the Institute on Aging.

**UCONJ 444 Interdisciplinary Collaborative Teams in Health Care (1-5, max. 10)** Course open to students in UW Health Sciences schools. Students function as an interdisciplinary learning group within a problem based learning framework. The primary goal of the course is to promote the development of interdisciplinary practice in the care of urban and rural underserved patient populations. Credit/no credit only.

**UCONJ 490 Social Sensitivity in Health Care (3) I&S** Multidisciplinary course for health professions students. Health professionals' roles in dealing with social, cultural, and physical barriers to health care of low-income groups and ethnic people of color. Personal involvement through field experiences and faculty drawn from affected communities as well as health sciences, social work schools. Credit/no credit only.

### Courses for Graduates Only

**UCONJ 500- Seminar in Interprofessional Collaboration (1-3)-, max. 7)** Interdisciplinary teams composed of students and community members placed in diverse urban settings to address an identified community need by developing and implementing collaborative, community-based projects. Seminars emphasize interprofessional collaborative practice, intrapersonal understanding, interpersonal group process skills, organizational savvy, community awareness, and sociocultural sensitivity. Graduate School of Public Affairs. Offered: AWSp.

**UCONJ 501 International Health (1) Hunt** Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements. Credit/no credit only.

**UCONJ 503 International Health (1) Hunt** Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements. Credit/no credit only.

**UNCONJ 510 Integrating Arts in the Classroom (4)** Prepares prospective elementary education teachers to understand and acquire arts literacy through a comprehensive approach to learning and teaching in and through the arts. Course is school and arts-site based, inclusive of multiple art forms. Based on comprehensive art principles, and project oriented. Credit/no credit only. Offered: Sp.

**UCONJ 513 Dynamics of Patient Management: Diabetes Mellitus (2)** Analysis of advanced knowledge related to interdisciplinary management of diabetes. Commonalities and differences in provider approaches, recent research and its effect on management practices, collaborative communication, knowledge application. Brief interactive presenta-

tions, decision-making opportunities, discussion. Credit/no credit only. Prerequisite: graduate standing in pharmacy, dietetics, nursing; third- or fourth-year medical student; or permission of instructor.

**UCONJ 520 Molecular Biophysics Research Seminar (1)** *Parson* A series of research seminars for faculty and students involved with the molecular biophysics program. Credit/no credit only.

**UCONJ 524 Developmental Neurobiology (3)** *Raible, Reh, Roelink, Rubel* Survey of contemporary issues in developmental neurobiology, including neurogenesis and differentiation; electrophysiological, morphological, and neurochemical regulation of cellular phenotype; neuronal pathways and synaptic contacts; cellular and synaptic plasticity; and behavior. Examination of molecular biological, morphological, electrophysiological, and behavioral approaches. Prerequisite: background in neurophysiology, neuroanatomy, molecular neurobiology.

**UCONJ 525 Overview of Faculty Research in Neurobiology (1)** Reviews research topics currently being studied in neurobiology. Student preparation consists of reading pertinent articles published on each topic. Credit/no credit only. Prerequisite: first year graduate student in neurobiology.

**UCONJ 530 Issues in Indian Health (3)** Survey of historical and contemporary issues in Indian Health. Covers Indian contributions to health, traditional Indian Medicine, current disease epidemiology, development of Federal Indian Health policy, the Indian Health Service, tribal health programs, and consequences of major legislation on Indian Health. Prerequisite: current health science student or permission of instructor.

**UCONJ 555 Principles of STD/HIV Research (3)** Provides MD and PhD fellows and graduate students with a comprehensive overview of the current state of knowledge in specific areas of STD/HIV research, including study design, laboratory methods, production of instruments for data collection, and methods for data analysis. Credit/no credit only.

**UCONJ 584 Plant Tumors (1, max. 9)** *Gordon* Discussion of the literature of plant tumors and current research work being carried on in this area at the University. Offered cooperatively by the departments of Biochemistry, Botany, and Microbiology and Immunology. Credit/no credit only. Prerequisite: offered only to persons actively pursuing work in this area.

# School of Law

## Dean

Roland L. Hjorth  
326 Condon

## Associate Dean

Richard O. Kummert  
306 Condon

## Assistant Deans

Michael Kingan  
412 Condon

Paula Littlewood  
414 Condon

Sandra E. Madrid  
338 Condon



General Catalog Web page:  
[www.washington.edu/students/gencaf/academic/School\\_Law.html](http://www.washington.edu/students/gencaf/academic/School_Law.html)



School Web page:  
[www.law.washington.edu](http://www.law.washington.edu)

Established in 1889, the School of Law is a member of the Association of American Law Schools and is on the American Bar Association's list of approved law schools. Graduates of the School are prepared to practice law anywhere in the United States. Additional information about the School is contained in the current *School of Law* catalog.

## Facilities and Services

The School of Law is housed in Condon Hall, adjacent to the University's main campus. It is equipped with classroom, library, lounge, and office facilities.

The Marian Gould Gallagher Law Library is one of the finest law libraries in the country. Its collection, among the largest university law collections on the West Coast, currently contains more than 450,000 bound volumes and volume equivalents of microform. In addition to the extensive main collection, it houses important materials that support the Asian, marine, sustainable international development, and tax law graduate programs and serves as a federal depository for selected United States government documents. An experienced audiovisual staff directs the use of video equipment in the trial advocacy and moot court programs. The library is equipped with the latest in micro-readers and printers in order to make full use of the growing microform collection. The library is a subscriber to LEXIS, WESTLAW, the Western Library Network, and other research databases.

## Juris Doctor Program

The Juris Doctor degree is conferred upon a student who has met the residence requirements, consisting of nine quarters of at least 12 credits each, and has earned at least 135 credits satisfactory to the School of Law.

As with most law schools in the United States, the first-year courses are required and are designed to introduce students to basic legal skills, foundational subject matter, and the variety of public and private processes with which the profession is concerned. Those courses deal with contracts, torts, property, civil procedure, criminal law, constitutional law, and basic legal skills.

Except for a required course in professional responsibility, the public service requirement, and an advanced writing project requirement, courses in the second and third years are elective. Therefore, a student may choose a program designed to suit his or her interests and needs. J.D. candidates are required to perform 60 hours of public-service legal work during the second or third year.

## Admission

New students may enter the School of Law only in autumn quarter. Instruction begins for first-year students a few days earlier than the time set for upper-class students. Beginning students must have received a baccalaureate degree from an accredited college or university prior to commencing the study of law.

All applicants are required to take the Law School Admission Test (LSAT) and to register for the Law School Data Assembly Service (LSDAS). Registration packets and test information are available at most law schools and from Law School Admission Council, Box 2000, 661 Penn Street, Newtown, PA 18940-0998. Email: [lsacinfo@lasac.org](mailto:lsacinfo@lasac.org).

No specific prelaw course is required or recommended, and the School of Law subscribes to the remarks set forth on prelaw preparation in *The Official Guide to U.S. Law Schools (2000 Edition)*. Applications for admission to the next entering class must be post-marked no later than January 15. To be assured of consideration for admission, an applicant must have complete credentials, including the LSDAS report, filed in the School of Law by February 1. An application fee (at this writing, \$50) also is required.

## Transfer Applicants

Students who have completed at least one year at a member school of the Association of American Law Schools may apply to this school for admission with advanced standing with credit for no more than one year of such work. A student who has completed or expects to complete at least two years of work at a member school of the Association of American Law Schools and who expects to graduate from that member school may apply to this school for admission as a non-degree candidate.

Applicants should request application forms and instructions from the admissions office in time to permit filing of all application materials by July 7.

Applications are considered only if vacancies exist. Selection of the applicants is based on evidence either (1) that the candidate can produce above-average work at this law school, or (2) that the candidate will contribute to the diversity of the student body.

Students working on law degrees to be conferred by the University have priority over non-degree candidates in the selection of courses. This policy is in accordance with the general University policy on the registration of nonmatriculated students.

## Financial Aid

Students in need of financial assistance may receive University aid, School of Law aid, federal loans, or aid from all of these sources. To be considered for aid, applicants must submit the Free Application for Federal Student Aid (FAFSA) by February 28. FAFSAs are available in December at most college financial aid offices, or may be obtained by writing or calling the Office of Student Financial Aid, 105 Schmitz Hall, Box 355880, University of Washington, Seattle, WA 98195, (206) 543-6101, [offa@u.washington.edu](mailto:offa@u.washington.edu). Applicants for admission should not wait until they have been admitted before applying for financial aid.

School of Law grants are awarded primarily on the basis of financial need, although scholarship, or other factors may be considered with regard to certain awards. Inquiries concerning School of Law aid should

be addressed to Financial Aid Coordinator, School of Law, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195-4600; [uwlawaid@u.washington.edu](mailto:uwlawaid@u.washington.edu)

## Inquiries

A more detailed statement on admission policy and application procedure is available in the School of Law. Requests for application materials and the University law school bulletin should be addressed to Law School Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195-4617; [admissions@law.washington.edu](mailto:admissions@law.washington.edu); (206) 543-4078.

## Graduate Program

Graduate Program Coordinator  
712 Condon, Box 354600  
(206) 543-4937  
[gradlaw@u.washington.edu](mailto:gradlaw@u.washington.edu)

In addition to the professional law program leading to the Juris Doctor degree, the law faculty offers graduate programs leading to the Master of Laws (LL.M.) in law and marine affairs, Asian and comparative law, the law of sustainable international development, and taxation. The School of Law offers the Doctor of Philosophy (Ph.D.) degree in Asian and comparative law only. The requirements for each program are as follows:

### Asian Law Program

The Master of Laws degree program in Asian and comparative law is designed for students with career and research interests in one or more of the legal systems of East Asia, with particular emphasis on that of Japan, as well as for lawyers from East Asia seeking advanced comparative study of American law. The Asian law program is structured around extensive course offerings involving comparative study of basic areas of United States and East Asian law and tutorials in areas of special interest to each student.

Admission to the LL.M. degree program in Asian and comparative law is limited to language-qualified applicants who have received the first degree in law and who have a record of superior academic achievement. Graduates of American law schools must have a degree from an ABA-accredited institution. The applicant must be competent in an East Asian language (or, in the case of foreign students, in English). Students without the required competence may be admitted to the program, but must successfully complete an approved program of intensive study of an East Asian language before beginning their studies. The program contemplates one year in residence, at least 36 credits, and an acceptable major research undertaking.

Admission to the Ph.D. program in law is limited to exceptional scholar-lawyers who are fluent in English and in either Japanese, Chinese, or Korean. Prospective Ph.D. students must normally complete the LL.M. program before being accepted as Ph.D. students. The core of the program is a major creative research project using Asian-language sources as well as English-language sources. At least two, and usually three, years in residence are necessary in order to accomplish the work that must be done in order to pass the General Examination that precedes candidacy for the doctoral degree. An acceptable dissertation must thereafter be submitted to complete the requirements for the degree. The Candidate may spend a year abroad while working on the dissertation but must be in residence during the quarter in which the degree is to be conferred.

### Law and Marine Affairs Emphasis

Students who have acquired a first degree in law can become prospective candidates for the LL.M. degree in law and marine affairs. Graduates of American law schools must have a degree from an ABA-accredited school. Particular emphasis is placed on interdiscipli-

nary aspects of marine affairs and coastal zone management. Attainment of the LL.M. degree with specialization in law and marine affairs requires satisfactory completion of 40 credits of course and research work, at least 15 of which must be in the School of Law. In the School of Law, courses include U.S. Coastal and Ocean Law, International Law of the Sea, Marine Law and Policy, and Admiralty and Maritime Law. Pertinent courses are also offered in the Schools of Fisheries, Marine Affairs, and Oceanography, the Graduate School of Public Affairs, the College of Engineering, and the Departments of Economics and Geography.

### Law of Sustainable International Development Emphasis

Students may earn an LL.M. degree in the law of sustainable international development. This LL.M. degree option is open to students with a first degree in law. Graduates of American law schools must have a degree from an ABA-accredited school. Emphasis is placed on the interdisciplinary study of sustainable international development, and students may earn more than half their credits in courses outside the School of Law, including courses offered by the Schools of International Studies and Public Health, and the Departments of Economics, Political Science, and Sociology. In the School of Law, courses offered include Legal Problems of Economic Development (required); International Environmental Law (required); Public Land Law; International Commercial Law; and Land, American Culture, and the Law. Attainment of the LL.M. degree with specialization in the law of sustainable international development requires satisfactory completion of 40 credits of course and research work, at least 15 of which must be in the School of Law, and the taking of courses in at least three other departments other than law. As part of their work, students must write one substantial paper.

### Taxation

Students may earn an LL.M. degree in taxation. This LL.M. degree option is open to students with a first degree in law. Graduates of American law schools must have a degree from an ABA-accredited school. International students must have a first degree in law or equivalent and may be admitted by the permission of the director. A candidate for the LL.M. degree must successfully complete 36 quarter hours of course work. Students who qualify may be enrolled either on a full-time or a part-time basis. Full-time students can complete the course of study within one nine-month academic year, while those participating on a part-time basis are allowed six academic years to complete the degree. Generally all courses must be taken from the Graduate Tax curriculum, although candidates for the LL.M. may, with the permission of the director, take up to 6 credits of course work in the Law School's J.D. curriculum. Certain core courses are required: Federal Tax Controversies and Procedure, Taxation of Corporations and Shareholders, Tax Accounting, Property Dispositions and Transactions, and Taxation of Partners and Partnerships. The remainder of the curriculum is elective.

### Financial Aid

Scholarship funds for graduate students in law are quite limited. Inquiries should be made to Law School Graduate Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu; (206) 543-4937.

### Inquiries

Requests for applications and program brochures for all School of Law LL.M. programs except the LL.M. in taxation, as well as information regarding application procedures, should be addressed to Law School Graduate Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu.

Requests for applications and program brochures for the LL.M. in taxation should be addressed to Gloria Strickland, Law School Graduate Tax Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195; gradlaw@u.washington.edu.

## Faculty

### Professors

Andersen, William \* 1964; LLB, 1956, University of Colorado (Denver); LLM, 1958, Yale University; administrative law, regulated industries, urban government, legislation and public policy.

Andrews, Thomas R. \* 1985; MA, 1973, Northwestern University; JD, 1979, University of Pennsylvania; professional responsibility in legal practice, community property, decedents' estates, torts.

Aronson, Robert H. \* 1975; JD, 1973, University of Pennsylvania; evidence, criminal law, professional responsibility, law and literature.

Bodansky, Daniel \* 1989; JD, 1984, Yale University; international law, international environmental and human rights law, civil procedure.

Clarke, Donald C. \* 1988; JD, 1987, Harvard University; modern Chinese law, American property law.

Cross, Harry M. \* 1943, (Emeritus); JD, 1940, University of Washington; property.

Emory, Meade 1995; LLB, 1958, George Washington University; LLM, 1962, Boston University; federal taxation.

Fitzpatrick, Joan M. \* 1983; JD, 1975, Harvard University; international human rights and civil rights, federal courts, immigration, constitutional law.

Fletcher, Robert L. \* 1956, (Emeritus); LLB, 1947, Stanford University; property.

Hardisty, James \* 1970; LLB, 1966, Harvard University; criminal law and procedure, psychiatry and law, juvenile courts, torts, family law.

Hazelton, Penny A. \* 1985; JD, 1975, Lewis And Clark College; MLL, 1976, University of Washington; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law.

Henderson, Dan F. \* 1962, (Emeritus); LLB, 1949, Harvard University; PhD, 1955, University of California (Berkeley); U.S./Japanese business transactions, corporate relations, admiralty.

Hershman, Marc \* 1976, (Adjunct); JD, 1967, Temple University; LLM, 1970, University of Miami (Florida); coastal zone management law.

Hicks, Gregory A. 1984; JD, 1978, University of Texas (Austin); property, environmental law, water law, public lands.

Hjorth, Roland L. \* 1964; LLB, 1961, New York University; transnational tax, Common Market, federal taxation.

Hume, Linda S. \* 1972; JD, 1970, University of California (Los Angeles); commercial transactions, property, equal rights, legal writing and analysis.

Huston, John \* 1967, (Emeritus); JD, 1952, University of Washington; LLM, 1955, New York University; federal taxation.

Jay, Stewart M. \* 1980; JD, 1976, Harvard University; civil procedure, theories of justice, federal courts, constitutional law.

Jecker, Nancy A. S. \* 1982, (Adjunct); MA, 1982, Stanford University; MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Junker, John M. \* 1964; JD, 1962, University of Chicago; criminal law and procedure, evidence.

Kummert, Richard O. \* 1964; MBA, 1955, Northwestern University; LLB, 1961, Stanford University; business planning, corporations, federal tax.

Loftus, Elizabeth F. \* 1973, (Adjunct); PhD, 1970, Stanford University; cognition, long-term memory, eyewitness testimony, psychology and law.

Morris, Arval \* 1955; JD, 1955, University of Colorado (Boulder); LLM, 1958, Yale University; LLD, 1972, Colorado College; constitutional law, jurisprudence, education law, civil rights.

Peck, Cornelius J. \* 1954, (Emeritus); LLB, 1949, Harvard University; administrative law, labor law, torts.

Prosterman, Roy L. \* 1965; LLB, 1958, Harvard University; international law, sustainable international development.

Rieke, Luvern V. \* 1949, (Emeritus); LLB, 1949, University of Washington; LLM, 1953, University of Chicago; LLD, 1959, Pacific Lutheran University; contracts, family law.

Rodgers, William H. \* 1979; LLB, 1965, Columbia University; legislation, environmental law, resource management, property.

Rombauer, Marjorie D. \* 1960, (Emeritus); LLB, 1960, University of Washington; creditor and debtor; personal property; legal research, writing, and analysis.

Schnapper, Eric 1995; MA, 1963, Johns Hopkins University; LLB, 1968, Yale University; constitutional law, civil procedure, civil rights, employment discrimination.

Smith, Charles Z. \* 1973, (Emeritus); JD, 1955, University of Washington; evidence, judicial administration.

Smith, Frank W. Jr. \* 1985; JD, 1962, University of Richmond; LLM, 1968, Harvard University; commercial law, bankruptcy, real property security.

Stoebuck, William B. \* 1967; MA, 1953, Indiana University; JD, 1959, University of Washington; SJD, 1973, Harvard University; property, land use, legal history.

Trautman, Philip A. \* 1956; JD, 1954, University of Washington; conflict of laws, civil procedure.

Vaughn, Lea B. \* 1984; JD, 1978, University of Michigan; labor law, alternate dispute resolution, civil procedure.

Wolcher, Louis E. \* 1986; JD, 1973, Harvard University; contracts, critical legal studies, torts, remedies.

Zerbe, Richard O. \* 1975, (Adjunct); PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental policy.

### Associate Professors

Kirtley, Alan \* 1984; JD, 1972, Indiana University; negotiation, mediation, alternative dispute resolution generally, clinical legal education.

Kuszler, Patricia Carol \* 1994; MD, 1978, Mayo Medical School/graduate School; JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Maranville, Deborah 1989; JD, 1975, Harvard University; Civil Clinic, unemployment law, feminist legal theory.

Takenaka, Toshiko \* 1992; LLM, 1990, PhD, 1992, University of Washington; U.S. patent and intellectual property law, international and comparative intellectual property law.

Townsend, Michael F. \* 1992; MA, 1978, PhD, 1982, University of Michigan; JD, 1989, Yale University; law and science, intellectual property, use of quantitative methods.

Wiehl, Lis W. \* 1993; MA, 1985, University of Queensland (Australia); JD, 1987, Harvard University; criminal law, especially federal prosecution; legal ethics; evidence; trial advocacy.

**Assistant Professors**

Allen, Craig H. 1994; JD, 1989, University of Washington; marine affairs, evidence, environmental regulation.

Boxx, Karen E. 1996; JD, 1983, University of Washington; decedents' estates, community property.

Donaldson, Samuel A. 1995; JD, 1993, University of Arizona; LLM, 1994, University of Florida; taxation.

Mastroianni, Anna C. \* 1996; JD, 1986, University of Pennsylvania; MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

O'Neill, Kathleen M. 1993; JD, 1980, Columbia University; legal research, writing, and analysis.

Ramasasthy, Anita G. 1996; MA, 1989, University of Sydney (Australia); JD, 1992, Harvard University; commercial law, legal history, contracts, non-profit organizations.

Walsh, Walter J. 1996; LLM, 1989, Yale University; torts, legal history, European community, constitutional law.

**Senior Lecturers**

Anderson, Helen A. 1994; JD, 1984, University of Washington; legal research, writing, and analysis.

Gold, Julia Ann 1995; JD, 1983, University of South Carolina; alternative dispute resolution, mediation.

Jones, Michele Elena 1993; JD, 1987, Gonzaga University; family law, children's rights.

McMurtrie, Jacqueline 1989; JD, 1983, University of Michigan; criminal law and practice.

**Lecturers**

Hotchkiss, Mary A. 1989; JD, 1983, LLM, 1985, George Washington University; legal research, writing, and analysis.

McGinnis, Kathleen M. 1994; JD, 1984, University of California (Berkeley); legal research, writing and analysis.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**LAW 410 Problems in Professional Responsibility (4) I&S**

**LAW 415 Criminal Justice (3) I&S** Examines pre-trial rights of persons suspected or accused of crime, primarily those rights covered by the Fourth, Fifth, Sixth, and Fourteenth Amendments of the U.S. Constitution.

**LAW 422 Copyright (3) I&S****LAW 429 Public Land Law (3) I&S**

**LAW 440 Legal Issues of Internet Law (3) I&S** Introduces the basic legal issues raised by networked digital technologies, such as the Internet. Covers jurisdiction, speech, privacy/access, propriety rights (copyrights, domain names), emerging law, leading policy debates, as well as fundamental Internet technical skills. Offered: S.

**LAW 442 Land Law and the Urban Environment (3) I&S** Examination of the major legal tools available to shape the urban environment by controlling the use of land. Considers zoning, subdivision controls, urban renewal, private land-use restrictions, and the rules of nuisance law. Credit/no credit only. Open to law and nonlaw students.

**LAW 447 Critical Perspectives in Law (3) I&S** Examination of modern critical legal thought and critics views regarding proposed alternative forms of social ordering.

**LAW 476 International Economic Relations and Trade Policy (3) I&S** Consideration of international control of national trade policies and permissible transnational reach of national trade or other regulation The General Agreement on Tariffs and Trade (GATT) and the international monetary system examined from legal and economic perspective. Examination and comparison of prescriptive jurisdiction to public international law.

**LAW 477 Law and Literature (3) VLPA/I&S** Examines literary portrayals of law, lawyers, and the legal system. Considers portrayals purporting to depict accurately the character of lawyers or the efficacy of the legal system, and works envisioning lawyers and the legal system in a "better world". Explores the interrelations between literary works and appellate decisions.

**LAW 481 Land, American Culture and the Law: Perspectives on the Use and Ownership of the Natural Environment (1-6, max. 6) I&S**

**First-Year Courses**

The courses below are intended for law students; other students are admitted only rarely with special permission of the dean. Only the course titles are given. For complete course descriptions, see the School of Law Bulletin

**LAW A 501- Contracts ([2-8]-, max. 8)**

**LAW A 502- Civil Procedure I ([2-6]-, max. 6)**

**LAW A 503- Property I ([2-8]-, max. 8)**

**LAW A 504- Torts ([2-8]-, max. 8)**

**LAW A 505- Criminal Law ([2-5]-, max. 5)**

**LAW A 506- Basic Legal Skills ([1-6]-, max. 6)**

**LAW A 507 Constitutional Law I: Constitutional Structures of Government (4)**

**Second- and Third-Year Courses**

**LAW A 508 Payment Systems (3)**

**LAW A 509 Administrative Law (3-4, max. 4)**

**LAW A 510 Sales: A Comparative Perspective (2)**

**LAW A 511 Transmission of Wealth (5)**

**LAW A 512 Secured Transactions III (3)**

**LAW A 513- Creditor-Debtor Law ([2-3]-)**

**LAW A 514 Corporations (3/4)**

**LAW A 515 Business Organizations (5)**

**LAW A 517 Securities Regulations (4)**

**LAW A 518 Restitution (3)**

**LAW A 520- Property II ([2-8]-, max. 8)**

**LAW A 521 Community Property (2/3)**

**LAW A 522 Copyright (3)**

**LAW A 523 Real Property Security (3/4)**

**LAW A 524 Private Land Development (3)**

**LAW A 525 Water Law (3)**

**LAW A 526 Copyrights and Trademarks (4)**

**LAW A 527 Environmental Law: Pollution Control (4)**

**LAW A 529 Public Land Law (3)**

**LAW A 530- Basic Income Tax ([2-6]-, max. 6)**

**LAW A 531 Death and Gift Taxation (2-5, max. 5)**

**LAW A 532 Taxation of Business Entities (5)**

**LAW A 534- The Beginning and End of Life: Rights and Choices ([1-4]-)**

**LAW A 538 Estate Planning Workshop (3-4)**

**LAW A 539- Medical Ethics and Jurisprudence (3-)**

**LAW A 540 Land Use Planning (3)**

**LAW A 542 Land Law and the Urban Environment (3)**

**LAW A 543 Business Reorganization Under the Bankruptcy Code (5)**

**LAW A 545 International Environmental Law (4)**

**LAW A 546- Legal Protection for Technology I: Basic Patent Principles ([2-4]-, max. 4)**

**LAW A 547- Critical Perspectives in Law (3-)**

**LAW A 548- Civil Rights ([2-6]-, max. 6)**

**LAW A 549 Advanced Legal Research (4)**

**LAW A 551 Constitution and American Public Education (3-6)**

**LAW A 552- Antitrust Law and Policy ([2-5]-, max. 5)**

**LAW A 553 Sex, Gender, Sexuality: Law and Theory (4)**

**LAW A 554- Labor Relations and the Law ([1-5]-, max. 5)**

**LAW A 556- Employment Discrimination ([2-4]-, max. 4)**

**LAW A 557 Foreign Affairs and the Constitution (3)**

**LAW A 558- Jurisprudence and Legal Philosophy ([2-4]-, max. 4)**

**LAW A 561 Law and Economics (3)** Offered: jointly with PB AF 532.

**LAW A 562 Employment Law (3/4)**

**LAW A 563 Urban Government (3)**

**LAW A 564 Legal History (1-4, max. 4)**

**LAW A 565 American Indian Law (3)**

**LAW A 567 Disability Law (3)**

**LAW A 574 The International Legal Process (2-4)**

**LAW A 576 International Economic Relations and Comparative Trade Policy (3/4)**

**LAW A 577 Immigration Law (4)**

**LAW A 578- International Commercial Law ([1-4]-, max. 4)**

**LAW A 579 Child Advocacy (4)**

**LAW A 580 Family Law (4-5)**

**LAW A 581- Washington Constitutional Law Seminar ([1-4]-, max. 4)**

**LAW A 583 Insurance Law (4)**

**LAW A 585 Admiralty (4)**

**LAW A 586 Secured Transactions IV (4)**

**LAW A 590 Constitutional Law: Equal Protection, Fundamental Rights, and Due Process of Law (4)**

**LAW A 591 Constitutional Law: Freedom of Expression (3)**

**LAW A 592- Constitutional Law II: The Fourteenth and First Amendments—Equal Protection, Fundamental Rights, Due Process of Law, Freedom of Expression and Religion ([2-8]-, max. 8)**

**LAW A 594 International and Comparative Intellectual Property Law (2)**

**LAW A 596- Law, Medicine, and Health Care Delivery ([1-4]-, max. 4)**

**LAW A 597 Health Care Financing and Regulation (4)**

**LAW A 598 Legal Research I (3)** Offered: jointly with LIS 591.

**LAW A 599 Legal Research II (4)** Offered: jointly with LIS 592.

**LAW B 500 Civil Procedure II (3)**

**LAW B 503- Evidence ([2-6]-, max. 6)**

**LAW B 505 Medical Malpractice (3)**

**LAW B 506- Conflicts of Laws ([2-6]-, max. 6)**

**LAW B 507 Federal Courts and the Federal System (3/4)**

**LAW B 510- Problems of Professional Responsibility (2-4, max. 4)**

**LAW B 511- Seminar on Problems in International Environmental Law ([1-4]-, max. 4)**

**LAW B 512 Legislation and the Formulation of Public Policy (3)**

**LAW B 513 Evidence IV (4)**

**LAW B 514 Street Law ([1-8]-, max. 8)**

**LAW B 515 Criminal Procedure (5)**

**LAW B 516- International Contracting: Negotiations and Drafting ([2-4]-, max. 4)** Credit/no credit only.

**LAW B 519 Pre-Trial Practice (3)**

**LAW B 520- Trial Advocacy ([2-6]-, max. 6)** Credit/no credit only.

**LAW B 521- Appellate Advocacy ([1-3]-, max. 3)** Credit/no credit only.

**LAW B 523 Negotiation (4)** Credit/no credit only.

**LAW B 525 Alternative Dispute Resolution (3)** Credit/no credit only.

**LAW B 526 Mediation Clinic (1-7, max. 7)** Credit/no credit only.

**LAW B 527 Criminal Law Clinic (8)** Credit/no credit only.

**LAW B 528 Unemployment Clinic (2-8, max. 8)** Credit/no credit only.

**LAW B 529 Advanced Environmental Law and Practice (1-4, max. 4)**

**LAW B 530 Judicial Externship (1-15, max. 15)**

**LAW B 531- Immigration Law Clinic ([1-8]-, max. 8)**

**LAW B 532- Supervised Analytic Writing ([1-3]-, max. 3)**

**LAW B 533 Interviewing and Counseling for Lawyers (2/3)** Credit/no credit only.

**LAW B 534- Affordable Housing Development Clinic ([1-12]-, max. 12)**

**LAW B 535 Legislative Externship (1-15, max. 15)** Credit/no credit only.

**LAW B 536 Drafting Basic Business Documents (1-3, max. 3)-**

**LAW B 537- Refugee Advocacy Clinic ([1-12]-, max. 12)** Credit/no credit only.

**LAW B 538 Agency Externships (1-15, max. 15)** Credit/no credit only.

**LAW B 539 Public Interest Law Externship ([1-15]-, max. 15)** Credit/no credit only.

**LAW B 560 Criminal Justice Externship (1-15, max. 15)** Credit/no credit only.

**LAW E 500 Advanced Writing Project (1-3, max. 3)**

**LAW E 502 White Collar Crime (4)**

**LAW E 505 Frontiers of Tort Law (3)**

**LAW E 514 The Law of Nonprofit Organizations (4)**

**LAW E 516- Advanced Criminal Procedure (5)**

**LAW E 517- Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4)** Offered: jointly with SISEA 517.

**LAW E 519 Philosophy of Law (4)**

**LAW E 521 Advanced Trial Advocacy (3)**

**LAW E 524- Child Advocacy Clinic ([6-12]-, max. 12)** Credit/no credit only.

**LAW E 528- Appellate Advocacy Clinic (2-, max. 4)**

**LAW E 531 Basic Income Tax Concepts (3)**

**LAW E 537 Taxation of C and S Corporations (4)**

**LAW E 540 Legal Issues of Internet Law (3)**

**LAW E 541 Internet Law and Commerce (3)**

**LAW E 547 Legal Protection for Computer Software (3)**

**LAW E 548 Litigation Strategies in Technology Protection (3)**

**LAW E 562 Legal, Ethical, and Social Issues in Public Health Genetics (3)** *Kuszler, Mastroianni* Offered: jointly with PHG 512/MHE 514; Sp.

**LAW E 564 Genetics and the Law (2)** *Kuszler* Offered: jointly with PHG 523; A.

**LAW E 560 Advanced Health Law (3)**

**LAW E 568- Indian Law Clinic (4, max. 12)**

**LAW E 570 Biotechnology and the Law (3)**

**LAW E 579 International and Foreign Law Research (2)**

## Asian and Comparative Law

**LAW B 540 Law in East Asia: Japan (4)** Offered: jointly with SISEA 540.

**LAW B 541 Law in East Asia: China (3)** Offered: jointly with SISEA 543.

**LAW B 542 Law in East Asia: Korea and Southeast Asia (3)**

**LAW B 543 Intellectual Property Law in East Asia (3)**

**LAW B 544- Transnational Litigation: United States-Japan ([2-4]-, max. 4)**

**LAW B 546- United States-Japanese Corporate Relations ([2-4]-, max. 4)**

**LAW B 549 Government Regulation of Business in Japan (3)** Offered: jointly with SISEA 549.

**LAW B 550- Legal Analysis and Research for Students Not Trained in the Common-Law System ([1-4]-, max. 4)**

**LAW B 551- Comparative Law Seminar ([2-6]-, max. 6)**

**LAW B 552- Tutorial in Comparative Law ([1-4]-, max. 4)**

**LAW B 555 Roman Law (3)**

**LAW B 559 Comparative Law: Europe, Latin America, and East Asia (4)**

## Law and Marine Affairs

**LAW B 561 International Law of the Sea (4)** Offered: jointly with SMA 506.

**LAW B 562 Quantitative Methods (4)**

**LAW B 563- Ocean Policy and Resources Seminar (3-)**

**LAW B 565 U.S. Coastal and Ocean Law (4)** *Allen*

## Seminars

**LAW B 567 General Externship Perspectives Seminar (2)** Credit/no credit only.

**LAW B 577- Law and Literature Seminar ([1-6]-, max. 6)**

**LAW B 578- Seminar on Legal Problems of Economic Development ([1-6]-, max. 6)**

**LAW B 580 Externship Tutorial (2)** Credit/no credit only.

**LAW B 581- Land, American Culture, and the Law: Perspectives on the Use and Ownership of the Natural Environment ([1-6]-, max. 6)**

**LAW B 584- Indian Law Seminar ([2-6]-, max. 6)**

**LAW B 589- Intellectual Property Law Seminar ([1-4]-, max. 4)**

**LAW B 590 The United States Constitution: Past, Present, and Future (2)**

**LAW B 596- International Protection of Human Rights Seminar (2-, max. 4)**

**LAW B 597- History of the Formation of the United States Constitution Seminar ([2-6]-, max. 6)**

**LAW B 598- Advanced Research and Writing in Property Seminar ([1-4]-, max. 4)**

**LAW B 599 Special Topics (1-12, max. 12)**

**LAW 600 Independent Study or Research (\*)**

**LAW 800 Doctoral Dissertation (\*)**

# Graduate School of Library and Information Science

## Director

Michael Eisenberg  
3rd Floor, Mary Gates Hall



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Grad\\_School\\_Library.html](http://www.washington.edu/students/genecat/academic/Grad_School_Library.html)



School Web page:  
[www.ischool.washington.edu](http://www.ischool.washington.edu)

## Graduate Program

Academic Program Support  
3rd Floor, Mary Gates Hall, Box 352840  
(206) 543-1794  
slis@u.washington.edu

The vision statement adopted by the School is "People and Knowledge: Building Information Connections. The faculty, staff, students, and alumni of the School of Library and Information Science believe that connecting people with knowledge is of fundamental individual and societal importance; further, we believe access to information is a basic human right. We commit ourselves to sustain this vision."

The School's goal is to provide a curriculum which prepares students to become leaders in the library and information world and which cultivates an integrated understanding of central underlying concepts, theories, processes, models and research with a focus on users and the organization of information; an appreciation of the varied roles, contexts, settings and values in which information work takes place and the interrelationships among these; a principled comprehension of important issues and trends and the ability to learn more about these; and professional skills, experiences, and orientation necessary and appropriate for entry-level positions.

A 63-credit course of study leads to the Master of Library and Information Science degree, which prepares graduates for professional information-related positions in libraries and other environments. The School's curriculum has several major features: a set of core courses and experiences, several required elements, and the option for specialization and emphasis.

The law librarianship program requires a J.D. degree for admission and may be completed in one calendar year. This specialized program of study prepares lawyers to serve as law librarians in courts, federal and state government agencies, schools of law, corporations, and law firms. The law librarianship courses are open to all School of Library and Information Science students.

## Special Research Facilities

The School offers state-of-the-art computer laboratories, classrooms, and research labs for instruction in the design and use of information systems. Students have access to a wide variety of software applications including titles for database and text management,

programming, graphics, web page creation, Internet exploration and collaboration, and office productivity. Students also have access to a large number of bibliographic databases and commercial information services. Please visit the School's web site at [www.ischool.washington.edu/technology](http://www.ischool.washington.edu/technology) for more information.

## Admission Requirements

The School of Library and Information Science admits students to the Master of Library and Information Science program on an annual basis with evening program (part-time) students entering in the summer quarter and Day program (full-time) students entering in the autumn quarter. Application deadlines are February 15 for the evening program and March 15 for the day program. Early application is encouraged.

Admission is subject to the approval of the School's admissions committee. A complete application file includes the application for admission; official transcripts; Graduate Record Examination scores (general test section); three letters of recommendation; and a personal statement regarding professional goals. The GRE requirement is waived for applicants with an earned doctorate. International students, except those from English-speaking countries, are required to take the Test of English as a Foreign Language (TOEFL) examination. International applicants are strongly encouraged to submit their applications by November 1.

In addition to the above requirements, applicants for the Law Librarianship program must hold a degree from an accredited American law school or from a law school in one of the common-law countries. Law Librarianship applicants are encouraged to submit LSAT scores in place of GRE scores.

The University of Washington School of Library and Information Science supports the efforts of the American Library Association and other professional organizations to cultivate diversity in the information professions.

Please visit the School's web site at [www.ischool.washington.edu](http://www.ischool.washington.edu) for further information and for copies of application materials, or contact the School's admissions office for an information and application brochure.

## Financial Aid

The School has funding available each year for several graduate staff assistantships. In addition, fellowships/scholarships from several endowment funds are awarded each year. All awards have financial need as one criterion, which is based on the figures the applicant provides on the Free Application for Federal Student Aid (FAFSA). This form is available from the Office of Student Financial Aid in mid-December and must be submitted by February 28 each year. The School is unable to offer financial assistance to international students. Other fellowships are described in *Financial Assistance for Library Education*, available from the American Library Association, 50 East Huron Street, Chicago, Illinois 60611. The School of Library and Information Science also provides information and application materials for the American Library Association's Spectrum Initiative. This scholarship is designed to improve library services through development of a more representative workforce.

The School of Library and Information Science programs are currently being revised and expanded. Please visit the School's web site at [www.ischool.washington.edu](http://www.ischool.washington.edu) for the most up-to-date information.

## Faculty

### Professors

Bengtson, Betty G. 1988, (Affiliate); MLS, 1967, Catholic University of America; MSD, 1986, University of Maryland.

Benne, Mae M. \* 1971, (Emeritus); MS, 1955, University of Illinois; children's literature, public library services for children.

Eisenberg, Michael B. \* 1998; MLS, 1973, State University of New York (Albany); PhD, 1986, Syracuse University; information science and technology.

Fidel, Raya \* 1982; MLS, 1976, Hebrew University of Jerusalem (Israel); PhD, 1982, University of Maryland; information retrieval systems, human information behavior, classification research.

Grudin, Jonathan T. 1999, (Affiliate); PhD, 1981, University of California (San Diego).

Hazelton, Penny A. \* 1985, (Adjunct); JD, 1975, Lewis And Clark College; MLL, 1976, University of Washington; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law.

Hiatt, Peter \* 1974, (Emeritus); PhD, 1963, Rutgers University; adult services, special populations, management assessment, community analysis, library education.

Shaw, Spencer G. \* 1970, (Emeritus); BLS, 1941, University of Wisconsin; librarianship.

### Associate Professors

Brooks, Terrence A. \* 1986; MLS, 1971, McGill University; PhD, 1981, University of Texas (Austin); information storage and retrieval, Internet scripting and programming.

Bruce, Harry \* 1998; MLS, 1993, PhD, 1996, University of New South Wales (Australia); human factors in information and communication technology.

Efthimiadis, Efthimis \* 1997; MSc, 1984, PhD, 1992, City University, London (England); information retrieval, evaluation, query expansion, medical informatics, user-system studies.

Friedman, Batya \* 1999; PhD, 1988, University of California (Berkeley); value-sensitive design, social-cognitive and cultural aspects of information systems, human-computer interaction.

Fuller, Sherrilynne S. \* 1988; MLS, 1968, Indiana University; PhD, 1984, University of Southern California; library and information management, biomedical and health informatics.

Johnson, Ronald A. 1986; MA, 1972, University of Chicago; MS, 1975, University of Southern California; information sciences.

Mignon, Edmond \* 1970, (Emeritus); PhD, 1976, University of California (Berkeley); information retrieval and information policy.

Skelley, Grant T. \* 1969, (Emeritus); PhD, 1968, University of California (Berkeley); history of the book, preservation, bibliography and reference.

Sutton, Stuart A. \* 1999; JD, 1981, Golden Gate University; LLM, 1982, MLS, 1987, PhD, 1991, University of California (Berkeley); law and policy information, metadata and access to distributed resources, legal informatics.

### Assistant Professors

Carlyle, Allyson \* 1996; MLS, 1986, PhD, 1994, University of California (Los Angeles); online catalog use and design, descriptive cataloging principles and theory.

Green, Maurice W. 1998; PhD, 1999, State University of New York (Albany); chief information officer competencies, IT management.

Janes, Joseph W. \* 1998; MLS, 1983, PhD, 1989, Syracuse University; reference: models of practice, incorporation of technology; research methods/statistics, history.

Nelson, Jerold A. \* 1971; MA, 1964, University of Minnesota; PhD, 1971, University of California (Berkeley); information access and use, intellectual freedom.

### Senior Lecturers

Barker, Scott F. 1999; MS, 1987, Syracuse University; computer networks, Internet applications, information management.

Smith, Sharyl Gay 1999; DLS, 1970, Columbia University, MLS, 1970, University of Washington; materials for children and the field of school library media.

### Lecturers

Bruce, Lorraine 1999; GradDipl, 1987 Riverina Murray Institute of Higher Education (Australia); integration of information and technology literacies in schools, user education and school media.

Oyler, Mel 1993; PhD, 1997, University of Washington.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Informatics

**INFO 440 Information System Design (5) NW** Theoretical and practical examination of the information systems design process. Techniques for assessing the need for technology, specifying the system design, and involving users in the design process are explored. Design methods include social impact statements, future scenarios, mock-ups, rapid prototyping, field-testing, heuristic evaluation. Prerequisite: CSE 373.

**INFO 490 Design and Development of Interactive Systems (5-8)** Design and formative evaluation of an interactive information system to solve a real problem. Student-organized team projects are encouraged. Must be taken for a minimum of 5 credits. Prerequisite: INFO 340, INFO 381, INFO 440.

**INFO 491 Research in Informatics (5-8)** Provides hands-on experience conducting a research project related to information behavior and technology. This project may be carried out in a natural setting or in the laboratory by preparing students to carry out similar research projects in their professional work. Prerequisite: INFO 370.

### Library and Information Science

**LIS 470 History of the Book (3)** Development of book from hieroglyphics, clay tablets, to present, emphasizing printed book in Western world since Gutenberg. Book as physical object, processes and materials of its production viewed in context of changing technologies and various cultural, esthetic, economic, trade influences. Aspects of book collecting. Credit/no credit only.

**LIS 498 Special Topics (1-5, max. 15)** Library service and information science subject matter in seminars, workshops, or other appropriate formats. Topics vary and may be repeated for credit. Credit/no credit only.

### Courses for Graduates Only

**LIS 500 The Life Cycle of Information (2)** Overview of the major concepts, processes and systems, actors, and operations in the life cycle of information. Introduction to the creation, publishing and distribution, evaluation and selection, organization, access, retrieval, and use of information. Exploration of the social context in which these processes and their stakeholders interact.

**LIS 501 Society, Users, and Libraries (4)** Technological, societal change as it relates to information. Society's information processes, ways individuals use information in their environments. Skills basic to other courses developed, including awareness of resources for study of library and information science. Intellectual context of librarianship as service profession. Prerequisite: major standing.

**LIS 502 Introduction to Information Science (3)** Theory, understanding, and perspectives for the analysis of design and operation of information retrieval systems. Systems analysis applied to the process of information transfer. Consideration of user needs assessment, performance evaluation, and control of terminology.

**LIS 503 Bibliographic Data Bases (4)** Concepts and conventions of bibliographic record structure, file organization, and search protocols. Elementary techniques in the use of bibliographic utilities and on-line search services. Prerequisite: major standing.

**LIS 504 Aspects of Publishing (3)** Examination of selected topics in book and periodical publishing from Renaissance through present. Focus on publishing practices, processes, and strategies in given economic, cultural, and social contexts. Covers the combination of activities, entrepreneurial or otherwise, that constitute publishing but not the technical means involved in producing the published product.

**LIS 505 Archival and Manuscript Services (3)** Selection, organization, and uses of archival and manuscript collections. Emphasis on the principles and techniques; some attention to the administration of state archival and historical institutions' collections. Lecture, demonstration, and laboratory.

**LIS 507 Preservation and Conservation of Library Materials (3)** Consideration of the many factors contributing to the physical vulnerability of library materials of all kinds and an overview of resources and strategies for those who determine preservation policy or manage the application of such policy. No technical background necessary.

**LIS 510 Information Behavior (4)** Introduction to the user-centered approach to information behavior. Theoretical foundations of various information behaviors such as information need, utilizing, gathering, seeking, and evaluating. Synthesis of user studies, construction of user profiles, performance of gap analysis, and application of the results of user studies to improve services and system design.

**LIS 513 Services for Special Groups (3)** Needs analysis and design of library services for the blind and visually handicapped, deaf and hearing impaired, institutionalized, mentally and physically handicapped, functionally illiterate, minorities, and aging. Skills, insights, and knowledge to work with these groups. Current research, practice, and experimental programs.

**LIS 520 Information Resources, Services, and Collections (4)** Concepts, processes, and skills related to parts of the life cycle of knowledge involving creation, production, distribution, selection, collection, and services to facilitate access. Specific discussion topics include characteristics of recorded knowledge; organizations and services devoted to managing access to recorded knowledge; principles associated with development of recorded knowledge and collections.

**LIS 521 Materials for General Information Needs (3)** Consideration of the individual in the generalized information environment. Interdisciplinary sources for the selection of library materials. Forms of materials for nonspecialized information retrieval and referral. Development of skills in question negotiation and search strategy.

**LIS 522 Collection Development (3)** Access to materials as context for development and management of library collections in academic, public, school libraries. Community analysis, library mission; collection development policies, criteria, levels, responsibilities; aids to selection; collection evaluation, use studies; controversial materials.

**LIS 523 Information Access in the Humanities (3)** Description and analysis of information problems and information sources in the humanities. Fields considered are philosophy, religion, visual arts, performing arts, language, and literature.

**LIS 524 Information Access in the Social Sciences (3)** Description and analysis of information problems and information sources in the social sciences. Fields considered are anthropology, business economics, education, geography, history, political science, psychology, and sociology.

**LIS 525 Information Access in Science and Technology (3)** Includes topics as applied in literature of natural sciences and engineering: nature of information transfer; characteristics and organization of bibliographic and reference sources; information retrieval from manual and computer on-line sources; search strategy; practice with specific data bases and manual sources. Recommended: 528.

**LIS 526 Government Publications (3)** Government publications of the United States and foreign countries, their acquisition, organization, and use. Credit/no credit only.

**LIS 527 Business Information Resources (3)** Survey of the extent and nature of business information and its sources, and of business information producers and consumers. Study and use of both print and on-line sources.

**LIS 528 Literature Searching (3)** Concepts and techniques of professional literature searches, using a variety of standard search languages on representative types of bibliographic data bases and on-line reference resources. Analysis and evaluation of data bases.

**LIS 530 Organizing Information Using Internet (3)** Covers the underpinnings of Internet access and system design, including the application of principles of information organization to arrange the chaotic array of information resources on the Internet; evaluation of Web sites and search engines; and basic interface consideration. Credit/no credit only.

**LIS 530 Organization of Information and Resources (4)** Introduction to issues in organization of information and documents including: analysis of intellectual and physical characteristics of documents; principles and practice in surrogate creation, including standards and selection of metadata elements; theory of classification, including semantic relationships and facet analysis; creation of controlled vocabularies; and display and arrangement. Prerequisite: LIS 500, which may be taken concurrently.

**LIS 531 Catalogs, Cataloging, and Classification (4)** Develops an understanding of library catalogs as information retrieval systems. Introduces library cataloging and classification. Focus on principles and standards in the creation of catalogs and cataloging records. Includes practice in descriptive and subject cataloging and classification. User perspective emphasized throughout. Prerequisite: LIS 500, LIS 530.

**LIS 533 Advanced Cataloging and Classification (4)** In-depth theory and practice in library cataloging and classification. Includes introduction to cataloging materials in a variety of formats. Prerequisite: LIS 500, LIS 530, and LIS 531.

**LIS 536 Indexing and Abstracting (3)** Techniques of vocabulary control and thesaurus construction as applied to indexing and abstracting processes. Design, selection, and evaluation of indexing systems. Computerized methods for free text, full text, and controlled vocabulary procedures. Application of methods to information retrieval systems. Credit/no credit only.

**LIS 537 Construction of Index Languages (3)** Explanations of design options, features of index languages or thesauri, and criteria to use in their selection. After completing the thesaurus construction project, students are prepared to design index languages, plan and implement a design project, and evaluate index languages. Credit/no credit only.

**LIS 540 Materials for General Information Needs (3)** Consideration of the individual in the generalized information environment. Interdisciplinary sources for the selection of library materials. Forms of materials for nonspecialized information retrieval and referral. Development of skills in question negotiation and search strategy. Prerequisite: LIS 501, or permission of instructor; recommended: LIS 500, LIS 503.

**LIS 540 Information Systems, Architectures and Retrieval (5)** Introduction and overview of information systems, system architectures, and retrieval models. Emphasis given to the role of users in the design, development, and evaluation of information retrieval and database management systems. Prerequisite: LIS 501, which may be taken concurrently.

**LIS 541 Organizing Information Using Internet (3)** Covers the underpinnings of Internet access and system design, including the application of principles of information organization to arrange the chaotic array of information resources on the Internet; evaluation of Web sites and search engines; and basic interface consideration. Credit/no credit only.

**LIS 542 Conceptual Database Design (3)** Preliminary design of data bases for decision support systems. Introduces methods of collecting user requirements, requirement analysis, data dictionary, the entity-relationship model, methods for database integration, preparation for data collection, and evaluation. Credit/no credit only.

**LIS 543 Design of Information Systems (3)** Discusses how theories of conceptual data modeling affect design of database and information systems, examines relationships between modeling and implementation, and bridges gaps between theoretical understanding of database design and implementation issues. Implements conceptual schemata development in 542.

**LIS 544 Information Retrieval System (3)** Covers theories and models in information retrieval (IR) and reviews user-centered and system-centered approaches. Issues involved in the design, development and evaluation of IR systems are examined including: methods and tools for document analysis, retrieval techniques, search engines, interfaces, usability, evaluation.

**LIS 545 Library and Information Web Development: Unix-based Scripting and Programming (3)** World Wide Web scripting and programming techniques for the presentation, validation and manipulation of digital library information and resources in a Unix environment. Focuses on skills, concepts, and technological aspects of user interactions with emphasis on limitations and advantages of the Unix environment. Prerequisite: LIS 503; recommended: LIS 541 or equivalent experience.

**LIS 546 Network System Administration (3)** Introduction to local area network hardware, topologies, operating systems, and applications. Covers aspects of managing network systems including physical layout and design of a networked computer system, network layer system and protocols, and network system software. Hands-on experience with LANs. Prerequisite: LIS 500.

**LIS 550 Information in Social Context (4)** Concepts, processes, and issues related to the larger social context within which the life cycle of knowledge is played out. Discussion topics include intellectual freedom, information as public/private good, intellectual property, privacy, confidentiality, information liability, information and telecommunications policy, the economics of information, and other professional values. Prerequisite: LIS 500, which may be taken concurrently.

**LIS 551 Intellectual Freedom in Libraries (3)** Analysis of issues related to intellectual freedom, particularly to implications for libraries and librarians. Consideration of current legal climate, conformity versus freedom in modern world, librarian as censor, social responsibility and individual freedom, intellectual freedom of children, prospects for future. Credit/no credit only.

**LIS 552 Cooperative Information Systems (3)** Analysis of cooperative information systems found among all types of libraries and information centers. Emphasis on developments in the United States and also treatment of foreign and multinational systems, with assessment of their contributions.

**LIS 553 Information in the Public Policymaking Process (3)** Demystifying information base for policymaking in democracy. Theoretical needs and opportunities for input of information associated with three branches of government and each phase of policymaking. Focus on actors bringing information to policymakers. Federal, state, and local comparison. Credit/no credit only.

**LIS 554 Information Policy (3)** Review of efforts to develop national information policy and assessment of where we are in process. Legislation, issues pertinent to national information policy (e.g., freedom of information, privacy, copyright, management of government information, telecommunications, transborder data flow, and satellite technology).

**LIS 560- Instructional and Training Strategies for Information Professionals (3)** Develops knowledge and skills in instruction and training functions for library and information settings. Issues and strategies for learning and teaching. Design, development, and evaluation of information and technology literacy programs. Addresses the needs of users when designing and delivering instruction. Prerequisite: LIS 500, which may be taken concurrently.

**LIS 561 Storytelling: Art and Techniques (3)** Storytelling, past and present, noting its development as an art form. Analyzing storytellers materials (folk literature and literary forms) throughout historical periods. Essential techniques necessary to this artistic skill. Planning storytelling programs for various ages, interest groups, and situations, utilizing folk, classic, and contemporary literature.

**LIS 565 Children's Materials: Evaluation and Use (4)** Library materials for children from infancy through elementary grades. Focus on resources in all media that serve informational, educational, cultural, and recreational needs of the young. Focuses on standard bibliographies and other resources designed to meet informational needs of adults serving children. Prerequisite: LIS 500, LIS 510, LIS 520, or permission of instructor.

**LIS 566 Young Adult Materials: Evaluation and Use (3)** Reading, evaluation, and sharing of literature currently appropriate to the needs, interests, and

abilities of young adults, ages twelve through twenty. Application of criteria to the assessment of young adult reading materials and consideration of the uses of these materials with young people.

**LIS 567 Public Library Services for Youth (3)** Administration of youth departments in public libraries; planning and promoting programs and services; evaluation of library collections; community and professional roles of the youth librarian. Prerequisite: LIS 501 or permission of instructor.

**LIS 570 Research Methods (4)** Research as a process from problem definition and formulation of questions to design, data collection, analysis, and reporting. Students recognize research opportunities, translate them into researchable frameworks, design research projects, and implement results in libraries and other information agencies. Prerequisite: LIS 500, which may be taken concurrently.

**LIS 580 Management for Information Organizations (4)** Introduction to internal and external management issues and practices in information organizations. Internal issues include organizational behavior, organizational theory, personnel, budgeting, planning. External issues include organizational environments, politics, marketing, strategic planning, funding sources. Prerequisite: LIS 500, which may be taken concurrently.

**LIS 581 Library Administration Skills (3)** Provides practice in the administrative skills related to personnel selection, supervision, and management, and to planning and budgeting processes in the library setting. Topics include work specification, performance evaluation, personnel policy formulation, budget types, and budget preparation and control.

**LIS 583 Management of Automated Systems in Libraries (3)** Developing criteria for selection and design of computer systems for libraries and information centers. Applying criteria in evaluation of hardware and software. Examining related management challenges such as vendor relations, financing options, personnel requirements, and design of auxiliary activities. Credit/no credit only.

**LIS 585 Administration of the School Library Media Program (3)** Develops competency in administering materials, equipment, and services of library media program as integral part of educational process of school. Focuses on developing skills in acquiring, organizing, and managing full range of learning resources for access and use, and communicating the program to users. Required for school library media specialists.

**LIS 586 Public Libraries and Advocacy (3)** Examines the purpose and role of public libraries in an information society. Includes governance, services, and planning with special emphasis on advocacy for the library and community.

**LIS 588 Special Librarianship (3)** Seminar in the practice of special librarianship in business and industrial firms, government agencies, and the freelance sector. User services and information resources. Credit/no credit only. Prerequisite: 24 credits in Master of Library and Information Science program.

**LIS 590- Directed Fieldwork (2-4, max. 8)** Library and information science majors only. A minimum of 200 hours of professional, supervised fieldwork in a library or professional information agency. May be taken in one quarter or as many as three consecutive quarters. Credit/no credit only. Prerequisite: 33 credits in Library and Information Science program.

**LIS 591 Legal Research I (3)** Introduction to legal bibliography and law librarianship. Basic primary and secondary legal bibliographic tools. Integration of manual and computer resources for effective legal research. Emphasis on state materials. Offered jointly with LAW A 598.

**LIS 592 Legal Research II (4)** Legal tools that answer more complex legal research problems, such as federal legislative histories, sources of administrative law, specialized subject research. Federal emphasis. Builds on skills and techniques taught in LIS 591/LAW A 598. Extensive work with online resources. Prerequisite: LIS 591 or permission of instructor. Offered: jointly with LAW A 599.

**LIS 593 Selection and Processing of Law Library Materials (3)** Study of tools for collection development and collection development plans in law libraries. All law library technical processes, including acquisitions, budgeting, cataloging, and serials. Credit/no credit only. Prerequisite: LIS 591 or permission of instructor.

**LIS 594 Law Library Administration (4)** Administration in law libraries, including organization, personnel, and management issues (e.g., interviewing, hiring, firing), communications, library planning, and bookkeeping. Credit/no credit only. Prerequisite: LIS 591 or permission of instructor.

**LIS 598 Special Topics in Information and Library Science (1-3, max. 12)** Seminar dealing with various topics in information and library science. Offered by visitors or resident faculty. Topics are changed from quarter to quarter. May not be offered every quarter. May be repeated for credit. Credit/no credit only. Prerequisite: determined by specific course.

**LIS 599 Seminar (1, max. 6)** Weekly seminar on current library and information science-related topics. Credit/no credit only.

**LIS 600 Independent Study or Research (\*)** Credit/no credit only.

**LIS 700 Master's Thesis (\*)** Credit/no credit only.



# School of Medicine

## Dean

Paul G. Ramsey  
C314 Health Sciences

## Associate Deans

Scott Barnhart  
John B. Coombs  
Daniel M. Dorsa  
Robert J. Gust  
D. Daniel Hunt  
Eric B. Larson  
Richard A. Molteni  
Thomas E. Norris  
Gordon A. Starkebaum  
Andrew A. Ziskind

## Assistant Deans

Carol F. MacLaren  
Susan G. Marshall  
Werner E. Samson

## WWAMI Coordinators/Assistant Deans

James R. Blackman, Boise, Idaho  
Philip D. Cleveland, Spokane, Washington  
Michael J. Dimino, University of Alaska  
Stephen J. Guggenheim, Montana State University  
Michael B. Laskowski, University of Idaho and Washington State University  
Sylvia J. Moore, University of Wyoming



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/School\\_Medicine.html](http://www.washington.edu/students/genocat/academic/School_Medicine.html)



School Web page:  
[www.washington.edu/medical/som/](http://www.washington.edu/medical/som/)

Established in 1946, the School of Medicine is the only medical school directly serving the states of Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI). Located in the Warren G. Magnuson Health Sciences Center, the School operates a decentralized program of medical education (WWAMI) via a regional network of teaching affiliates.

The School's basic-science departments provide educational opportunities for students from all schools and colleges within the University. Clinical teaching programs are conducted at the University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Regional Medical Center, and the Veterans Affairs Puget Sound Health Care System, as well as at other clinical affiliates in Seattle and throughout the WWAMI states.

The School admits 176 medical students to its first-year class and has a total enrollment of about 750 students pursuing the Doctor of Medicine degree. The full-time faculty numbers approximately 1,500 members. The affiliated University residency-training network enrolls approximately 900 house officers. Enrollment in the graduate programs in the basic sciences exceeds 400 students, and approximately 800 postdoctoral fellows are enrolled in various advanced training programs. The School has baccalaureate and graduate programs in occupational therapy, physical therapy, prosthetics and orthotics, and medical technology. The School participates in training a broad spectrum of other allied health professionals. The School is also home for the Physician Assistant Training Program known as MEDEX.

## Academic Programs

### Doctor of Medicine

Upon completion of the curriculum of the School of Medicine, the M.D. degree is awarded to those candidates who (1) have given evidence of good moral character, (2) have satisfactorily completed the requirements of the curriculum, (3) have fulfilled all special requirements, and (4) have discharged all indebtedness to the University.

### MEDEX Northwest Certificate Program

MEDEX Northwest is a program designed to train physician assistants. It provides primary-care, midlevel practitioners by training medical personnel with prior clinical experience. A fully accredited physician assistant program conforming to standards developed and administered by the American Medical Association, MEDEX Northwest places 70 to 75 students annually in a variety of sites in Washington, Alaska, Idaho, Montana, and Oregon. Successful completion of the program culminates in the award of a Bachelor of Clinical Health Services degree (see description in the undergraduate program volume) or in a certificate.

MEDEX Northwest is a seven-quarter program. The first three quarters consist of intense clinical and didactic instruction at one of three training locations: Seattle, Spokane, or Yakima. The final four quarters are spent in clinical experiences throughout the WWAMI region. The first six months are spent in a variety of inpatient and outpatient clinical rotations and the last six months are spent in a family-practice preceptorship. The preceptorship is an on-the-job experience tailored to the practice of individual primary-care physicians and emphasizes diagnosis and treatment. At the completion of the program, students are eligible to sit for the national certifying examination for physician assistants.

### Special Requirements

Applicants must have a minimum of two years of recent, full-time, hands-on experience in the direct delivery of medical care to patients, or current professional credentials and at least two years of recent experience in an allied health field. Applicants must have completed two college-level English courses (at least one must be in composition), human anatomy and physiology course work totaling at least 10 quarter-credit hours, and at least one science course in a discipline relevant to medicine, such as biology or chemistry. English prerequisite courses must have been taken in a college or university in the United States, Canada, the United Kingdom, Australia, New Zealand, or Ireland. All academic prerequisites must have been awarded with college-level credit with grades of 2.5 or better.

For additional information, contact MEDEX Northwest Physician Assistant Program, Box 354725; (206) 598-2600.

### Master of Occupational Therapy

A curriculum in occupational therapy leading to a graduate degree is offered by the Department of Rehabilitation Medicine. It provides professional training in the health sciences and in the theory and practice of occupational therapy as it impacts *occupational performance* across the life span and in the various arenas of practice. Occupation refers to daily living skills that include self-care, work, and leisure/play. Information concerning admission to the occupational therapy program appears under Rehabilitation Medicine in this catalog.

### Master of Physical Therapy

A graduate-level curriculum in physical therapy is offered by the Department of Rehabilitation Medicine. It provides professional education in the basic sciences and in the clinical use of physical therapy evaluation

and management strategies in the treatment or prevention of neuromusculoskeletal dysfunction. Information concerning admission to the physical therapy program appears under Rehabilitation Medicine in this catalog.

### Master of Science and Doctor of Philosophy

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Bioengineering, Biological Structure, Immunology, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Laboratory Medicine, Medical History and Ethics, and Rehabilitation Medicine. Students may work toward these degrees concurrently with the M.D. degree, taking additional years beyond the typical four-year medical curriculum.

Concurrent degrees are possible in many other departments and colleges of the University. Recent graduates have pursued concurrent degrees in the basic sciences of medicine and the School of Public Health and Community Medicine. A student who intends to work toward a graduate degree should confer with the chairperson of the department in which graduate study is to be pursued and with the Associate Dean for Academic Affairs of the School of Medicine. Specific requirements for admission to work for advanced degrees appear in the Graduate School section of this catalog. Permission to pursue advanced degrees is granted to medical students only if they are progressing normally in the medical curriculum and show evidence of being able to take on this additional work load.

## Doctor of Medicine

### Admissions

(These procedures and policies described are subject to change. Information regarding changes is available from the School of Medicine Admissions Office.)

### Selection Factors

Candidates for admission to the University of Washington School of Medicine are considered comparatively on the basis of academic performance, motivation, maturity, personal integrity, and demonstrated humanitarian qualities. A knowledge of and exposure to the needs of individuals and society and an awareness of health-care delivery systems are desired. Extenuating circumstances in an applicant's background are evaluated as they relate to these selection factors.

Applicants must submit scores from the Medical College Admission Test (MCAT). This exam must be taken no later than autumn of the year before matriculation and cannot be more than three years old at the time of matriculation. MCAT registration blanks are available through premedical advisers or through the Office of Admissions. Under exceptional circumstances, to be determined by the Admissions Committee, the GRE may be considered during the admissions process; however, if accepted, the applicant will be required to take the MCAT prior to matriculation.

The following science course requirements must be completed before matriculation but preferably should be completed by the time of application: A total of 32 semester hours or 48 quarter hours of undergraduate courses divided into (a) *Chemistry*, 12 semester/18 quarter hours, which can be satisfied by taking any combination of inorganic, organic, biochemistry, or molecular biology courses; (b) *Physics*, 4 semester/6 quarter hours; (c) *Biology*, 8 semester/12 quarter hours; and (d) *Other ("open") science subjects*, 8 semester/12 quarter hours, which can be met by taking other courses in any of the three categories above.

Under exceptional circumstances certain course requirements may be waived for individuals who present unusual achievements and academic promise. All can-

didates must demonstrate substantial academic ability in their major field as well as in the required courses. Candidates should be proficient in the use of the English language and basic mathematics and are expected to have a basic understanding of personal computing and information technologies. An understanding of the following biochemistry/molecular biology concepts (generally covered in a beginning biochemistry course) is required: know the chemical nature of DNA, RNA, genes, and in general how genes are organized in chromosomes; understand the nature of eukaryotic DNA replication; be familiar with transcription of genes and intron splicing; have an overview of the mechanism of protein synthesis; understand principles of recombinant DNA technology (e.g., restriction endonucleases, PCR, southern blots, transformation); understand pH, pKa, and buffers; understand how proteins fold and how ligand binding and enzymatic activity depend upon three-dimensional folding; understand principles of enzyme kinetics (Km, Vmax, competitive inhibition, allostery, and regulation by phosphorylation); understand principles of energetics (e.g., free energy change, equilibrium constants, concentration gradients, and redox potentials); understand glycolysis, the TCA cycle, and how ATP is produced by oxidative phosphorylation; be familiar with how fatty acids are oxidized and synthesized; be familiar with patterns of amino acid catabolism and the urea cycle; understand the nature of phospholipids, lipid bilayers, and membranes; and have an overview of nucleotide biosynthesis.

Those students who entered in the fall of 1999 had a mean GPA of 3.59 and the following mean MCAT scores: Verbal, 9.9; Physical Science, 10.0; and Biological Science, 10.4.

Completion of three years of course work at an accredited college or university is the minimum required before possible matriculation; however, 99 to 100 percent of entrants in recent years have earned bachelor's degrees. No specific major is advised. A broad background in the humanities and liberal arts is encouraged, indeed expected.

### Application Procedure

The University of Washington participates in the American Medical College Application Service (AMCAS). The deadline for submitting an application to AMCAS is November 1. After receiving the application from AMCAS, the School of Medicine will ask qualified individuals to submit a \$35 application fee and supplemental application materials. Every attempt will be made to notify applicants of the final action by the end of March of the year of matriculation.

Residents of the states of Washington, Wyoming, Alaska, Montana, or Idaho are eligible to apply. Individuals with a demonstrated interest in research may apply for the M.D./Ph.D. program (MSTP) regardless of residency. Applicants from outside this five-state region who come from disadvantaged backgrounds or who have demonstrated a commitment to serving underserved populations will be considered. Foreign applicants, in addition to the above requirements, must also have a permanent-resident visa. Applications will not be considered from persons who have failed to meet minimum standards in another medical or dental school.

The deadline for submitting the additional application materials is January 15. These supplemental materials include:

1. A supplemental application form. This will be sent to qualified applicants after the School of Medicine has received the AMCAS application.
2. A 300-word autobiographical statement in which the candidate describes the origin and development of his or her motivation to be a physician and any other issues of importance to the candidate. The applicant may request that the Personal Comments section of the AMCAS application be used to fulfill this requirement.

3. A concise statement, not exceeding 200 words, as to why the candidate wants to attend the University of Washington School of Medicine.
4. A premedical-committee letter of recommendation or three letters from instructors from whom the candidate has taken courses. These letters should be critical evaluations of the candidate's academic ability, strengths and weaknesses, the difficulty of course work undertaken, motivation for medicine, personal maturity, and special attributes and assets.
5. A \$35 fee. This will automatically be waived for those who have qualified for AMCAS fee waivers. Others seeking a waiver of this fee should submit their requests directly to the School of Medicine Admissions Office.
6. Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the Essential Requirements of Medical Education at the University of Washington School of Medicine: Admission, Retention and Graduation Standards to be sent with the supplemental application form.
7. Conviction/Criminal History Information Form. Washington state law requires that all individuals who have access to children under 16 years of age, developmentally disabled people, and other vulnerable persons, disclose background information concerning crimes and offenses against these populations.

Candidates from Wyoming, Alaska, Montana, and Idaho will be required to submit residency certifications from their respective state certifying officers. Proof of legal residence for Washington residents also may be requested. Determination of state of legal residence is not made by the School of Medicine; specific instructions regarding this requirement are furnished at the time of application. Those who enter as residents of Wyoming, Alaska, Montana, and Idaho are expected to spend their first year at the university site in their particular state. Twenty Washington students begin their medical education by spending the first year at Washington State University. Offers of acceptance, therefore, are conditional upon agreement to participate in the WWAMI Program.

Inquiries, address changes, or other information regarding the application should be transmitted in writing and directed to the Committee on Admissions, Office of Admissions, Box 356340, School of Medicine, University of Washington, Seattle, Washington 98195-6340; or email askuwsom@u.washington.edu.

### Office of Multicultural Affairs

The Office of Multicultural Affairs assists students from minority or disadvantaged backgrounds who are pursuing M.D. or M.D.-Ph.D. degrees. The program nurtures interests in medical careers by providing a variety of support services and enrichment activities in the areas of recruitment, education, admission, retention, and professional development. The School actively recruits applicants from disadvantaged backgrounds or those who have a demonstrated commitment to work with underserved populations. Students should contact the Office of Multicultural Affairs for assistance during the application process. The program offers counseling and advocacy, referrals to University and community resources, tutoring, financial-aid information, and numerous opportunities to interact with other minority health-care professionals within the community. Various student organizations also provide minority medical students a means to interact socially and pursue shared interests, to offer peer support, and to assist with community-outreach activities.

U-DOC is a high-school summer-enrichment program offered by the Office of Multicultural Affairs. It is a six-week program for students who have completed their junior year in high school. U-DOC's goal is to foster, affirm, and encourage high school students' interest in

the medical profession by allowing them to further explore medical careers and to obtain a valuable introduction to college life. U-DOC is offered in each of the five WWAMI states.

The Western Consortium Minority Medical Education Program (MMEP) offers undergraduate and some qualified postbaccalaureate students a six-week summer academic-enrichment program that includes science, mathematics, writing, study skills, and MCAT preparation. Structured clinical and research activities are also offered. Housing, stipends, and travel assistance are available.

A Prematriculation Program for entering minority and disadvantaged medical students is offered for six weeks during the summer. The program is designed to facilitate students' entry into medical school by providing instruction in histology as well as enrichment activities in areas such as study skills, stress management, test-taking skills, research, clinical practice, and community health. Stipends and travel assistance are available to students who qualify.

During the regular school year, the Office of Multicultural Affairs serves as a general-information resource for both the academic and nonacademic needs of students, and facilitates students' access to the multiple resources in the School of Medicine, the WWAMI region, and the community. Annual events include a Pre-admission Workshop and a Cross-Cultural Medicine Workshop.

The Native American Center of Excellence was established in 1992 as part of the Office of Multicultural Affairs to encourage Native American students to pursue medicine as a career, to promote research on Native American health issues, and to foster the preparation of Native American students for faculty roles in academic medicine. The Center of Excellence provides educational experiences that integrate western medicine with the Native American way of life, offers a variety of support services to promote the academic development of students, and sponsors a variety of educational opportunities within the Native American community.

Inquiries and requests for additional information may be obtained from the Office of Multicultural Affairs, Box 357430, School of Medicine, University of Washington, Seattle, Washington 98195-7430; (206) 685-2489.

### Medical Scientist Training (M.D.-Ph.D.) Program

A limited number of highly qualified candidates who wish to pursue both the M.D. and Ph.D. degrees are considered annually. Medical-scientist trainees must be accepted by the School of Medicine for the M.D. degree and by the Graduate School for the Ph.D. degree. They are permitted a wide choice of research specializations from among numerous disciplines and interdisciplinary areas of biomedical sciences. The program emphasizes continuity of both clinical and basic-sciences exposure. Among participating graduate departments and interdepartmental disciplines are biochemistry, bioengineering, environmental health, epidemiology, genetics, immunology, microbiology, molecular biotechnology, pathology, pharmacology, physiology and biophysics, and zoology. Participating interdepartmental and affiliate programs are neurobiology and behavior, molecular and cellular biology, and the Fred Hutchinson Cancer Research Center.

Applicants should correspond directly with the Director of the Medical Scientist Training Program, C423 Health Sciences, Box 357470, University of Washington, Seattle, Washington 98195-7470; (206) 685-0762, as well as proceed with the regular School of Medicine application.

Applicants who wish to be considered for the M.D.-Ph.D. program must submit the Medical Scientist Training Program application as quickly as possible. Both the application and any supplemental material requested must be complete by January 15. This appli-

cation form is sent to all eligible applicants together with acknowledgment of receipt of their medical school application. Serious consideration is rarely given to applicants with minimal research experience and/or a cumulative GPA of less than 3.50 or MCAT scores of less than 10 in each category.

## Financial Information

### Fees and Other Charges

All fees and extra service charges are payable in U.S. dollars and due at the time specified for such fees and charges. The University reserves the right to change any of its fees and charges without notice. Resident tuition for 1999-2000 is \$3,070 per quarter; nonresident tuition is \$7,752 per quarter.

### Financial Assistance

Financial aid awards are based on the demonstrated need of the students. All applicants for aid must submit data for an analysis of need using the Free Application for Federal Student Aid. This requires disclosure of financial information from the student and the student's parents. The Federal Direct Stafford Loan (subsidized and unsubsidized), Perkins Loan, and the Primary Care Loan are the primary sources of aid. Loans are also available from the School of Medicine provided students meet the need requirement that is based on both the student's and parents' financial information. Limited amounts of grant funds are available to Washington state residents who meet specific funding criteria.

Scholarships are available through the School of Medicine scholarship fund. These awards vary in amount and require financial information from the student and the student's parents. There is a separate application for the School of Medicine scholarship, which has a May 30 due date.

Financial aid information is distributed to all accepted applicants. Application forms for financial aid may be obtained from the UW Office of Student Financial Aid or the School of Medicine Financial Aid Office. The deadline for receipt of the financial-aid application by the processor is February 28. Applicants must meet this deadline to be considered for all available aid sources regardless of the status of their admission file. Late applicants are awarded only Stafford and Unsubsidized Stafford loans.

Outside employment is discouraged while the student is enrolled in medical-school course work.

## Medical Curriculum

### Basic Science Curriculum (122 Credits)

The first two years of the medical-student curriculum is identified as the Basic Science Curriculum. It consists of three phases, or groups, of courses in the human biology series: pre-organ-system courses in the sciences basic to medicine, organ systems taught by basic and clinical disciplines, and introduction to clinical medicine. The first phase is designed to provide the background in basic disciplines required for the organ-system courses. In the second phase, the student is concerned with learning the normal and pathophysiological properties of the several human organ systems. Emphasis is placed upon correlating these properties with clinical methods of data collection and problem formulation. Students pursue the Introduction to Clinical Medicine course throughout the first two years, learning to interview patients, obtain a medical history, and perform physical examinations.

<t>Students are expected to pursue the Basic Science Curriculum during their first two years in the School of Medicine. The academic demands of the Basic Science Curriculum are scaled so that most students also will be able to take elective courses that will broaden the student's background.

### First Year

Microscopic Anatomy (Histology)  
Gross Anatomy and Embryology  
Mechanisms in Cell Physiology  
Introduction to Clinical Medicine  
Biochemistry  
Systems of Human Behavior I  
Cell and Tissue Response to Injury  
Microbiology and Infectious Disease  
Introduction to Immunology  
Head, Neck, Ear, Nose, and Throat  
Nervous System  
Introduction to Clinical Medicine

### Second Year

Cardiovascular System  
Respiratory System  
Introduction to Clinical Medicine  
Principles of Pharmacology I  
Endocrine System  
Systemic Pathology  
Genetics  
Skin System  
Gastrointestinal System  
Epidemiology  
Hematology  
Musculoskeletal System  
Medicine, Health, and Society  
Urinary System  
Systems of Human Behavior II  
Principles of Pharmacology II  
Reproduction  
Nutrition for Physicians

### Clinical Curriculum (144 Credits)

The clinical curriculum is pursued predominantly in the third and fourth years of medical school. It includes three elements: prescribed clerkships to be completed by all students (84 credits or 42 weeks in family medicine, internal medicine, obstetrics and gynecology, pediatrics, psychiatry, and surgery); a clinical selective series requiring a minimum number of credits (12) in two clinical areas (rehabilitation medicine/chronic care and emergency care/trauma); and a minimum of 48 credits of clinical clerkships selected by the student.

Education in the clinical curriculum utilizes the case-study method. Students gain clinical knowledge and gradually increase their clinical problem-solving abilities while working as junior members of a medical-care team. Each such team is headed by a faculty clinician working in one of the medical school-affiliated hospitals or practice units.

### Independent Study in Medical Science

In addition to the basic and clinical curricula, each student must complete 10 credits in courses, independent study, and investigation in one or more of the biological, behavioral, sociocultural, or epidemiological sciences basic to medicine. The purpose of this requirement is for the student to gain an understanding of the philosophy and methods of science. Of the 10 credits, 6 are earned by the satisfactory completion of a project in Independent Study in Medical Science (ISMS) that includes a written paper. The remaining 4 may be satisfied by taking 500-level courses in a variety of subjects at any time during the student's enrollment in the M.D. program.

### WWAMI Program

The WWAMI Program was initiated in 1971 as an effort to decentralize medical education to provide a broader range of educational opportunities for students, and to address the need for primary-care physicians oriented toward rural practice. It is an integral part of the undergraduate medical curriculum and is a fully accredited program of the School of Medicine. The WWAMI Program is named for the five states (Washington, Wyoming, Alaska, Montana, and Idaho) that share

resources and responsibilities in the regional educational program. Funds appropriated to the WWAMI Program by the Wyoming, Alaska, Montana, and Idaho legislatures assure each state of positions for its students in the entering medical class each year.

### First-Year Training

In the first year of the WWAMI Program, approximately 40 percent of the students admitted to the University's School of Medicine receive the first year of medical school training at Washington State University, the University of Wyoming, the University of Alaska, Montana State University, or the University of Idaho. Washington State University positions not filled by volunteers are assigned by lottery. Every Washington-resident applicant should recognize the possibility of assignment to Washington State University during the first year. Students from Wyoming, Alaska, Montana, and Idaho attend their home-state institutions. While in one of these institutions, they enroll in basic-science courses taught by the science faculty and are provided supplemental resources from the University of Washington's School of Medicine faculty. These students join their classmates at the University's campus in Seattle for the second year of medical studies.

### Third- and Fourth-Year Training

At the conclusion of the second year, students enter the portion of the curriculum that is predominantly clinical. As part of the clinical training, they complete clerkships at the University of Washington, at its affiliated hospitals, or at Community Clinical Units located in the five-state region. During the third year of basic clerkships, School of Medicine full-time and clinical faculty members provide supervised clinical training in six specialties: family medicine, internal medicine, obstetrics and gynecology, pediatrics, psychiatry, and surgery. During the fourth year, students may select clerkships in a variety of clinical specialties.

### Enrichment Opportunities

Students may enhance their medical education through a variety of sponsored activities that offer students an opportunity to explore areas of special interest, such as working in rural or urban clinics that serve medically underserved communities, undertaking medical research projects, or participating in an international exchange program with a developing country. Brief descriptions of three of the more formally structured programs follow.

### Rural/Underserved Opportunities Program (RUOP)

This program exposes students to rural medicine and utilizes clinical training sites in all five states. For one month during the summer between the first and second years, students work with physicians in small communities, offering a chance to better understand the challenges and opportunities in these settings. Students receive a stipend supported by the Family Health Foundation, the Academy of Family Physicians, Area Health Education Centers, and the School of Medicine.

### Medical Student Research Training Program

Research opportunities are offered to UW medical students interested in gaining valuable experience from training in medical research. The purpose of the program is to encourage students to participate in a research project as part of their medical education. This research is planned and carried out under the supervision of a faculty sponsor and may be undertaken during any quarter. Student trainees in the program receive a stipend supported largely by a special fund from the School of Medicine. The project is expected to be twelve weeks, full-time, on a working schedule of forty hours per week, and the student may not be enrolled in courses for credit during this time.

## Medical Thesis Program

The Medical Thesis program of the School of Medicine is voluntary, and participation is initiated by the student. Often a student will develop a special interest in some particular field in medicine. This interest may create a desire to do more in-depth research to learn more about the field. The thesis program is a means of fulfilling that desire. The medical thesis represents work of original and superior scientific merit that is conducted independently by the student. A faculty committee reviews the theses submitted by medical students.

## Student Evaluation and Promotion

The awarding of the Doctor of Medicine degree is contingent upon satisfactory completion of academic and noncognitive requirements. The latter includes the acquisition of behavioral patterns and attitudes consistent with the oath that all students take at the time of graduation. As such, student evaluation is based upon the faculty's observation of the student's behavior and conduct as well as papers and examinations. Every student is required to pass Steps 1 and 2 of the United States Medical Licensing Examination, all University of Washington examinations, and complete an approved Independent Study in Medical Science project before receiving the Doctor of Medicine degree. Periodic reviews of student performance are conducted by the School's Student Progress Committee. Students are informed of their deficiencies and the remedial requirements, if any, for these deficiencies. Dismissal from the School may occur if the student fails to maintain an acceptable academic record, fails to follow academic directives provided by the School's committees, or fails to develop attitudes and behavioral patterns appropriate to a career in medicine. The Faculty Council on Academic Affairs reviews the Student Progress Committee's actions, and the Dean of the School of Medicine has final approval of the committee's and council's recommendations. A review mechanism is available within this process. Once dismissal or withdrawal from the School has occurred, the student may petition for reinstatement through the Faculty Council on Academic Affairs. Reinstatement will not be considered without substantial evidence that the problems causing the dismissal or withdrawal have been resolved. Only one reinstatement petition through the Faculty Council on Academic Affairs is allowed. If more than one year elapses after the withdrawal or dismissal, the individual may be required to apply for readmission through the admissions process. If a reinstatement petition is denied, subsequent requests for admission must be directed through the standard admissions procedures.

## Grading System

The grades awarded in each course in the M.D. curriculum are Honors, Pass, or Fail in the basic-science curriculum, and Honors, High Pass, Pass, or Fail in the clinical curriculum. The School's goal is to provide a curriculum that defines the competencies to be achieved by the student at each level. However, a pattern of documented evaluator concerns about a student's performance may indicate unsatisfactory performance when the record is viewed as a whole, even though passing grades have been assigned. Honors may be awarded in a course on predetermined criteria that may involve additional work in the subject as selected by the student. The grading system precludes the ranking of students in class standing by a grade-point average.

The School of Medicine reserves the right to revise or modify the curriculum, system of evaluation, or graduation requirements.

## Honors

A charter as Alpha of Washington was granted to the School of Medicine in 1950 by Alpha Omega Alpha, the honorary medical society. Members are elected by the membership of Alpha Omega Alpha on the basis of high scholarship and good moral character.

## Graduation with Honors

A degree of Doctor of Medicine with Honors may be awarded to students with high achievement who, in addition, have demonstrated initiative and success in clinical and scholarly pursuits related to medicine. Candidates for graduation with honors are nominated by the departments each year and are selected on the basis of a review of their academic records by the Honors and Awards Committee.

## Graduate Medical Education and Postdoctoral Training

The University of Washington School of Medicine offers a broad array of residency and fellowship programs. Training occurs at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Puget Sound Health Care System, Children's Hospital and Regional Medical Center, and other affiliated training sites in Seattle and throughout the WWAMI region. Postdoctoral research fellowship opportunities in the basic sciences are also offered.

## Continuing Medical Education

The Office of Continuing Medical Education, School of Medicine, offers a wide variety of courses for physicians and health-care professionals in the Pacific Northwest and throughout the nation.

Offerings include short courses of one to three days, one- to two-week board-review courses, visiting professorships, preceptorships, and mini-residencies. Other offerings include lecture series at hospitals, video-tape presentations, self-directed instructional materials, and other specific courses requested by members of the medical community throughout the WWAMI region. Information on offerings is available from its Web site at [www.uwcmce.org](http://www.uwcmce.org).

All physicians also are invited to participate in continuing medical education programs offered by clinical departments, such as grand rounds and regular conference series.

The University of Washington School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. All programs sponsored by the Office of Continuing Medical Education are applicable to physician relicensure requirements of the Washington Board of Medical Examiners and for Category I credit of the Physician's Recognition Award of the American Medical Association. Prescribed credit for the American Academy of Family Physicians and other types of credit are included in the program offerings when appropriate.

Brochures and calendars for courses are available for more detailed information. For information concerning Continuing Medical Education programs, contact:

University of Washington School of Medicine  
Office of Continuing Medical Education  
Box 358220  
1325 4th Avenue, Suite 2000  
Seattle, Washington 98101-8220  
Telephone: (206) 543-1050 or 1-800-869-2633  
Email: [cme@u.washington.edu](mailto:cme@u.washington.edu)  
Web site: [www.uwcmce.org](http://www.uwcmce.org)

## Anesthesiology

BB1459 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Anesthesiology.html](http://www.washington.edu/students/genecat/academic/Anesthesiology.html)



Department Web page:  
[depts.washington.edu/anesth/](http://depts.washington.edu/anesth/)

The Department of Anesthesiology maintains an active program of teaching and research for both the specialist and nonspecialist. Medical students are introduced to the principles of anesthetic management and the effects of anesthetic agents on circulatory and respiratory physiology. The clinical-clerkship program provides basic training in airway management and care of the unconscious patient. A three-year residency program is available for physicians who desire specialty training in anesthesiology. In addition, advanced clinical and research training is offered in several major subspecialty areas (cardiac anesthesia, neuroanesthesia, pediatric anesthesia, obstetrical anesthesia, pain management, and regional anesthesia). Opportunities for collaborative research are available to undergraduate and graduate students. The department conducts a regular series of clinical conferences, didactic lectures, and research seminars. Questions regarding clinical clerkships may be directed to Dr. Jeremy Geiduschek at (206) 526-2518. Other training questions may be directed to the Residency Coordinator at (206) 543-2773.

## Faculty

### Chair

Frederick W. Cheney

### Professors

Artru, Alan A. 1980; MD, 1975, Medical College of Wisconsin.

Bashein, Gerard \* 1974; PhD, 1969, Carnegie Mellon University; MD, 1974, University of New Mexico.

Bishop, Michael J. 1979; MD, 1974, University of California (San Diego).

Byers, Margaret R. \* 1972. (Research); PhD, 1969, Harvard University; somatosensory receptor structure, cytochemistry, and pathologic reactions; neuroimmune interactions.

Chapman, C. Richard \* 1971; PhD, 1969, University of Denver; human pain measurement, psychophysiology, sensation and perception, chronic pain.

Cheney, Frederick W. 1967; MD, 1960, Tufts University.

Cullen, Bruce F. 1984; MD, 1966, University of California (Los Angeles).

Domino, Karen B. 1986; MA, 1974, University of New Mexico; MD, 1978, University of Michigan; neuroanesthesia.

Fink, B. Raymond 1964, (Emeritus); MD, 1938, University of London (UK).

Freund, Felix G. 1963, (Emeritus); MD, 1948, University of Buenos Aires (Argentina).

Freund, Peter 1980; MA, 1971, Brown University; MD, 1975, Columbia University; temperature regulation, vasomotor control, physiology/biophysics.

Hornbein, Thomas F. \* 1963; MD, 1956, Washington University; physiology, biophysics.

Kharasch, Evan D. \* 1984; PhD, 1983, MD, 1984, Northwestern University; clinical pharmacology of anesthetic agents, drug metabolism, and drug interactions.

Lam, Arthur M. 1986; MD, 1974, Western Ontario University (Canada); neuroanesthesia.

Lecky, John H. 1988; MD, 1965, University of Pennsylvania.

Loeser, John D. 1969; MD, 1961, New York University; pain, neurophysiology.

Lynn, Anne 1981; MD, 1975, Stanford University; pediatric anesthesiology.

Martin, Roy W. \* 1971, (Research); PhD, 1975, University of Washington; bioinstrumentation, ultrasonic Doppler, echo, tissue characterization, signal processing.

Murray, Jeffrey P. 1980; MD, 1974, University of Rochester; pediatric anesthesiology.

Otto, Catherine M. 1982, (Adjunct); MD, 1979, University of Washington; cardiology.

Pavlin, Edward G. 1973; MD, 1968, University of Manitoba (Canada).

Pearlman, Alan S. 1978, (Adjunct); MD, 1970, Harvard University; cardiology.

Ready, L. Brian 1977; MD, 1967, University of Saskatchewan (Canada); pain management.

Slattery, John T. \* 1978, (Adjunct); PhD, 1978, State University of New York (Buffalo); pharmacokinetics/pharmacodynamics of alkylating agents, oncology/bone marrow transplant/gene therapy.

Su, Judy Y. 1976, (Research); PhD, 1968, University of Washington; physiological effects of anesthetic drugs.

Turk, Dennis C. 1996; PhD, 1978, University of Waterloo (Canada); pain control/psychology.

Unadkat, Jashvant D. \* 1985, (Adjunct); PhD, 1982, University of Manchester (UK); mechanisms of transport of anti-HIV drugs across placenta, CSF-blood barrier, and intestine.

Ward, Richard J. 1963, (Emeritus); MD, 1949, St Louis University.

Zimmerman, Jerry J. 1998; MD, 1979, University of Wisconsin; pediatric critical care.

### Associate Professors

Bernards, Christopher M. 1988; MD, 1984, Oregon Health Sciences University.

Bowdle, T. Andrew 1981; MD, 1980, PhD, 1983, University of Washington.

Buckley, F. Peter 1977; MBBS, 1968, St Bartholomew's Hospital Medical School (UK).

Butler, Stephen H. 1975; MD, 1966, University of Toronto (Canada); pain management.

Chabal, Charles 1985; MD, 1982, University of Pittsburgh.

Chadwick, Heathcliff S. 1980; MD, 1976, University of Oregon.

Chudler, Eric H. 1991; PhD, 1985, University of Washington.

Colley, Peter S. 1973; MD, 1967, University of Vermont.

Deem, Steven A. 1992; MD, 1984, Southern Illinois University; critical care.

Edwards, William T. 1990; PhD, 1968, Massachusetts Institute of Technology; MD, 1975, University of Massachusetts; pain management.

Egan, Kelly J. 1980; MA, 1968, Texas Technological University; PhD, 1980, University of Washington; clinical psychology.

Everett, Lucinda 1998; MD, 1982, University of Connecticut; pediatric anesthesiology.

Gavrin, Jonathan R. 1991; MD, 1978, Dartmouth College; pain management.

Geiduschek, Jeremy M. 1983; MD, 1983, Vanderbilt University; pediatric anesthesiology.

Haberkern, Charles M. 1988; MD, 1974, Columbia University; anesthesiology.

Jacobson, Louis 1985; MBChB, 1973, University of Capetown (South Africa); anesthesia.

Jardine, David 1987; MD, 1980, Johns Hopkins University; pediatric anesthesiology.

Karl, Helen W. 1990; MD, 1976, University of Virginia; pediatric anesthesiology.

Mackie, Kenneth P. \* 1987; MD, 1984, Yale University; molecular and cell biological studies of cannabinoid receptor signaling.

Martin, Lynn D. 1994; MD, 1982, University of Washington; pediatric anesthesiology.

Orr, Rosemary J. MBBC 1975; MBChB, 1967, Queen's University of Belfast (Ireland); pediatric anesthesiology.

Oxorn, Donald C. 1998; MD, 1978, McGill University (Canada); trauma and critical care.

Pavlin, D. Janet 1975; MD, 1969, University of Manitoba (Canada).

Posner, Karen L. 1986, (Research); PhD, 1990, University of Washington.

Ramamoorthy, Chandra 1991; MBBS, 1978, Jawaharlal Institute of Postgraduate Medical Education and Research (India); pediatric anesthesiology.

Rooke, G. Alec 1982; MD, 1980, University of Washington; cardiac anesthesia.

Ross, Brian K. 1983; MS, 1973, Idaho State University; PhD, 1975, University of North Dakota; MD, 1983, University of Washington.

Schwid, Howard A. 1986; MD, 1982, University of Wisconsin.

Sharar, Samuel R. 1983; MD, 1983, University of Washington.

Williams, Glyn D. 1988; MBChB, 1976, University of Rhodesia; pediatric anesthesiology.

### Assistant Professors

Bramhall, John S. 1995; PhD, 1976, Aston University (England); MD, 1991, University of California (San Diego).

Dunbar, Peter J. 1991; MBChB, 1978, University of Aberdeen (UK); pain management.

Fitzgibbon, Dermot R. 1992; MBChB, 1983, Cork Regional Hospital; pain management.

Hanson, Kimberly A. 1993; PhD, 1986, MD, 1993, University of Nebraska; pediatric anesthesiology.

Ibrahim, Andra E. 1997; MD, 1990, University of Minnesota; metabolism of volatile anesthetics.

Metinko, Andrew P. 1999; MD, 1985, University of Michigan; pediatric critical care.

Okifuji, Akiko 1996; PhD, 1995, State University of New York (Binghamton); psychology.

Schenkman, Kenneth A. 1990; MD, 1986, Indiana University; pediatric anesthesia.

Souders, Jennifer E. 1992; MD, 1988, University of Chicago.

Terman, Gregory W. \* 1987; MA, 1981, PhD, 1985, University of California (Los Angeles); MD, 1987, University of Miami (Florida).

Tumber, P. Paul S. 1997; MD, 1991, University of Saskatchewan (Canada).

Van Norman, Gail 1986; MD, 1981, University of Washington.

Vavilala, Monica S. 1994; MD, 1991, University of Texas (Houston).

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**ANEST 498 Undergraduate Thesis (\*)** *Geiduschek* By special arrangement. Time and credit to be arranged. Offered: AWSpS.

**ANEST 499 Undergraduate Research (\*)** *Geiduschek* Specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (Six weeks, full-time. Limit: two students.) Offered: AWSpS.

**ANEST 501 P-Preceptorship in Anesthesiology (1)** *Geiduschek* An opportunity for first- and second-year medical students to gain experience with medical practice situations by observing clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: AWSpS.

**ANEST 680 P-Basic Anesthesia Clerkship (4)** *Geiduschek* Introduction to the principles of airway management, ventilatory support, use of local anesthetics, techniques of patient monitoring and fluid therapy. Skills taught include airway management, venipuncture, lumbar puncture and endotracheal intubation. Prerequisite: third- or fourth-year student. (Two weeks, full-time. Limit: three to five students each two-week period.) Affiliated hospitals. Offered: AWSpS.

**ANEST 681 P-Advanced Clerkship in Anesthesiology (8)** *Geiduschek* Clerkship for students desiring greater exposure to anesthesiology as a specialty. Individual programs can be arranged in the following areas: surgical anesthesia, obstetrical anesthesia, and pain clinic. Prerequisite: Third- or fourth-year student. (Four weeks, full-time. Limit: two students per period.) Affiliated hospitals. Offered: AWSpS.

**ANEST 697 P-Anesthesiology Special Electives (\* max. 24)** *Geiduschek* Special clerkships, externships, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain a special assignment form from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor. (Four to twelve weeks, full-time.) Offered: AWSpS.

**ANEST 699 P-WWAMI Anesthesiology Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

## Biochemistry

J405 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Biochemistry.html](http://www.washington.edu/students/genecat/academic/Biochemistry.html)



Department Web page:  
[depts.washington.edu/biowww](http://depts.washington.edu/biowww)

Graduate Program Coordinator  
 J405 Health Sciences, Box 357350  
 (206) 543-1660  
[biograd@u.washington.edu](mailto:biograd@u.washington.edu)

Modern biochemistry involves the study of biological processes at a molecular level. Specific research projects may include study in such diverse fields as molecular biology, molecular biophysics, genetics, microbiology, immunology, developmental biology, organic chemistry, pharmacology, and physiology. Graduate students enrolled in the Department of Biochemistry engage in studies and research that prepare them for the challenging opportunities open to the professional biochemist/molecular biologist in colleges, universities, research institutes, medical schools, government laboratories, and the laboratories of biotechnology and pharmaceutical industries.

The course of advanced study is designed to give each student a firm foundation upon which to base further professional progress. In the first year of academic work, students attend courses in biochemistry and molecular biology, and in related fields such as chemistry, biophysics, genetics, cell biology, and microbiology. In the second and succeeding years, an increasing amount of time is devoted to research and independent study. Students gain teaching experience during the second year of the graduate program.

An accredited major in biology, chemistry, or biochemistry fulfills admission prerequisites. As a minimum, students from other majors need to have completed the following undergraduate courses: two years of chemistry, mathematics through calculus, one year of physics, and at least one year of biology. Experience in a research laboratory during or following baccalaureate study is highly desirable. Applicants must also meet the general admission requirements of the Graduate School.

Normally, all graduate students admitted to the Department of Biochemistry are provided with financial assistance.

Research facilities for the department are housed in the Biochemistry-Genetics Building, which provides approximately 52,000 square feet of excellent research space, conference rooms, and a departmental library. In the immediate vicinity are the departments of Immunology, Genetics, Microbiology, Molecular Biotechnology, and Pharmacology, as well as programs in biomolecular structure, molecular medicine, neurobiology, and molecular and cellular biology, with whom the department has common research interests. The laboratories are equipped with modern research equipment and are supported by external, centralized research facilities, which include a modern computer center, the Marine Biology Laboratory at Friday Harbor, and the Health Sciences Library. Its emphasis on biomedical research is facilitated by the location of the department within the Health Sciences complex of the School of Medicine.

## Faculty

### Acting Chair

Richard D. Palmiter

### Professors

Adman, Elinor T. \* 1967, (Adjunct Research); MA, 1964, PhD, 1967, Brandeis University; molecular structure visualization, macromolecular crystallography, metalloproteins.

Bornstein, Paul \* 1967; MD, 1958, New York University; cell-matrix interactions and gene regulation.

Chung, Dominic W. 1977, (Research); PhD, 1976, University of California (Los Angeles); factor XI deficiency, structure and function of fibrinogen.

Cooper, Jonathan A. \* 1987, (Affiliate); PhD, 1976, University of Warwick (UK); regulation of cellular metabolism and proliferation by protein phosphorylation.

Dale-Crunk, Beverly A. \* 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry.

Davie, Earl Warren \* 1962; PhD, 1954, University of Washington; mechanism of blood clotting, cloning of plasma proteins.

Eisenman, Robert M. \* 1982, (Affiliate); PhD, 1971, University of Chicago; transcription, protein-protein interaction, cancer.

Eyre, David R. \* 1985, (Adjunct); PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Fujikawa, Kazuo 1970, (Research); PhD, 1965, Kyoto University (Japan); studies of blood coagulation and anionic phospholipids at thrombotic sites.

Gelb, Michael H. \* 1985, (Adjunct); PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry.

Glomset, John A. \* 1977; MD, 1960, University of Uppsala (Sweden); membrane structure and function.

Gordon, Milton \* 1959; PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants, sequence of agrobacteria.

Hauschka, Stephen D. \* 1972; PhD, 1966, Johns Hopkins University; muscle gene regulation, gene therapy, stem cell phenotypic conversion.

Hol, Wilhelmus G. J. \* 1992; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Hurley, James Bryant \* 1985; PhD, 1979, University of Illinois; molecular basis of vision.

Kaushansky, Kenneth \* 1979, (Adjunct); MD, 1979, University of California (Los Angeles); hematology.

Kimelman, David \* 1989; PhD, 1985, Harvard University; molecular regulation of early vertebrate development.

Klevit, Rachel E. \* 1983; DPhil, 1981, Oxford University (UK); structure/function of breast cancer proteins; protein NMR, mass spectrometry, other spectroscopies.

Loeb, Lawrence A. \* 1978; MD, 1961, New York University; PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.

Morris, David R. \* 1966; PhD, 1964, University of Illinois; cell growth, gene expression, polyamines.

Palmiter, Richard D. \* 1982; PhD, 1968, Stanford University; genetic approaches to neuromodulator function in mammalian nervous system.

Parson, William W. \* 1971; PhD, 1965, Case Western Reserve University; spectroscopic and computational studies of energy capture and electron transfer in photosynthesis.

Petra, Philip H. \* 1966; PhD, 1966, Tulane University; protein chemistry with emphasis on steroid-protein interaction.

Reid, Brian R. \* 1980; PhD, 1965, University of California (Berkeley); biophysical chemistry.

Roberts, James Michael \* 1989, (Affiliate); MD, 1984, PhD, 1984, Columbia University; how cyclin-kinase complexes regulate events necessary for chromosomal DNA replication.

Saari, John C. \* 1974; PhD, 1970, University of Washington; retinal biochemistry.

Teller, David C. \* 1965; PhD, 1965, University of California (Berkeley); physical chemistry of macromolecules, protein crystallography.

Walsh, Kenneth A. \* 1958, (Emeritus); PhD, 1959, University of Toronto (Canada); structure and functions of proteins; protein mass spectrometry.

Young, Elton \* 1969; PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.

### Associate Professors

Davis, Trisha Nell \* 1987; PhD, 1983, Yale University; cell biology, centrosomes, mitosis, cell cycle, genomic instability.

Hahn, Steven M. \* 1994, (Affiliate); PhD, 1984, Brandeis University; the mechanism and regulation of eukaryotic transcription.

Muller, Eric D. \* 1988, (Research); PhD, 1981, Yale University; fluorescence microscopy and DNA synthesis.

Nagarajan, Venkatraman 1987, (Research); PhD, 1985, University of Notre Dame; electron-transfer aspects of photosynthesis.

Quaife, Carol J. 1981, (Research); PhD, 1984, University of Washington; metallothioneins.

Roth, Mark \* 1994, (Affiliate); PhD, 1988, University of Colorado (Boulder); chromosome segregation, growth control.

Stenkamp, Ronald E. \* 1978, (Adjunct); PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, blood clotting proteins, streptavidin.

Stoddard, Barry L. \* 1994, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; structure and function of enzyme catalysts, bacterial signal transduction.

Wiseman, Robert W. \* 1989, (Adjunct); PhD, 1988, Florida State University; cellular energetics, NMR spectroscopy, mitochondria, kinetics, gene expression, metabolism.

### Assistant Professors

Baker, David \* 1993; PhD, 1989, University of California (Berkeley); protein folding.

Beeson, Craig C. \* 1996, (Adjunct); PhD, 1993, University of California (Irvine); chemistry and biochemistry of the immune system.

Daum, Guenter 1993, (Research Adjunct); PhD, 1989, University of Konstanz (Germany); vascular smooth muscle cells.

Ferre-D'amare, Adrian Riu 2000, (Affiliate); PhD, 1995, Rockefeller University.

Neugebauer, Karla \* 1999, (Adjunct); PhD, 1990, University of California (San Francisco); transcription and splicing regulators studied with high resolution light microscopy.

Ruohola-Baker, Hannele \* 1993; PhD, 1989, Helsinki University (Finland); signaling, pattern formation, establishment of polarity in development.

Tsukiyama, Toshio \* 1999, (Affiliate); PhD, 1991, Hiroshima University (Japan).

Zhang, Kam \* 1995, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; structural studies of proteins involved in poptosis; protein folding and macromolecular phasing.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**BIOC 405 Introduction to Biochemistry (3) NW** *Daum, Teller, Wiseman* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: BIOL 201 or both BIOL 101 and GENET 371; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

**BIOC 406 Introduction to Biochemistry (3) NW** *Hurley, Petra* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: BIOC 405. Offered: W.

**BIOC 426 Basic Techniques in Biochemistry (4) NW** *Chung, Petra* Introduction to basic biochemistry experiments. Acquaints students (largely Biochemistry majors) with basic biochemical laboratory techniques. Prerequisite: BIOC 440, which may be taken concurrently. Offered: ASP.

**BIOC 440 Biochemistry (4) NW** *Davis, Klevit* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: 2.0 in BIOL 201; either CHEM 224, CHEM 239, or CHEM 337. Offered: A.

**BIOC 441 Biochemistry (4) NW** *Gordon, Young* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: 1.7 in BIOC 440. Offered: W.

**BIOC 442 Biochemistry (4) NW** *Kimelman, Palmiter* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: either 1.7 in BIOC 406 or 1.7 in BIOC 441. Offered: Sp.

**BIOC 496 Research Seminar for Undergraduates (1, max. 2) NW** formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Prerequisite: BIOC 396 or CHEM 396. Offered: jointly with CHEM 496 Sp.

**BIOC 498 Undergraduate Thesis (\*)** For senior medical students. Offered: AWSpS.

**BIOC 499 Undergraduate Research (\*)** Investigative work on enzymes, proteins, lipids, molecular biology, developmental biology, intermediary metabolism, physical biochemistry, and related fields. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOC 515-519** (For description, see listing for "Current Literature Conferences" at the end of this section.)

**BIOC 520 Seminar (1)** Seminar dealing with timely topics in the field of biochemistry. Prerequisite: permission of instructor. Offered: AWSp.

**BIOC 525-529** (For description, see listing for "Current Literature Conferences" at the end of this section.)

**BIOC 530 Advanced Biochemistry (3)** *Baker, Gelb, Hol, Klevit, Stenkamp, Stoddard* Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisite: a comprehensive course in biochemistry and permission. Offered: A.

**BIOC 533 Topics In Biochemistry (1, max. 30)** *Daum, Davie, Fischer* Provides in-depth examination of current topics in biochemistry, molecular biology, and structural biology. Designed to help participants in basic science departments become acquainted with latest ideas on selected topics. Emphasis on analysis of key concepts in the field with reference to classical papers and recent literature. Prerequisite: permission of instructor. Offered: AWSp.

**BIOC 534 Topics In Molecular Biophysics (1.5)** *Parson* Emphasis on methods used to study macromolecular structure and dynamics, including x-ray crystallography, NMR, optical spectroscopy, computer modeling, protein folding and ligand binding. Two topics covered each quarter; students may register for one or both. Prerequisite: permission of instructor. Offered: AWSp.

**BIOC 535-539** (For description, see listing for "Current Literature Conferences" at the end of this section.)

**BIOC 540 Literature Review (2)** *Parson* Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: jointly with BMSD 540 A.

**BIOC 541 Literature Review (2)** *Palmiter* Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: W.

**BIOC 542 Literature Review (2)** *Morris* Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: Sp.

**BIOC 546-548** (For description, see listing for "Current Literature Conferences" at the end of this section.)

**BIOC 555-559** (For description, see listing for "Current Research Conferences" at the end of this section.)

**BIOC 565-569** (For description, see listing for "Current Research Conferences" at the end of this section.)

**BIOC 575-579** (For description, see listing for "Current Research Conferences" at the end of this section.)

**BIOC 581 Introduction to Biochemical Research (4, max. 16)** Student works with one of the research groups within the department for one quarter and then rotates to other laboratories for second and third quarters. Credit/no credit only. Prerequisite: graduate standing in biochemistry or permission of instructor. Offered: AWSpS.

**BIOC 586-588** (For description, see listing for "Current Research Conferences" at the end of this section.)

**BIOC 600 Independent Study or Research (\*)** Offered: AWSpS.

**BIOC 700 Master's Thesis (\*)** Offered: AWSpS.

**BIOC 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Current Literature Conferences

**BIOC 515- 519, 525- 529, 535- 539, 546-548 Current Literature Conference in Biochemistry** Weekly literature reviews of topics pertinent to ongoing research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.)

**BIOC 515 Matrix Macromolecules in Morphogenesis and Development (1, max. 30)** *Bornstein* Offered: AWSp.

**BIOC 516 Molecular Mechanisms of Blood Clotting (1, max. 30)** *Davie* Offered: AWSp.

**BIOC 517 Protein Structure (1, max. 30)** *Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOC 518 Signaling in Development (1, max. 30)** *Ruohola-Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOC 525 Phytoremediation (1, max. 4)** *Gordon* Literature survey of phytoremediation topics. Discussion of latest techniques for the use of plants to concentrate heavy metals in the soil and of plants and plant-bacteria combinations to detoxify various organic contaminants. Credit/no credit only. Offered: AWSpS.

**BIOC 526 Control of Growth and Differentiation During Development (1, max. 30)** *Hauschka* Offered: AWSpS.

**BIOC 528 Signal Transduction (1, max. 30)** *Hurley* Offered: AWSp.

**BIOC 529 Molecular Biology of Early Development (1, max. 30)** *Kimelman* Offered: AWSpS.

**BIOC 535 Macromolecular Structure (1, max. 30)** *Klevit* Offered: AWSp.

**BIOC 536 Control of Cell Growth (1, max. 30)** *Morris* Offered: AWSp.

**BIOC 537 Regulation of Gene Expression (1, max. 30)** *Palmiter* Offered: AWSpS.

## Current Research Conferences

**BIOC 555- 559, 565-569, 575-579, 586- 588 Current Research Conferences in Biochemistry** Weekly group conferences concerning ongoing graduate student and postdoctoral research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.)

**BIOC 555 Cell and Molecular Biology of Connective Tissue Proteins (1, max. 30)** *Bornstein* Offered: AWSpS.

**BIOC 556 Enzymatic and Genetic Aspects of Blood Clotting (1, max. 30)** *Davie* Offered: AWSp.

**BIOC 557 Growth Regulation by Calcium Binding Proteins (1, max. 30)** *Davis* Offered: AWSpS.

**BIOC 559 Membrane Biochemistry and Cell Growth (1, max. 30)** *Glomset* Offered: AWSpS.

**BIOC 560 Protein Folding (1, max. 30)** *Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOC 561 Origin of Polarity (1, max. 30)** *Ruohola-Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOC 565 Plant Molecular Genetics (1, max. 30)** *Gordon* Offered: AWSpS.

**BIOC 566 Growth and Differentiation of Skeletal and Cardiac Muscle (1, max. 30)** *Hauschka* Offered: AWSpS.

**BIOC 568 Molecular and Genetic Aspects of G Protein Signal Transduction (1, max. 30)** *Hurley* Offered: AWSpS.

**BIOC 569 Inductive Events in Early Development (1, max. 30)** *Kimelman* Offered: AWSpS.

**BIOC 575 NMR Analysis of Proteins and Nucleic Acids (1, max. 30)** *Klevit* Offered: AWSpS.

**BIOC 576 Sequential Analysis of Growth Regulation (1, max. 30)** *Morris* Offered: AWSpS.

**BIOC 577 Gene Regulation in Transgenic Mice (1, max. 30)** *Palmiter* Offered: AWSpS.

**BIOC 578 Electron Transport in Photosynthesis (1, max. 30)** *Parson* Offered: AWSpS.

**BIOC 588 Molecular Biology of Yeast Gene Regulation (1, max. 30)** *Young* Offered: AWSpS.

## Bioengineering

309 Harris Hydraulics Laboratory

The Center for Bioengineering provides a comprehensive, multidisciplinary program of education and research. The concepts and techniques of engineering are applied to the challenges in biology and medicine. Major areas of current bioengineering research include distributed diagnostics and home health care, molecular bioengineering and nanotechnology, engineered biomaterials, biomedical imaging and image-guided therapy, and computational bioengineering. Detailed information on Bioengineering, its faculty, and courses appears in the Interschool or Intercollege Programs section of this catalog.

## Biological Structure

 *General Catalog Web page:*  
[www.washington.edu/students/genocat/academic/Biological\\_Structure.html](http://www.washington.edu/students/genocat/academic/Biological_Structure.html)

 *Department Web page:*  
[www.biostr.washington.edu](http://www.biostr.washington.edu)

Graduate Program Coordinator  
G517 Health Sciences, Box 357420  
(206) 543-5474  
gradprog@biostr.washington.edu

The Department of Biological Structure offers graduate programs of study leading to the Master of Science and Doctor of Philosophy degrees. The department promotes an understanding of biological processes through the study and analysis of structure-function relationships. The research problems that interest members of the faculty are diverse, including cellular differentiation and development explored in a variety of biological systems, neuroscience, molecular biophysics, biomolecular structure, and quantitative biology with an emphasis on computer-graphic representations of biological structures. This diversity creates a lively atmosphere in the department that provides a stimulating environment for the training of scientists with a variety of backgrounds.

The department's graduate program is directed toward the education of doctoral students who anticipate careers that will involve teaching or research in the

biomedical sciences. Graduates from the program are expected to have a broad knowledge of biological structure at all levels, from the molecular to the human anatomical, with major emphasis on the cellular level.

Graduate students select research and teaching options in their program. The research options are designed to provide training for a student in one or two of the following areas: cell and developmental biology, neurobiology, reproductive biology, quantitative biology, cellular immunology, molecular biology, and macromolecular structure. The purpose of the teaching options is to prepare the student to teach in one of the anatomical subdisciplines: human anatomy, neuroanatomy/neurobiology, histology, embryology/developmental biology, cell biology, and macromolecular structure.

### Special Requirements

Applicants should have completed an undergraduate major in an appropriate field, such as anthropology, biochemistry, biology, chemistry, physics, psychology, or zoology.

The department is currently recruiting students into its labs and graduate program principally through the basic-science interdisciplinary programs. Students interested in working with particular department faculty members should apply for admission through one of the following programs: Molecular and Cellular Biology, Neurobiology and Behavior, Biomolecular Structure and Design, or the Medical Scientist Training Program. Alternatively, some faculty sponsor students for application to the departmental program. For further information, contact the graduate program coordinator.

### Financial Aid

The department offers financial support through teaching assistantships and training-grant positions and from research funds.

## Faculty

### Chair

Anita E. Hendrickson

### Professors

Adman, Elinor T. \* 1967, (Research); MA, 1964, PhD, 1967, Brandeis University; molecular structure visualization, macromolecular crystallography, metalloproteins.

Baskin, Denis G. \* 1979, (Research); PhD, 1969, University of California (Berkeley); histology, cytochemistry, neuroendocrinology.

Byers, Margaret R. \* 1972, (Research); PhD, 1969, Harvard University; somatosensory receptor structure, cytochemistry, and pathologic reactions; neuroimmune interactions.

Clark, John I. 1982; PhD, 1974, University of Washington; structural and developmental basis of lens-cell transparency and cataract formation.

Farr, Andrew G. \* 1982; PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.

Gehrig, John D. \* 1954, (Emeritus); DDS, 1946, MSD, 1951, University of Minnesota; oral and maxillofacial surgery, biological structure.

Hendrickson, Anita E. \* 1969; PhD, 1964, University of Washington; neuroanatomy, morphology and development of primate retina.

Herring, Susan W. \* 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Hol, Wilhelmus G. J. \* 1992; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Jensen, Lyle H. \* 1949, (Emeritus); PhD, 1943, University of Washington; molecular structure, x-ray diffraction.

Koehler, James K. \* 1963, (Emeritus); PhD, 1961, University of California (Berkeley); electron microscope, cryobiology, reproductive biology.

Lee, Minako Y. \* 1977, (Research Emeritus); MD, 1963, Tokyo Women's Medical College (Japan); hematopoiesis and osteoclast development.

Mirkes, Philip E. 1979, (Adjunct Research); PhD, 1970, University of Michigan; human embryology.

Myall, Robert W. \* 1977, (Adjunct); BDentS, 1964, University of London (UK); MD, 1975, University of British Columbia (Canada); oral and maxillofacial surgery and biological structure.

Patton, Dorothy L. 1981, (Adjunct); PhD, 1981, University of Washington; infectious disease.

Press, Oliver W. \* 1982, (Adjunct); PhD, 1977, MD, 1979, University of Washington; treatment of hematologic malignancies with monoclonal antibody immunoconjugates.

Reh, Thomas A. \* 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Rosse, Cornelius \* 1967; MD, 1964, DSc, 1983, University of Bristol (UK); knowledge representation in anatomy.

Westrum, Lesnick E. \* 1966; MD, 1963, University of Washington; PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

### Associate Professors

Brinkley, James F. III \* 1988, (Research); MD, 1974, University of Washington; PhD, 1984, Stanford University; computer applications in medicine and biology.

Dacey, Dennis M. \* 1986; PhD, 1983, University of Chicago; the neural basis of vision and the organization of primate retina.

Gaddum-Rosse, Penelope \* 1969, (Emeritus); PhD, 1965, University of Liverpool (UK); reproductive biology.

Graney, Daniel O. \* 1966; PhD, 1965, University of California (San Francisco); gross anatomy, clinical anatomy, computers in teaching.

Harris, Roger M. \* 1982; PhD, 1975, University of Washington; neuro-anatomical recovery from spinal cord injury.

Kalet, Ira J. \* 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Landau, Barbara R. 1962, (Emeritus); MS, 1949, PhD, 1956, University of Wisconsin.

Merritt, Ethan A. \* 1989, (Research); PhD, 1980, University of Wisconsin; x-ray crystallography and structure-based drug design.

Nameroff, Mark A. \* 1970; MD, 1965, PhD, 1966, University of Pennsylvania; cell differentiation.

Prothero, John W. \* 1965, (Emeritus); PhD, 1960, Western Ontario University (Canada); scaling, model building, morphogenesis, cell kinetics.

Robinson, Farrel R. \* 1986; PhD, 1982, Brown University; study of the cerebellum via monkey eye movements.

Sherk, Helen \* 1982; PhD, 1978, Massachusetts Institute of Technology; neural mechanisms underlying vision, especially visual guidance during locomotion.

Skahen, Julia G. 1941, (Emeritus); MS, 1928, University of Washington; PhD, 1941, University of Chicago.

Stenkamp, Ronald E. \* 1978; PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, blood clotting proteins, streptavidin.

Sundsten, John Wallin 1962, (Emeritus); PhD, 1961, University of California (Los Angeles); neuroanatomy.

Yablonka-Reuveni, Zipora \* 1982, (Research); MSc, 1975, Weizmann Institute For Science (Israel); PhD, 1979, University of Windsor (Canada); myogenesis during growth, development, and regeneration of skeletal muscle.

### Assistant Professors

Broderson, Stevan H. \* 1967; PhD, 1967, State University of New York (Buffalo); computer graphics.

Cunningham, Michael L. \* 1988, (Adjunct); MD, 1988, University of Vermont; PhD, 1996, University of Washington; congenital defects.

Raible, David W. \* 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Roelink, Henk \* 1996; MSc, 1985, University of Groningen (Netherlands); PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules in mediating neural tissue differentiation during vertebrate development.

Verlinde, Christophe L. M. \* 1992, (Research); PhD, 1988, Catholic University of Leuven (Belgium); structure-based drug design and protein crystallography.

Xu, Wenqing \* 1999; PhD, 1995, Massachusetts Institute of Technology; structural studies of proteins involved in cancer, immune dysfunction, and neuronal diseases.

### Lecturers

Mulligan, Kathleen A. 1987; PhD, 1985, University of New South Wales (Australia); neurobiology, gross anatomy, teaching innovations, technical communication.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**B STR 301 General Anatomy (4) NW** *Nameroff* Survey of systemic human anatomy, including human skeletal system, muscular system, respiratory system, circulatory system, nervous system, digestive system, endocrine system, urinary system, and reproductive system. For second, third, and fourth year undergraduates. Offered: Sp.

**CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4)** See Conjoint Courses.

**B STR 431 Introduction to Neuroanatomy (4) NW** *Mulligan* General survey of the structure of the central nervous system, including an analysis of sensory and motor systems and higher integrative functions and clinical correlation. Restricted to OT, PT, and dental students. Offered: W.

**B STR 498 Undergraduate Thesis (\*)** Individual research projects under the supervision of an instructor. For senior medical students. Offered: AWSpS.

**B STR 499 Undergraduate Research (\*)** Individual research projects in cellular and developmental biology, experimental immunology, reproductive biology, neurobiology, molecular structure, morphometrics, computer modeling, and related fields under the supervision of an instructor. Offered: AWSpS.

**B STR 501 Gross Anatomy (1-10, max. 10)** Lecture and laboratory dissection course in regional anatomy: thorax, abdomen, pelvis, perineum. Prerequisite: permission of instructor. Offered: A.

**B STR 502 Gross Anatomy (1-5, max. 5)** *Graney* Lecture and laboratory dissection course in regional anatomy: upper and lower extremities. Prerequisite: permission of instructor. Offered: W.

**B STR 503 Gross Anatomy (1-5, max. 5)** *Graney* Lecture and laboratory dissection course in regional human anatomy; head and neck. Prerequisite: permission of instructor. Offered: Sp.

**CONJ 508 EM Methods and Interpretation (3-5)** *Wight* See Conjoint Courses.

**B STR 510 Seminar in Anatomy (1)** *Graney* Scientific and historical basis of selected studies in biological structure, anatomy, and human development. Original literature used as basis for textbook descriptions is reviewed. Prerequisite: permission of instructor. Offered: AWSp.

**CONJ 511 Functional Neuroanatomy (4)** *Hendrickson, Smith* See Conjoint Courses.

**B STR 512 Human Microanatomy (4)** *Nameroff* Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicroscopic points of view. Prerequisite: permission of instructor. Offered: A.

**B STR 515 Biological X-Ray Structure Analysis (3)** *Stenkamp* Theory of x-ray diffraction, with emphasis on applications to biological systems. Prerequisite: permission of instructor. Offered: W.

**B STR 517 Embryology/Developmental Biology Seminar (1)** *Nameroff* Embryology of a region or organ. Topics vary. Emphasis on original literature and developmental principles. Prerequisite: permission of instructor. Offered: AWSp.

**B STR 519 Current Problems in Macromolecular Structure (2, max. 10)** *Hol* A discussion of macromolecular structures related to specific areas of biological research. Emphasis on discussion of relevant research papers and use of computer graphics to visualize the molecular structures. Offered: AWSpS.

**CONJ 520 Anatomy and Autopsy (1/2, max. 2)** *Fligner* See Conjoint Courses.

**UCONJ 524 Developmental Neurobiology (3)** *Raible, Reh, Roelink, Rubel* See University Conjoint Courses.

**B STR 520 Structure Based Design of Drugs and Vaccines (3)** *Hol* Lecture and discussion on research papers illustrating protein structure based design of new drugs and vaccines. Review of methods of structure-based drug design and problem of drug resistance. Discussion on importance of adjuvants, protein engineering methods, and immune evasion methods in vaccine design. Offered: W.

**B STR 521 Advanced Biomacromolecular Crystallography (3)** *Hol, Merritt, Stenkamp* Aspects of protein crystallography ranging from crystal growth, phase determination methods, density averaging to refinement, fiber diffraction of DNA and proteins. Offered: odd years; W.

**B STR 530 P-Gross Anatomy and Embryology for Dental Students (7)** *Broderson, Clark* Normal anatomy of the thorax, abdomen, pelvis, and perineum are discussed and dissected employing cadavers. The development of the organ systems is presented and related to definitive adult structure. Developmental anomalies and diagnostic anatomy are also discussed. Prerequisite: admission to School of Dentistry. Offered: A.

**B STR 540 Special Problems in Anatomy (1-6, max. 6)** Special projects in anatomy under sponsorship of faculty member. Prerequisite: graduate, medical, or dental student standing and permission of instructor. Offered: AWSpS.

**B STR 541 P-Microscopic Anatomy for Dental Students (4)** Lecture and laboratory work in microscopic anatomy. For dental students taking HUBIO 510; others by permission of instructor. Offered: A.

**B STR 550 P-Head and Neck Anatomy for Dental Students (4)** *Broderson, Clark, Graney* Normal anatomy of the head is discussed and dissected employing human cadavers. The fundamentals of diagnostic anatomy are also discussed. Restricted to first-year dental students. Prerequisite: B STR 530. Offered: Sp.

**B STR 555 Laboratory Rotation in Biological Structure (\* max. 5)** Introduction to experimental design, research methods, and scientific thought in laboratories of faculty members. Provides hands-on experience, an entrance into the literature of the field, and opportunities for discussion with all members of the laboratory. First year dental students only. Prerequisite: permission of instructor. Offered: AWSpS.

**B STR 557 Biomolecular Structure Seminar (1)** *Hol* Literature review of key research in Biomolecular Structure in the form of short presentations by participants followed by discussion. Critical evaluation of methods and results regarding properties and protein structure determination. Credit/no credit only. Prerequisite: graduate standing in biological structure or biochemistry and permission of instructor. Offered: AWSp.

**B STR 559 Developing Research Proposals (2)** Developing research proposals in cellular, molecular, and developmental biology; neurobiology; morphometrics and computer modeling; experimental immunology and hemopoiesis; reproductive biology; molecular structure. Weekly seminars by faculty and written proposals by students to include background and significance of projects specific hypotheses and aims, methodology, analyses of possible outcomes. Prerequisite: permission of instructor. Offered: even years; Sp.

**B STR 580 P-Anatomy Teaching Practicum (\* max. 8)** *Graney, Koehler, Sherk* Opportunity for medical student (or other professional student) to gain teaching experience in biological structure and human biology courses, including gross anatomy, histology, and neuroanatomy. May include lecture, laboratory, conference, depending on student interest, experience. Credit based on course credit in which student is assisting. Prerequisite: permission of course chairperson. Offered: AWSp.

**B STR 584 Seminar in Neurogenesis (1)** *Reh* Discussion of current research on process by which neurons are generated in the nervous system. Offered: AWSpS.

**CONJ 585 Surgical Anatomy (1-3, max. 12)** *Graney* See Conjoint Courses.

**B STR 591 X-Ray and NMR Analysis of Macromolecular Structure (1, max. 9)** *Hol* Weekly discussion of current topics in research on molecular structure, usually emphasizing techniques of x-ray crystallography. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**B STR 594 Seminar in Myogenesis (1, max. 5)** *Nameroff* Discussion of recent work on the differentiation of skeletal muscle and related cell types. Emphasis on the cell-biological aspects of differentiation both *in vivo* and *in vitro*. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**B STR 595 Skin Biology Seminar (1, max. 5)** *Smith* Presentation, discussion of ongoing multidisciplinary research in basic and clinical problems of adult and

fetal skin biology. Genetic diseases of epidermis and dermis, percutaneous absorption in adult and fetal skin, wound healing, cutaneous blood flow, development and prenatal diagnosis of inherited disorders, pigment cell biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**B STR 597 Topics in Neurobiology (1, max. 5)** *Harris* Presentations by participants of topics in neuroanatomy, neurophysiology, neurochemistry, and other areas relating to the nervous system. Problems of current research interest. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

**B STR 598 Reading in Biological Structure (2)** Critical evaluation of research in biological structure, including current problems, methods and future directions by reading and discussing research and review papers. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**B STR 600 Independent Study or Research (\*)** Offered: AWSpS.

**B STR 700 Master's Thesis (\*)** Offered: AWSpS.

**B STR 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Comparative Medicine

T142 Health Sciences

 *General Catalog Web page:*  
[www.washington.edu/students/genocat/academic/Comparative\\_Med.html](http://www.washington.edu/students/genocat/academic/Comparative_Med.html)

The Department of Comparative Medicine provides education and research opportunities in the use of animals in biomedical research, testing, and education. In addition, training is provided for veterinarians in the diagnosis, treatment, and prevention of the diseases of laboratory animals. Current educational programs include scheduled courses in the principles and techniques of animal experimentation (C MED 407) for biomedical graduate students, zoonotic diseases, and training in laboratory-animal medicine for veterinary medical students and veterinarians, combined with a Master of Science degree program in comparative medicine. Areas of current research interests include immunohematology, biology of aging, generation and characterization of transgenic animal models, somatic cell gene transfer, and animal models of gene therapy.

Graduate Program Coordinator  
T136 Health Sciences, Box 351790  
(206) 685-3261

### Postdoctoral Program

Postdoctoral training in the areas of laboratory animal medicine and comparative pathology is offered to persons with a D.V.M. or equivalent degree. Training consists of a combination of course work, clinical residency rotations, and research leading to a Master of Science degree in comparative medicine. The program also prepares participants for specialty certification by the American College of Laboratory Animal Medicine. Stipend support is normally provided.

### Master of Science

The Master of Science degree in comparative medicine provides advanced training in comparative medicine to veterinarians. Admission to the degree program requires acceptance into the department's Postdoctoral Training Program. The degree option involves additional elective courses, the completion of a more-involved research project, and a thesis.

### Predocutorial Program

This program is designed to acquaint veterinary medical students with laboratory-animal medicine as a veterinary specialty. Specific areas covered include control/treatment of the principal diseases of common laboratory animals and their role in biomedical research. Blocks of four to eight weeks are available for fourth-year students year-round. Stipend support is normally provided.

## Faculty

### Chair

Melvin B. Dennis

### Professors

Dennis, Melvin B. \* 1971; DVM, 1961, Washington State University; comparative medicine, including animal models and experimental surgery.

Di Giacomo, Ronald F. \* 1974; VMD, 1965, University of Pennsylvania; MPH, 1974, University of Washington; epidemiology and zoonoses.

Liggitt, H. Denny \* 1989; DVM, 1972, PhD, 1979, Colorado State University; using in vivo models to evaluate novel approaches for gene delivery, transgenic models.

Morton, William R. \* 1976; VMD, 1967, University of Pennsylvania; animal models for AIDS-related research on vaccine development and pathogenesis studies.

Rausch, Robert L. \* 1978, (Emeritus); DVM, 1945, Ohio State University; PhD, 1949, University of Wisconsin; parasitology, helminthic zoonoses.

Van Hoosier, Gerald \* 1975; DVM, 1957, Texas A&M University; laboratory animal medicine with emphasis on effects of intercurrent infection on mouse phenotypes.

Whitney, Robert A. 1997, (Affiliate); DVM, 1959, Oklahoma State University; MS, 1965, Ohio State University.

Wolf, Norman S. \* 1968, (Adjunct); DVM, 1953, Kansas State University; PhD, 1960, Northwestern University; hematopoietic stem cell dynamics and transplantation, aging at the cellular level.

### Associate Professors

Debowes, Linda J. 1999, (Affiliate); DVM, 1981, Washington State University; MS, 1985, Kansas State University.

Grossmann, Angelika \* 1985, (Affiliate); DVM, 1978, PhD, 1982, Freie University of Berlin (Germany); immunosenescence in humans and mice; immunotoxicology; transmembrane signaling in T-lymphocytes.

Hargis, Ann M. 1990, (Affiliate); DVM, 1973, MS, 1976, Colorado State University.

Ladiges, Warren C. \* 1982; DVM, 1971, MS, 1978, Washington State University; molecular immunology of autoimmune disease, transgenic mouse models of aging.

Price, Lillian M. \* 1984; VMD, 1972, PhD, 1983, University of Pennsylvania; t-cell development in the thymus, immunotoxicology, thymus development, retinoic acid embryopathy.

Thouless, Margaret E. \* 1980, (Adjunct); PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.

Waggie, Kimberly S. 1997, (Affiliate); DVM, 1980, Iowa State University; MS, 1984, University of Missouri.

Weigler, Benjamin J. \* 1997; DVM, 1986, Colorado State University; MPH, 1988, University of California (Berkeley); PhD, 1991, University of California (Davis); infectious disease epidemiology in laboratory animal medicine and management.

### Assistant Professors

Iritani, Brian M. 1992; DVM, 1988, Washington State University; PhD, 1997, University of Washington; developmental immunology, cell signaling and molecular basis of cancer.

Kramer, Robert W. 1995, (Affiliate); DVM, 1987, University of California (Davis).

Ware, Carol B. 1995, (Research); PhD, 1986, University College (Ireland).

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsccat/](http://www.washington.edu/students/crsccat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**C MED 407 Principles of Animal Experimentation (3)** *Dennis, VanHoosier* Focus on biology and care of experimental animals, animal models of human disease, ethical use of animals in biomedical research and teaching; techniques of aseptic surgery. Includes lectures and animal-use laboratories. For graduate and advanced undergraduate students. Prerequisite: permission of instructor. Offered: A.

**C MED 499 Undergraduate Laboratory Research (1-6, max. 6)** *Van Hoosier* Specific problems in comparative medicine. Credit/no credit only. Offered: AWSpS.

**C MED 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10)** *Liggitt* Use of animals in experimental study of disease; techniques of animal necropsy, characterization, interpretation of gross and microscopic lesions, correlation of lesions with altered physiological processes, differentiation between naturally occurring and experimentally induced lesions. Prerequisite: PATH 444, PATH 445, or equivalent, and permission of instructor. Enrollment limited: two students per quarter. Offered: AWSpS.

**C MED 514 Comparative Pathology Conference (1, max. 6)** *Anderson, Liggitt* Focus on histopathology of naturally occurring and experimentally induced lesions of primates, laboratory and domestic animals, fish, wildlife, and birds. Participants discuss the lesions and the basic pathogenetic mechanisms that underlie them. Prerequisite: PATH 500 or equivalent and permission of instructor. Offered: AWSpS.

**C MED 516 Current Literature in Laboratory Animal Medicine (1, max. 12)** *VanHoosier* Critical evaluation of recent articles on laboratory animal medicine and science. Emphasis on literature dealing with spontaneous diseases of laboratory animals, biology and husbandry, zoonotic diseases, and animal models of human disease. Experimental design, use of animals in research, and methods of reviewing manuscripts. Prerequisite: permission of instructor. Offered: AWSpS.

**C MED 518 Clinical Conference Seminar (1, max. 12)** *Price* Clinical reports of cases of spontaneous and induced diseases, animal models of human disease, and zoonotic diseases discussed. Disease prevalence and preventive medicine measures. Diagnostic exercises. Prerequisite: permission of instructor. Offered: AWSpS.

**C MED 520 Biology of Laboratory Animals (2)** *DiGiacomo, Lichtenwalner, Pekow, VanHoosier* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and dif-

ferences within, and between, species, including man. Husbandry, genetics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: AS.

**C MED 521 Biology of Laboratory Animals (2)** *DiGiacomo, Lichtenwalner, Pekow, VanHoosier* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and differences within, and between, species, including man. Husbandry, genetics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: WS.

**C MED 526 Zoonotic Diseases (3)** *DiGiacomo, Rausch* Explores the public health aspects of zoonotic diseases, their epidemiology and current approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans in North America. Prerequisite: C MED 511, C MED 512, or C MED 520 or permission of instructor. Offered: jointly with EPI 526; S.

**C MED 530- Diseases of Laboratory Animals (3-)** *Anderson, DiGiacomo, VanHoosier* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: AS.

**C MED 531- Diseases of Laboratory Animals (3-)** *Anderson, DiGiacomo, VanHoosier* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: WS.

**C MED 540 Animal Models (1)** *Dennis* Naturally occurring and experimentally induced analogs of human diseases in animals with emphasis on diseases in search of animal models, and approaches to identifying new models. Animal models of categorical disease (e.g., cancer, atherosclerosis, gerontology) discussed. Prerequisite: permission of instructor. Offered: SpS.

**C MED 590 Selected Topics in Animal Medicine (2)** *Dennis, VanHoosier* Radiation biology, genetics, anesthesiology and experimental surgery, preventive medicine, and ethical aspects of use of animals in biomedical teaching and research. Specific topics vary from year to year, depending on the expertise of the annual visiting professor. Prerequisite: permission of instructor. Offered: SpS.

**C MED 600 Independent Study or Research (\*)** Offered: AWSpS.

**C MED 601- Internship Rotation—Laboratory Animal Medicine (1-)** Prerequisite: DVM degree. Offered: AWSpS.

**C MED 700 Master's Thesis (\*)** Offered: AWSpS.

## Conjoint Courses

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**CONJ 401 Human Anatomy and Physiology (4)** *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Prima-

rily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: BIOL 201; BIOL 202; BIOL 203; either CHEM 155, CHEM 160, or CHEM 162. Offered: A.

**CONJ 402 Human Anatomy and Physiology (4)** *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: CONJ 401. Offered: W.

**CONJ 403 Human Anatomy and Physiology (4)** *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: CONJ 402. Offered: Sp.

**CONJ 505 P-Pain Clinic Preceptorship (1)** *Loeser* One morning a week for a total of 30 hours per quarter spent observing patient care in either inpatient or outpatient settings at University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: Pain Center.

**CONJ 515 Interdisciplinary Health and Human Services Delivery in Rural Communities (1)** *House* Provides opportunities for students in health and human services to explore current trends and issues of service delivery in rural communities. Demographics, economics, community structure, culture, and professional/personal issues are addressed. Prerequisite: major standing in a health or human services profession. Offered: W.

**CONJ 520 Anatomy and Autopsy (1/2, max. 2)** *Fligner* Students attend autopsies at UWMC affiliated hospitals for demonstration of normal anatomic relationships and gross pathological changes in various diseases. Offered as elective concurrent with HUBIO 520P. Prerequisite: HUBIO 510P or equivalent, permission of instructor, and orientation. Offered: WSp.

**CONJ 531 Signaling Mechanisms in Excitable Cells (1.5)** *Hille* Membrane electricity. Structure and roles of voltage-gated and ligand-gated ion channels in electrical signaling. Calcium as a second messenger. Exocytosis and its regulation. Phototransduction in photoreceptors. Prerequisite: comprehensive undergraduate course in general biochemistry and molecular biology, or permission of instructor. Offered: A.

**CONJ 532 Signal Transduction from the Cell Membrane to the Nucleus (1.5)** *Beavo, McKnight, Moon, Storm* Intracellular signaling pathways leading from cell membrane receptors to nucleus. Pathways activated by seven transmembrane receptors and G-proteins, insulin/PI3 kinase, nitric oxide and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction. Prerequisite: BIOC 442 or equivalent, or permission of instructor. Offered: A.

**CONJ 533 The Dynamic Chromosome (1.5)** *Henikoff, Roth* The chromosome viewed as the ultimate organelle. How chromosomes are maintained and propagated. Epigenetic regulation of genes. Genetic, biochemical, and cytologic methods for understanding chromosome functions. Prerequisite: cell biology, biochemistry, and genetics. Offered: A.

**CONJ 534 Selected Problems in Nervous System Development (1.5)** Introduces students to current issues in developmental neurobiology. Topics include regionalization of the neuroectoderm, mechanisms of neurogenesis, axon patterning and plasticity, and cell death. Not intended to be comprehensive; examines the experimental basis for current views in the field of a few topical issues.

**CONJ 536 Experimental Design in Cell Biology (1.5)** *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest is covered in depth in order to follow a line of investigation and critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with ZOO 541 W.

**CONJ 537 Gene Transcription and RNA Processing (1.5)** *Stoddard* Focuses on biochemical mechanisms of eukaryotic gene transcription and RNA processing. Readings in current research literature. Offered: A.

**CONJ 539 Biological Basis of Neoplasia (1.5)** *Foote, Neiman, Kemp, Zarbl* Lecture/discussion on cellular and molecular mechanisms underlying phenotypes associated with cancer, including genetic pre-disposition, injury, and instability; alteration in control of cell division and cell death; failure of differentiation; tumor angiogenesis and metastasis. Molecular biology of tractable model systems is emphasized. Prerequisite: introductory biochemistry and cell biology. Offered: W.

**CONJ 541 Molecular Biology of Cellular Processes (1.5)** *Bornstein* Translational control; cytoskeleton and molecular motors; protein targeting, sorting and secretion; apoptosis; regulation of cell function by extracellular matrix. Prerequisite: comprehensive undergraduate course in biochemistry and molecular biology or permission of instructor. Offered: Sp.

**CONJ 542 Development (1.5)** *Raible* Molecular mechanisms of development; molecules and pathways used for the patterning of developing organisms. Similarities and differences in the making of plants, invertebrates, and vertebrates. Prerequisite: Comprehensive undergraduate courses in Biology, Molecular Biology, or permission of instructor. Offered: Sp.

**CONJ 543 Problems in Genetic Analysis (1.5)** *Emerman, Edgar, Ostrander* Introduction to the course in problems of genetic analysis using a variety of organisms. Focuses on the use of classical and modern genetic tools to understand fundamental problems in biology and medicine. Presents several widely used genetic approaches in detail. Offered: Sp.

**CONJ 544 Protein Structure, Modification and Regulation (1.5)** *Stoddard, Strong* Overview of general principles of protein structure, including forces that contribute to folding and stabilization, followed by an extended coverage of the means by which protein structure and function are modified and regulated. Examples from recent developments in protein folding, processing, and allosteric regulation. Prerequisite: introductory biochemistry and cell biology.

**CONJ 550 P-Clinical Infectious Diseases (3)** *Spach* Lecture series by faculty members from various departments, authorities in the field of clinically important infectious diseases. Lectures, reading assignments, and handouts emphasize epidemiology, clinical manifestations, laboratory findings, diagnosis, treatment, and prevention. Oriented for second-year medical students. Credit/no credit only. Prerequisite: HUBIO 521 or permission of coordinator, Department of Medicine. Offered: W.

**CONJ 585 Surgical Anatomy (1-3, max. 12)** *Graney* Guided dissection of selected regions, supplemented by conferences. Offered conjointly by the departments of Biological Structure and Surgery. Prerequisite: permission of department. Coordinator: Department of Biological Structure.

**CONJ 677 P-Clinical Allergy and Immunology (\* max. 12)** *Callanan (Boise Veterans Affairs Hospital), Henderson (University of Washington Medical Center)* Clinic and office experience in diagnosing and managing allergic disease. Clinical conferences,

hospital rounds on clinical immunology and allergy. Student may elect a flexible program, emphasizing adult or pediatric allergy. Prerequisite: MED 665 or basic clerkships in Departments of Family Medicine or Pediatrics. (Four weeks, full-time.) Offered: AWSpS.

**CONJ 678 P-Pain Clinic Clerkship (8)** Full-time, four-week clerkship emphasizing comprehensive care of patients with chronic pain from benign diseases and cancer. Faculty members from multiple departments provide student with didactic and bedside experiences; student member of treatment team. Involves both inpatient and outpatient activities. Prerequisite: completion of human biology series, MED 665.

**CONJ 680 P-Detoxification and Rehabilitation Program for Alcoholism and Drug Abuse (\* max. 16)** *Reoux* Supervised introduction to alcoholic detoxification and rehabilitation and drug abuse. Supervised clinical experience in a variety of alcoholism and drug abuse treatment programs; accompanied by a core series of lectures and discussions. For medical students only. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

**CONJ 696 P-WRITE Clinical Electives (\* max. 24)** Clinical electives for WRITE program. Offered: AWSpS.

**CONJ 697 International Exchange Clerkship (12)** *Hunt* Participation in health care delivery systems in developing countries; observation of relationship of host country's traditional medicine with Western medicine. Students live in cross-cultural setting to better understand their own assumptions about health care and life styles. Offered: Sp.

**CONJ 698 P-Foreign Medical Student Clerkship (\* max. 24)** A limited number of students from foreign medical schools are accepted for individually designed clinical clerkships at available sites after all UWMC students are accommodated. Prerequisite: permission of Associate Dean for Academic Affairs, School of Medicine.

**CONJ 699 P-Clinical Clerkships (\* max. 32)**

## Family Medicine

C408 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Family\\_Medicine.html](http://www.washington.edu/students/genocat/academic/Family_Medicine.html)



Department Web page:  
[www.fammed.washington.edu](http://www.fammed.washington.edu)

Family medicine is the discipline concerned with the continuing and comprehensive care of individuals and their families. The prime instructional goal of the department is the education and training of physicians who will apply the knowledge and skills of this and other medical disciplines in family practice. Implicit in this goal is the necessity for continual development of new knowledge and its application in the clinical activities of the department.

The Department of Family Medicine was founded in 1971 and is involved with instruction of medical students in several ways. These include presentations in the basic curriculum of the first two years, clinical clerkships as part of the clinical core curriculum, and other elective courses open to all medical students. A graduate residency program in family practice provides training consistent with the standards of the American Board of Family Practice, the American Academy of Family Physicians, and the Council on Medical Education of the American Medical Association. Active teaching affiliations are maintained throughout the WWAMI region at both undergraduate and graduate levels.

Family-medicine fellowship training programs are available to develop teaching and research skills for future academic faculty.

## Faculty

### Chair

Alfred O. Berg

### Professors

Berg, Alfred O. 1979; MD, 1974, Washington University; MPH, 1979, University of Washington; family medicine.

Chrisman, Noel J. \* 1973, (Adjunct); PhD, 1966, University of California (Berkeley); community partnership research, clinical cultural competence, ethnic health beliefs and practices.

Coombs, John B. 1983; MD, 1972, Cornell University; rural health policy, nutrition and medicine.

Ellsworth, Allan J. 1981; PharmD, 1977, Philadelphia College of Pharmacy and Science; primary care, family medicine.

Hart, Lawrence G. 1982; PhD, 1985, University of Washington; rural health policy, medical geography.

Katon, Wayne J. \* 1976, (Adjunct); MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.

Mayer, Jonathan D. \* 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, clinical applications, philosophy, human-environment relations.

Norris, Thomas E. 1988; MD, 1973, University of Texas (Galveston); rural health policy, primary care policy, geriatrics.

Rosenblatt, Roger A. \* 1977; MD, 1971, MPH, 1971, Harvard University; research into the organization and delivery of health services, rural health policy.

Schneeweiss, Ronald 1977; MBChB, 1964, University of Capetown (South Africa); family medicine.

### Associate Professors

Baldwin, Laura M. 1984; MD, 1980, University of Southern California; MPH, 1986, University of Washington; family medicine.

Crittenden, Robert A. 1981; MD, 1976, MPH, 1987, University of Washington; health plans/policies.

Dobie, Sharon A. 1987; MCP, 1971, University of California (Berkeley); MD, 1979, University of California (San Francisco); family medicine.

Eggertsen, Sam C. 1982, (Clinical); MD, 1976, University of Washington; family medicine.

Ellsbury, Kathleen E. 1982; MD, 1977, Johns Hopkins University; MPH, 1982, University of Missouri; family medicine.

Gloyd, Stephen S. \* 1985, (Adjunct); MD, 1973, University of Chicago; MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Goldbaum, Gary M. \* 1989, (Adjunct); MD, 1978, University of Colorado (Denver); MPH, 1989, University of Washington; behavioral factors in HIV/AIDS, preventive medicine.

Greer, H. Thomas 1977; MD, 1974, University of Mississippi; MPH, 1979, University of Washington; family medicine.

Leversee, John H. 1973, (Emeritus); MD, 1952, University of Minnesota; family medicine.

Losh, David Paul 1992; MD, 1974, University of Kansas; family medicine.

Neighbor, William E. Jr. 1983; MD, 1979, University of Washington; family medicine and preventive cardiology.

Oliver, Lynn M. 1988; MD, 1983, University of Washington; family medicine.

Stevens, Nancy G. \* 1982; MD, 1979, MPH, 1982, University of Washington; family medicine.

Taplin, Stephen H. 1983; MD, 1978, University of California (Davis); MPH, 1985, University of Washington; family medicine.

Taylor, Thomas R. 1979; MBChB, 1957, PhD, 1971, University of Glasgow (UK); family medicine.

Wright, George 1997; MA, 1964, PhD, 1977, University of Michigan.

### Assistant Professors

Church, Lili Lucille 1992; MD, 1985, University of Iowa; family medicine.

Doescher, Mark 1996; MD, 1989, University of California (San Francisco).

O'Kane, John 1993, (Adjunct); MD, 1993, University of Vermont; family medicine, sports medicine, team care.

Pinsky, Linda E. 1989, (Adjunct); MD, 1989, University of Washington; general internal medicine.

Saver, Barry G. 1989; MA, 1978, Harvard University; MD, 1983, Columbia University; MPH, 1991, University of Washington; family medicine.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**FAMED 499 Undergraduate Research (\*)** Research activities arranged with University-based or community physicians in diversified areas relating to family medicine. Prerequisite: permission of course coordinator. Offered: AWSpS.

**FAMED 501 P-Introduction to Family Medicine: Preceptorship (2.5)** Students spend one morning per week for one or more quarters working with a practicing community family physician. Prerequisite: first- and second-year medical students, permission of course coordinator. Offered: AWSpS.

**FAMED 505 P-Rural/Urban Preceptorship (\* max. 12)** Opportunity to work in a variety of underserved medical settings in rural and urban areas of Washington, Wyoming, Alaska, Idaho, and Montana. Prerequisite: permission of instructor. Offered: AWSpS.

**FAMED 545 Preclinical Geriatric Elective (2)** Covers disease and disability prevention, health promotion, and positive attitudes that can contribute to successful aging. Emphasis on optimum aging, site visits, and extensive contact with diverse older people.

**FAMED 546 Preclinical Hospice Volunteer Training Elective (3)** Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with MHE 517.

**FAMED 547 Spirituality in Medicine (1, max. 3)** Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with MHE 518.

**FAMED 556 Spanish for Health Professionals (1)** Instruction in interviewing Spanish-speaking patient. Credit/no credit only. Prerequisite: health professions student.

**FAMED 630 P-WRITE Family Medicine Clinical Clerkship (\* max. 24)** Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

**FAMED 640 P-Clinical Clerkship in Family Medicine - Boise (12)** Stresses ambulatory primary care with emphasis on comprehensive, integrated care to patients of both genders and all ages. Student functions as clerk in community/residency site. Participates in care of assigned patients, using office, hospital, home, community resources. Prerequisite: third- or fourth-year medical students. Offered: AWSpS.

**FAMED 641 P-Clinical Clerkship in Family Medicine - Spokane (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 642 P-Clinical Clerkship in Family Medicine - Madigan (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 643 P-Clinical Clerkship in Family Medicine - Tacoma (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 644 P-Clinical Clerkship in Family Medicine - University of Washington Medical Center (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 645 P-Clinical Clerkship in Family Medicine - Group Health (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 646 P-Clinical Clerkship in Family Medicine - Swedish (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 647 P-Clinical Clerkship in Family Medicine - Providence (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 648 P-Clinical Clerkship in Family Medicine - Renton Valley (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 649 P-Clinical Clerkship in Family Medicine - Olympia (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 650 P-Clinical Clerkship in Family Medicine - Anacortes (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 651 P-Clinical Clerkship in Family Medicine - Omak (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 652 P-Clinical Clerkship in Family Medicine - Spokane Valley (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 653 P-Clinical Clerkship in Family Medicine - Anchorage (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 655 P-Clinical Clerkship in Family Medicine - Havre (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 656 P-Clinical Clerkship in Family Medicine - Whitefish (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 657 P-Clinical Clerkship in Family Medicine - Pocatello (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 658 P-Clinical Clerkship in Family Medicine - Sea Mar Clinic (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 659 P-Clinical Clerkship in Family Medicine - Country Doctor (12)** For description and prerequisite, see 640. Offered: AWSpS.

**FAMED 660 P-Clinical Clerkship in Family Medicine - Yakima (12)** For description and prerequisites, see 640. Offered: AWSpS.

**FAMED 661 P-Clinical Clerkship in Family Medicine - Bremerton (12)** For description and prerequisites, see 640. Offered: AWSpS.

**FAMED 670 P-Advanced Preceptorship in Underserved WWAMI Area (\* max. 24)** Students gain experience, knowledge, and skills needed to care for rural, Native-American Indian, and other ethnic or underserved populations in Washington, Wyoming, Alaska, Montana, and Idaho. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

**FAMED 671 P-Advanced Preceptorship in United States (\* max. 24)** Supplemental experience in rural/urban practice or a family medicine department in a setting not already established through the family medicine curriculum. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

**FAMED 672 P-Advanced Preceptorship International (\* max. 24)** For medical students desiring primary care experience abroad. Special project deals with influences of social, cultural, educational, and economic forces on health care delivery. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

**FAMED 673 P-Advanced Preceptorship at WWAMI Clinical Centers (\* max. 12)** Supplemental experience in Family Medicine for late junior or senior medical students at selected WWAMI clinical centers. Prerequisite: completion of basic 6-week clerkship in Family Medicine. Offered: AWSpS.

**FAMED 674 P-Advanced Preceptorship in Biopsychosocial Approaches in Primary Care (8)** Emphasizes the learning of patient-centered interviewing and counseling skills necessary for effective practice of primary care medicine.

**FAMED 680 P-Traditional Indian Medicine Clerkship in Primary Care Setting (\* max. 12)** Students learn how western physician collaborate with traditional Indian healers in the provision of health care to an urban Indian population. Prerequisite: completion of required third-year clerkship, UCONJ 530 or permission of instructor. Offered: AWSpS.

**FAMED 681 P-Indian Health Care Clerkship (\* max. 12)** Individually designed learning experience allows student to choose training opportunities, including Indian IHS Clinics, Tribal 638 Health Programs, IHS Public Health Program, Urban Indian Health programs, Tribal Council Health activities, and Tribal/IHS Alcoholism Treatment programs. Prerequisite: completion of required third-year clerkships, UCONJ 530, and permission of instructor. Offered: AWSpS.

**FAMED 698 P-Clinical Clerkship in Family Medicine, Away (12)** For description and prerequisites, see 640. Offered: AWSpS.

**FAMED 699 P-WWAMI Family Medicine Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department. Offered: AWSpS.

## Human Biology

### Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only. This sequence is required for all medical students. Other students may enroll by permission of the Assistant Dean for Curriculum, School of Medicine.

**HUBIO 500 P-Medical Practice Preceptorship at WWAMI Sites (1, max. 3)** Personal experience with, and insight into, medical practice situations. Student is stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WWAMI sites. Registration limited to first-year medical students at WWAMI sites. Offered: AWSpS.

**HUBIO 501 P-Human Biology Special Projects (\*)** *Hunt, MacLaren* Designed for medical students electing a special study project related to the Introduction to Clinical Medicine or other human biology courses, which are offered during the first and second years in the School of Medicine. Primarily intended for students in remedial or extended programs. Prerequisite: permission of assistant dean for curriculum. Offered: AWSpS.

**HUBIO 505 P-WWAMI Preceptorship (1)** Opportunity for first-year medical students at WWAMI sites to gain personal experience with medical practice situations by being assigned to selected clinical faculty members in their offices. Offered: ASP.

**HUBIO 510 P-Microscopic Anatomy: Histology (3)** *Nameroff* Lectures and laboratories in microscopic anatomy designed to provide the principles and concepts of histology, to define the morphological characteristics of the cells, tissues, and organs of the human body, and to relate this information to functional processes studied in concurrent and subsequent courses. Offered: A.

**HUBIO 511 P-Gross Anatomy and Embryology (7)** *Clark* Structural organization of human body at the macroscopic level to provide a foundation for physical examination and functional assessment of the human organism. Integrates embryological development with study of the cadaver and examination of the normal living body. Concentrates on exploration of the body cavities and the viscera they contain. Offered: A.

**HUBIO 512 P-Mechanisms in Cell Physiology (5)** *Crill* Physiology of the cell membrane, including ionic and electrical potential gradients; active transport, excitability, and action potentials; biophysics of sensory receptors; neuromuscular transmission; muscle energetics and contractility; spinal reflexes and central synaptic transmission; autonomic nervous system; energy metabolism and temperature regulation; epithelial transport; gastrointestinal motility and secretions. Offered: A.

**HUBIO 513- P-Introduction to Clinical Medicine (1-)** *Goldstein* Instruction in communication skills and interview techniques to form the basis for the doctor-patient relationship and for the skills of communicating with patients. The patient profile is obtained. Attention to developing comfort in the physician role. Offered: A.

**HUBIO 514- P-Biochemistry I-A (4-)** *Walsh* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic inter-

relationships as they occur in the individual stressed and related to disturbances in disease states. Offered: A.

**HUBIO 516- P-Systems of Human Behavior I-A (3-)** *Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: A.

**HUBIO 520 P-Cell and Tissue Response to Injury (6)** *Norwood* Patterns of cell and tissue response to injury. Mechanisms of cell injury, the inflammatory process, immunology, immunopathology, thrombosis, normal and abnormal growth, neoplasia, clinicopathological correlation. Offered: W.

**HUBIO 521- P-Microbiology and Infectious Disease I-A (4-)** *Moseley* Pathogenesis and immunity of infectious diseases, natural barriers. Microbiology, epidemiology, clinical manifestations and control of representative bacterial, fungal, parasitic, and viral infectious diseases. Chemotherapeutics and principles of chemotherapy. Sterilization, principles of asepsis, nosocomial and iatrogenic infections and their prevention. Offered: W.

**HUBIO -522- P-Introduction to Clinical Medicine (-2-)** *Goldstein* Medical history is introduced and instruction in data collection is begun. Experience in conducting medical interviews with patients to obtain the medical history and patient profile. Special problems related to interviewing are addressed. Offered: W.

**HUBIO 523 P-Introduction to Immunology (2)** *Aderem* Basic concepts such as antigens; antibodies; complement; B- and T-lymphocyte function, including interactions with each other and with accessory cells; immunological tolerance; major histocompatibility complex; and role of these basic concepts in immunopathology (immunodeficiencies, hypersensitivities, autoimmunity, blood transfusion, and transplantation). Offered: W.

**HUBIO -524 P-Biochemistry I-B (-3)** *Walsh* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic interrelationships as they occur in the individual stressed and related to disturbances in disease states. Offered: W.

**HUBIO -526 P-Systems of Human Behavior I-B (-1)** *Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: W.

**HUBIO 530 P-Epidemiology (2)** *Wald* Community health and disease, including assessment of disease risk and mechanisms of epidemic detection, spread, and control; interpretation of research design, data analysis, bias source; and clinical epidemiology, including evaluation and application of diagnostic tests, natural history of disease, and quantitative aids for clinical decision making. Offered: W.

**HUBIO 531 P-Head, Neck, Ear, Nose, and Throat (5)** *Graney* Gross anatomy (including skull, pharynx, and larynx), audition and balance, physiology and clinical evaluation, maxillofacial disorders, diseases of nasal passages, nasopharynx and oropharynx, accessory sinuses. Physical examination. Offered: Sp.

**HUBIO 532 P-Nervous System (6)** *Reh* Integrated approach to normal structure and function of the nervous system, including the eye. Neuropathological examples, as well as clinical manifestations of neurological disease are presented. Offered: Sp.

**HUBIO -534 P-Microbiology and Infectious Disease I-B (-2)** *Moseley* Pathogenesis and immunity of infectious diseases, natural barriers. Microbiology, epidemiology, clinical manifestations and control of representative bacterial, fungal, parasitic, and viral infectious diseases. Chemotherapeutics and principles of chemotherapy. Sterilization, principles of asepsis, nosocomial and iatrogenic infections and their prevention. Offered: Sp.

**HUBIO -535 P-Introduction to Clinical Medicine (-4)** *Goldstein* Adult screening physical examination is taught through the use of lecture, audiovisual aids, and small-group tutorial, where students in supervised setting practice the physical examination on one other. Further practice in the performance and recording of the patient profile and medical history. Offered: Sp.

**HUBIO 540 P-Cardiovascular System (5.5)** *Feigl* Interdisciplinary approach to cardiovascular medicine, including anatomy, physiology, radiology, pathology, medicine, and surgery. Function of the cardiovascular system in health and disease. Offered: A.

**HUBIO 541 P-Respiratory System (4)** *Culver* Interdisciplinary approach to the respiratory system, including anatomy of thorax and lungs, ventilation mechanics, blood-gas transport, gas exchange, acid-base balance, and the physiology and pathology of obstructive, restrictive, and pulmonary-vascular diseases. Offered: A.

**HUBIO 542- P-Introduction to Clinical Medicine (2.5-)** *Goldstein* Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities. Offered: A.

**HUBIO 543 P-Principles of Pharmacology I (4)** *Vincenzi* Includes general principles of pharmacology and the specific pharmacology of major drugs acting on the autonomic and cardiovascular systems. Offered: A.

**HUBIO 544 P-Endocrine System (2.5)** *Weigle* Normal, gross, and microscopic anatomy and physiology of the endocrine system. Illustrations examining the clinical relevance of homeostasis, feedback, and other controlling mechanisms previously learned. Endocrine integration of metabolism. Clinically important endocrine pathophysiology. Offered: A.

**HUBIO 546 P-Systemic Pathology (2)** *Schmidt* Multidisciplinary approach to some diseases that affect more than one organ system (nervous, cardiovascular, respiratory) and that are caused by different mechanisms (congenital, inflammatory, vascular, traumatic, metabolic, neoplastic). Offered: A.

**HUBIO -550- P-Introduction to Clinical Medicine (-3.5-)** *Goldstein* Advanced instruction in interview technique, history taking, and physical examination, with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms. Offered: W.

**HUBIO 551 P-Gastro-Intestinal System (4)** *Saunders* Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination. Offered: W.

**HUBIO 552 P-Hematology (3)** *Gernsheimer* Familiarizes students with the basic pathophysiological mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Pathophysiology, rather than minute details of individual disease, is stressed. Offered: W.

**HUBIO 553 P-Musculoskeletal System (4.5)** *Teitz* Gross, surface, applied, and radiographic anatomy. Clinical manifestations in the musculoskeletal system

and pathophysiology of trauma, aging, infection, and inflammation, as well as congenital and metabolic disorders. Dissections, physical examinations, and problem based learning. Offered: W.

**HUBIO 554 P-Genetics (2.5)** *Horwitz* Review of basic genetic principles and their applications in clinical medicine. Includes human chromosomal disorders; patterns of inheritance, genetic counseling, amniocentesis; pathogenesis of hereditary diseases, monogenic and multifactorial; role of genetics in common diseases; behavioral genetics; drug-gene interactions; and prevention and treatment of genetic diseases, including prenatal diagnosis and population screening. Offered: A.

**HUBIO 555P Medicine, Health, and Society (2.5)** *Lafferty* Interrelationships between provision of medical care and nonbiological factors that influence health. Includes relative importance of society, environment, and individual choice in determining health status; impact of organizational, economic, and political influences on medical practice and choice; their importance in decision making. Offered: W.

**HUBIO -560 P-Introduction to Clinical Medicine (-5)** *Goldstein* Introduction to clinical and laboratory diagnosis. Offered: Sp.

**HUBIO 562 P-Urinary System (4)** *Andress* Anatomy, physiology, and pathology of the kidney, ureter, bladder, and prostate; pathophysiology and treatment of common fluid and electrolyte problems; renal pharmacology; major clinical urinary system syndromes, with current diagnostic approaches and therapy. Offered: Sp.

**HUBIO 563 P-Systems of Human Behavior II (3)** *N. Ward* Major psychiatric disorders are defined and described, and a systematic approach to differential diagnosis is presented. Conceptual development, pathogenesis, epidemiology, nomenclature, and the terminology used in psychiatry are discussed. Offered: Sp.

**HUBIO 564 P-Principles of Pharmacology II (3)** *Chaukin* Lectures and conferences on drugs that act on the central nervous system. Emphasis on physiological and biochemical mechanisms, with consideration of therapeutic and adverse effects. Offered: Sp.

**HUBIO 565 P-Reproduction (3.5)** *Steiner* Normal development of the human reproductive system. Sexual differentiation, puberty, endocrine control of testicular and ovarian function, gamete biology, fertilization, implantation, immunology and endocrinology of pregnancy, labor and delivery, pathology of the male and female reproductive organs, contraception, prolactin and lactation, aging and infertility. Offered: Sp.

**HUBIO 567 P-Skin System (2)** *Raugi* Gross and microscopic anatomy. Physiology, protection, temperature control, pigmentation, and photosensitivity. Pathology and genetics of skin abnormalities, including tumors. Introduction to clinical evaluation, including physical examination and illustrating examples of inflammatory, vascular, immunological (including drug hypersensitivity), and neoplastic diseases. Offered: A.

**HUBIO 568 P-Nutrition for Physicians (1)** *Chait, Lipkin* Principles and practice of clinical nutrition, including role of nutrients in normal growth and development, pathogenesis of chronic disease, and nutrition in the management of certain disease states. Offered: Sp.

**HUBIO 598 P-WWAMI Non-Clinical Selectives (\*)** Courses offered at WWAMI university sites designed to satisfy the non-clinical selective graduation requirement for medical students. Offered: AWSp.

**HUBIO 599 P-Independent Study in Medical Science (6)** *Marshall* Independent research with faculty sponsor and completion of paper as partial fulfillment of non-clinical selective graduation requirement. Offered: Sp.

## Immunology

H564 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/immunology.html](http://www.washington.edu/students/genecat/academic/immunology.html)



Department Web page:  
[www.immunol.washington.edu](http://www.immunol.washington.edu)

For those contemplating careers in biomedical research, immunology provides challenging and exciting intellectual opportunities. Progress in the discipline in the past decade has been extraordinary, a fact that is nowhere more visible than at the University of Washington. The Department of Immunology, launched in 1989, now boasts more than 200 scientists, students, and technicians, all engaged in elucidating mechanisms underlying immune recognition and responsiveness. Current members of the department have distinguished records in the area of lymphocyte signaling, T and B cell development, macrophage function, antigen processing, immuno-tolerance, and the structure of antigen receptors.

Consider for a moment the fundamental processes that underlie immune function. First, millions of potentially injurious macromolecules must somehow be recognized. Second, recognition of these macromolecules, generally structures associated with potential pathogens, must trigger powerful effector mechanisms that permit elimination of the offending microorganisms. Finally, these recognition and effector systems must somehow distinguish the universe of potentially harmful molecules from an equally diverse repertoire of structurally similar 'self' components. How is such exquisitely specific molecular recognition achieved? How do the cells responsible for mediating host defense develop, and what signaling systems direct their responses? These questions can now be productively addressed using biochemical, genetic, and cell biological techniques.

Graduate Program Coordinator  
H564 Health Sciences, Box 357650  
(206) 685-3955, fax (206) 543-1013  
[immuno@nucleus.immunol.washington.edu](mailto:immuno@nucleus.immunol.washington.edu)

The Department of Immunology continues to grow and includes more than 25,000 square feet of laboratory space housed on three floors of the H and I wings of the Health Sciences Center. Joint faculty members (those holding primary appointments in other departments) have laboratory facilities in adjacent buildings. Individual laboratories are well equipped for modern biomedical research, and there are central departmental facilities for fluorescence-activated cell sorting, confocal microscopy, and the production of transgenic animals. Students have access to all the instruments and to state-of-the-art microcomputer-based data manipulation. The departmental library maintains recent copies of all major immunology journals and many more are available online or in the nearby University of Washington Health Sciences Library, which is one of the premier scientific libraries in the United States, providing access to scientific literature in all relevant disciplines.

Students are admitted for autumn quarter; the application deadline is January 15 for U.S. citizens, and November 1 for international applicants. The requirements for admission are flexible; however, most successful applicants will have completed survey courses in biology, chemistry, and physics, one year of organic chemistry, and mathematics through integral calculus. Prior exposure to immunology through formal course work or laboratory research is desirable. All immunology graduate students are assured of financial support for the term of their studies.

## Faculty

### Chair

Christopher B. Wilson

### Professors

Aderem, Alan A. \* 1996; PhD, 1979, University of Capetown (South Africa); macrophage development and differentiation, phagocytosis, signal transduction and the cytoskeleton.

Bevan, Michael J. \* 1990; PhD, 1972, National Institute for Medical Research (UK); T lymphocyte development and specificity, response to pathogens.

Clark, Edward A. \* 1984, (Adjunct); PhD, 1977, University of California (Los Angeles); lymphocyte surface molecules, lymphocyte activation and cell communication.

Greenberg, Philip D. \* 1978; MD, 1971, St University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.

Hood, Leroy E. \* 1992, (Affiliate); PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

Lernmark, Ake \* 1988, (Adjunct); MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity, with emphasis on insulin-dependent diabetes.

Nepom, Gerald T. \* 1982, (Affiliate); PhD, 1977, MD, 1978, University of Washington; immunogenetics of human MHC, molecular and cellular immunology, immunoregulation, autoimmunity.

Van Den Engh, Ger \* 1992, (Adjunct); PhD, 1976, University of Leiden (Netherlands); flow cytometry, quantitative cytogenetics, instrument design and development.

Wilson, Christopher B. \* 1980; MD, 1972, University of California (Los Angeles); T cell development, innate immunity, host defenses to infection.

### Associate Professors

Concannon, Patrick J. \* 1989, (Affiliate); PhD, 1984, University of California (Los Angeles); juvenile and adult onset diabetes, genetics of radiation sensitivity/cancer susceptibility syndromes.

Farr, Andrew G. \* 1982, (Adjunct); PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.

Fink, Pamela J. \* 1990; PhD, 1981, Massachusetts Institute of Technology; T cell differentiation and self tolerance, FAS ligand-mediated costimulation in T cells.

Goverman, Joan M. \* 1992, (Adjunct); PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.

Hockenbery, David M. \* 1994, (Adjunct); MD, 1982, Washington University; gastroenterology.

Milner, Eric C. B. \* 1987, (Affiliate); PhD, 1980, University of Montana; molecular biology of the B cell repertoire in normal, immunocompromised, and autoimmune subjects.

Rudensky, Alexander Y. \* 1992; PhD, 1986, Gabrichevsky Institute For Epidemiology and Microbiology; antigen processing and presentation, T-cell development.

Ziegler, Steven F. \* 1988, (Affiliate); PhD, 1984, University of California (Los Angeles); genetic analysis of immune function, human autoimmune disease.

### Assistant Professors

Beeson, Craig C. \* 1996, (Adjunct); PhD, 1993, University of California (Irvine); chemistry and biochemistry of the immune system.

Bix, Mark \* 1999; PhD, 1993, Massachusetts Institute of Technology; cellular differentiation: roll of epigenetic mechanisms in regulating cytokine gene expression.

Foote, Jefferson \* 1994, (Affiliate); PhD, 1985, University of California (Berkeley); biophysics of immune maturation, antibody engineering and immunotherapy, x-ray crystallography.

Nelson, Bradley H. \* 1997, (Affiliate); .PhD, 1991, University of California (Berkeley); cytokine receptor signaling, T cell cycle regulation, immune response to cancer.

Strong, Roland K. \* 1994, (Affiliate); PhD, 1990, Harvard University; structural molecular biology and crystallography of proteins mediating mucosal immune responses.

Willerford, Dennis M. 1996, (Adjunct); MD, 1995, Washington University; hematology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

### IMMUN 441 Introduction to Immunology (4) NW

General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: BIOL 202; recommended: GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with MICROM 441; A.

### IMMUN 499 Undergraduate Research (\* max. 24)

Investigative work on a variety of topics, including mechanisms of antigen recognition, T-cell development and differentiation, immunogenetics, lymphocyte activation, MHC gene structure and function, retrovirology, and the pathogenesis of autoimmune diseases, among others. Prerequisite: permission of instructor. Offered: AWSpS.

### IMMUN 532 Advanced Immunology (4)

Examines the molecular and cellular basis of immune function. Students must have completed a baccalaureate degree in a biological specialty and be conversant with molecular genetics. Topics include: hematopoiesis, antigen receptor structure, lymphocyte development, antigen presentation, and cytokines. Offered: W.

### IMMUN 534 Central Issues in Immunology (2, max. 4)

Presentations by participants of topics relating to the broad study of immunology. Prerequisite: graduate standing in Immunology. Offered: Sp. Current Research Conferences Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter.

### IMMUN 550 Selected Topics in Immunology (1, max. 30)

Formal seminar-discussion course for advanced students focused on recent developments in the field and consisting of literature research and intensive in-depth study of important and timely topics. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**IMMUN 551 Regulation of T Cell-Dependent B Cell Maturation (1, max. 30)** *Clark* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 552 Immunogenetics and Autoimmunity (1, max. 30)** *Concannon* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 554 Immunogenetic Aspects of Human Autoimmunity (1, max. 30)** *Nepom* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 555 Model of Autoimmune Disease and Their Regulation (1, max. 30)** *Goverman* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 557 Thymic Environment (1, max. 30)** *Farr* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 558 Molecular Biology of the Human Antibody Repertoire (1, max. 30)** *Milner* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 559 Cytokine Gene Regulation (1, max. 30)** *Bix* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 560 Progress in T Cell Research (1, max. 30)** *Bevan, Fink, Rudensky* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 561 Mechanisms of Peripheral Tolerance (1, max. 30)** *Fink* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 562 Developmental Regulation of T Cell Function (1, max. 30)** *Wilson* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 563 Macrophage Biology: Signaling and Phagocytosis (1, max. 30)** *Aderem* Credit/no credit only. Prerequisite: graduate standing in Immunology.

**IMMUN 564 Cellular/Molecular Regulation of T Cell Responses (1, max. 30)** *Greenberg* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 567 Antigen Processing and Presentation (1, max. 30)** *Rudensky* Credit/no credit. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

**IMMUN 568 Antibody Structure and Function (1, max. 30)** *Foote* Credit/no credit only. Prerequisite: graduate standing in Immunology.

**IMMUN 569 Genetics of Diabetes (1, max. 30)** *Lennmark* Credit/no credit only. Prerequisite: graduate standing in Immunology.

**IMMUN 570 Cytokine Signaling in Lymphocytes (1, max. 30)** *Nelson* Credit/no credit only. Prerequisite: graduate standing in Immunology.

**IMMUN 573 Immunology Seminar Series (1, max. 30)** Weekly discussion in which original research results are presented and discussed. Emphasis is on new and original contributions to field of immunology and related areas; occasional seminars are concerned with review of important topics. Credit/no credit only. Prerequisite: firm background in immunology, permission of instructor. Offered: AWSp.

**IMMUN 599 Introduction to Immunology Research (1-6, max. 6)** Current problems in immunological research. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**IMMUN 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**IMMUN 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSpS.

**IMMUN 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.

## Laboratory Medicine

NW120 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Laboratory\\_Med.html](http://www.washington.edu/students/genecat/academic/Laboratory_Med.html)



Department Web page:  
[www.labmed.washington.edu](http://www.labmed.washington.edu)



Medical Technology Program Web page:  
[depts.washington.edu/medtech/](http://depts.washington.edu/medtech/)

The Department of Laboratory Medicine provides service, education, and research. The divisions of the department include clinical chemistry, hematology, microbiology, coagulation, immunology, genetics, molecular diagnostics, virology, and medical informatics. In addition to courses for medical students, the department offers a Master of Science degree program. The department provides residency training in clinical pathology for graduate physicians and postdoctoral training in several subspecialty areas of laboratory medicine.

## Graduate Program

Graduate Program Director  
NW120 University of Washington Medical Center, Box 357110  
(206) 598-6131  
[Imedgrad@u.washington.edu](mailto:Imedgrad@u.washington.edu)

The Department of Laboratory Medicine offers a graduate program leading to the Master of Science degree. Each student in the program selects one of the major areas of concentration (chemistry, coagulation, hematology, immunology, microbiology, or virology). The chemistry option is approved by the Commission on Accreditation in Clinical Chemistry. The other options have no comparable accrediting agencies.

A thesis based upon independent research in the student's selected area of concentration is required. Course requirements vary with the option selected. However, the program is flexible and permits each student (with the help of an adviser) to plan a course of study that meets individual needs. A full-time student normally completes the program in two years. The program prepares qualified candidates for supervisory positions in clinical laboratories and for careers in investigation or teaching in an area of clinical laboratory science.

## Admission Requirements

Applicants must have a B.S. or B.A. degree in a field appropriate to the graduate study (medical technology, biochemistry, biology, chemistry, or microbiology) and meet the Graduate School requirements for admission. The applicant must also be certified as a medical technologist/clinical-laboratory scientist, or as a specialist in a particular area of laboratory medicine by one of the national certifying agencies. In addition, applicants must take the Graduate Record Examination aptitude test.

## Major Requirements

Students must meet the minimum requirements for a master's degree as stated in the Graduate School section of this catalog. In addition, a core of courses is required for all students in the program as well as additional specific course requirements for the various major areas of concentration.

## Financial Aid

Research assistantships may be available for second-year students. Opportunities for part-time employment in departmental laboratories may be available, and applications will be considered.

## Research Facilities

Each division in the department is equipped with modern facilities for research in its specialty area.

## Residency Training Program

The department provides residency training in clinical pathology (laboratory medicine) for graduate physicians in cooperation with the Department of Pathology. Persons who complete the program are eligible for certification by the American Board of Pathology. For additional information, contact the Resident Program Director, Department of Laboratory Medicine, Box 357110.

## Faculty

### Chair

James Fine

### Professors

Ashley, Rhoda L. \* 1981; PhD, 1977, University of California (Davis); pathogenesis of viral infections, immune response to herpes, rapid diagnosis.

Benjamin, Denis R. \* 1982; MBChB, 1968, University of Witwatersrand (S Africa); pediatric pathology, hematopathology, nutrition, circadian rhythms.

Chatrian, Gian E. 1981, (Emeritus); MD, 1951, University of Naples (Italy); electroencephalography and clinical neurophysiology.

Corey, Lawrence \* 1977; MD, 1971, University of Michigan; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus.

Coyle, Marie B. \* 1973; PhD, 1965, Kansas State University; DNA probes and GLC for rapid identification of mycobacteria and corynebacteria.

Detter, James C. \* 1970, (Emeritus); MD, 1962, University of Kansas; laboratory diagnosis of genetic disorders, red-cell disorders and laboratory instrumentation.

Gilliland, Bruce C. \* 1970; MD, 1960, Northwestern University; rheumatology/immunology.

Kaplan, Alex 1960, (Emeritus); PhD, 1936, University of California (Berkeley); clinical chemistry.

Kenny, Margaret \* 1970, (Emeritus); PhD, 1968, University of Illinois; clinical chemistry, new technologies for in vivo clinical biochemical analysis.

Labbe, Robert F. \* 1957, (Emeritus); PhD, 1951, Oregon State University; porphyrin disorders, nutritional biochemistry.

Mullins, James I. \* 1994, (Adjunct); PhD, 1978, University of Minnesota; cell biology and biochemistry.

Plorde, James J. \* 1982, (Emeritus); MD, 1959, University of Minnesota; infectious diseases, antibiotic-resistant nosocomial infections.

Raisys, Vidmantas A. \* 1971; PhD, 1969, State University of New York (Buffalo); clinical toxicology, therapeutic drug monitoring.

Schmer, Gottfried \* 1970, (Emeritus); MD, 1956, University of Vienna (Austria); tropical medicine and public health, clinical parasitology, preventive medicine.

Strandjord, Paul E. \* 1969, (Emeritus); MD, 1959, Stanford University; clinical chemistry, leadership and management.

**Associate Professors**

Battaglia, David 1980, (Adjunct); MS, 1978, PhD, 1985, University of Washington; gamete biology.

Bauer, Larry \* 1980, (Adjunct); PharmD, 1980, University of Kentucky; clinical pharmacokinetics and drug metabolism, drug interactions.

Chandler, Wayne L. \* 1982; MD, 1982, St Louis University; clinical chemistry, clinical coagulation, hematology.

Chou, David 1998; MD, 1974, University of Pittsburgh; MS, 1979, University of Minnesota; medical informatics, instrument automation, clinical chemistry.

Clayson, Kathleen J. \* 1969, (Emeritus); MS, 1968, University of Minnesota; enzymology in clinical chemistry.

Coombs, Robert W. \* 1985; PhD, 1977, MD, 1981, Dalhousie University (Canada); diagnosis and pathogenesis of HIV infection.

Delaney, Collene J. \* 1982; PhD, 1972, University of Illinois; clinical chemistry, the study of diabetes and alcoholism.

Fine, James \* 1977; MD, 1972, MS, 1977, University of Minnesota; enzymology, medical informatics.

Fligner, Corinne L. 1983, (Adjunct); MD, 1976, University of New Mexico; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology.

Frenkel, Lisa M. 1994; MD, 1987, University of Kansas; infectious diseases.

Fritsche, Thomas R. \* 1981; MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites; medical microbiology.

Gretch, David R. \* 1990; PhD, 1990, MD, 1990, University of Iowa; research and diagnostics related to viral hepatitis.

Hackman, Robert C. 1982; MD, 1971, Stanford University; infectious and pulmonary complications in immunocompromised patients.

Lampe, Mary F. \* 1988; MS, 1976, University of Washington; PhD, 1984, University of North Carolina; medical technology education, molecular analysis of *Chlamydia trachomatis* pathogenesis.

McElrath, Margaret Juliana 1990, (Adjunct); PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.

Opheim, Kent E. \* 1977; PhD, 1972, Cornell University; molecular cytogenetics, pediatric clinical chemistry, drug assay development.

Raghu, Ganesh 1981, (Adjunct); MD, 1974, University of Mysore (India); respiratory disease.

Rutledge, Joe C. \* 1989; MD, 1976, Vanderbilt University; genetic disease pathology, human embryology, mouse mutagenesis, pediatric chemistry/hematology.

Schiller, Harvey S. \* 1982; MD, 1966, Washington University; clinical chemistry, hematology, interpretation of laboratory data.

Stephens, Karen G. \* 1989, (Research); PhD, 1982, Indiana University; molecular genetics of human inherited disease; gene mapping, regulation, and imprinting.

Tait, Jonathan F. \* 1983; MD, 1983, PhD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.

Wener, Mark H. \* 1980; MD, 1974, Washington University; diagnostic immunology, immune complex diseases.

Zeh, Judith \* 1961, (Adjunct Research); PhD, 1979, University of Washington; estimation of whale population size and dynamics, statistics in infectious disease research.

**Assistant Professors**

Astion, Michael L. \* 1991; PhD, 1989, MD, 1989, University of Pennsylvania; neural networks, multimedia computer-aided tutorials, immunology.

Behrens, Joyce A. 1971; MS, 1971, University of Minnesota; clinical hematology and clinical coagulation methodologies.

Cookson, Brad T. \* 1991; MD, 1991, PhD, 1991, Washington University; cellular immune response to intracellular bacteria, microbial pathogenesis, clinical microbiology.

Koelle, David 1988, (Adjunct); MD, 1985, University of Washington; allergy and infectious diseases.

Le Crone, Carol N. \* 1967, (Emeritus); MS, 1966, Colorado State University; hematology, hemoglobinopathies.

McGonagle, Lee Anne 1969, (Emeritus); MPH, 1969, University of Michigan; clinical microbiology, procedures for diagnostic bacteriology.

Sabath, Daniel E. \* 1989; PhD, 1989, MD, 1989, University of Pennsylvania; regulation of gene expression in hematopoietic cells.

Szabo, La Verne 1970, (Emeritus); MS, 1970, University of Washington; general clinical chemistry, heavy metals in clinical chemistry.

Wald, Anna \* 1989, (Adjunct); MD, 1985, Mt Sinai School of Medicine; MPH, 1994, University of Washington; epidemiology, natural history, and therapeutics of HSV and other herpes viruses infections.

Wood, Brent L. 1990; PhD, 1988, MD, 1990, Loma Linda University; clinical laboratory hematology.

**Lecturer**

Goodyear, Nancy 1997; PhD, The Catholic University of America; clinical microbiology and education.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**LAB M 418 Topics in Clinical Chemistry (5) Raisys**

Lecture and laboratory exercises covering fundamentals of instrumentation, methodology, and quality control in the clinical chemistry laboratory. Offered: Sp.

**LAB M 419 Clinical Coagulation (4) Behrens**

Lecture and laboratory coverage of the theory of the hemostatic system, to include tests used in the diagnosis/monitoring of patients with abnormal bleeding and/or thrombosis. Instrumentation as appropriate for testing included. Quality control and quality assurance discussed. Offered: S.

**LAB M 420 Clinical Microscopy (3) Raisys**

Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Analysis of other body fluids. Methods of microscopic examination by use of bright-field, phase, and polarizing microscopy. Offered: S.

**LAB M 421 Medical Microbiology (1/6, max. 6)**

Goodyear, Lampe Lecture and laboratory coverage of human infections and diagnostic procedures used for isolation, identification, and antimicrobial susceptibility testing of the microorganisms associated with disease. Offered: S.

**LAB M 423- Clinical Chemistry (\*-, max. 24) Raisys**

Clinical testing related to protein and amino acid determinations, pancreatic function and intestinal absorption, renal and liver function, enzymes, electrolytes, and acid-base balance, lipids, toxicology, and endocrinology. Offered: AWSp.

**LAB M 424- Clinical Microbiology (\*-, max. 24)**

Goodyear, Lampe Techniques used in the diagnostic microbiology laboratory, including quality control, specimen evaluation, identification of pathogenic microorganisms, and antimicrobial susceptibility testing. Offered: AWSp.

**LAB M 425- Clinical Hematology (\*-, max. 24)**

Behrens Clinical study of techniques used in the diagnostic evaluation of blood cells, including production, proliferation, survival, morphologic, and functional features. Assessment of proteins and cells important in hemostasis included. Quality control and quality assurance issues considered. Biomolecular techniques appropriate for evaluation of the hematologic and hemostatic systems discussed. Offered: AWSp.

**LAB M 426 Clinical Immunohematology (7)**

Behrens Lecture and laboratory covering theory of transfusion medicine and serological procedures used in the evaluation of cellular antigen systems. Principles of immunology and genetics included as appropriate for the techniques performed; screening of donor units to provide a safe product discussed. Quality control and quality assurance issues considered. Offered: W.

**LAB M 427- Selected Studies in Laboratory Medicine (\*-, max. 24) Behrens, Goodyear, Lampe, Raisys**

Selected clinical study in the major scientific disciplines of laboratory medicine, to include molecular diagnostics, or pursuance of a clinical research study. Credit/no credit only. Offered: AWSpS.

**LAB M 499 Undergraduate Research (\*)**

Specific project in clinical laboratory investigation. Offered: AWSpS.

**LAB M 502 Laboratory Medicine Grand Rounds (1, max. 6) Coyle**

Grand rounds are concerned with current topics in the field of laboratory medicine. Credit/no credit only. Offered: AWSp.

**LAB M 510 Laboratory Medicine Research Conference (1, max. 6) Tait**

Presentation and discussion of ongoing research and development projects by faculty, residents, fellows, and graduate students. Open to graduate students in laboratory medicine and other medical sciences. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**LAB M 520 Seminar in Organization and Management in Laboratory Medicine (3) Chandler**

Core course for the Master of Science degree in laboratory medicine. Prerequisite: graduate student standing in laboratory medicine or permission of instructor. Offered: odd years; Sp.

**LAB M 521 Advanced Laboratory Hematology (1, max. 6) Sabath**

Lectures on diagnostic clinical hematology with emphasis on clinicopathologic correlation. For laboratory medicine graduate students with special interest in diagnostic clinical hematology. Credit/no credit only. Prerequisite: graduate standing and permission of instructor. Offered: AWSp.

**LAB M 522 Hematopathology Seminar (2) Sabath, Wood**

Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with PATH 522; even years; W.

**LAB M 590 P-Research Projects in Laboratory Medicine (\*)** *Tait* Opportunity for laboratory experience on a research problem related to laboratory medicine. Students investigate areas of potential clinical importance. Projects selected from areas such as chemistry, coagulation, hematology, immunology, microbiology, virology, molecular diagnostics, and computer applications. Research goals established by instructor in discussion with student. Prerequisite: permission of instructor. Offered: AWWSpS.

**LAB M 596 Clinical Chemistry Seminar (2)** *Raisys* Conferences on research and development in clinical chemistry. For postdoctoral students in clinical chemistry and graduate students. Prerequisite: permission of instructor. Offered: AWWSpS.

**LAB M 601 Internship (3-9, max. 9)** Credit/no credit only. Prerequisite: graduate standing in laboratory medicine. Offered: AWWSpS.

**LAB M 680 P-Clinical Laboratory Testing: Methods and Interpretation (\*)** *Wener* Provides the third- and fourth-year medical student with the opportunity to evaluate clinical laboratory data in the clinical laboratory setting. One-on-one teaching using case material and actual clinical samples. Offered: AWWSpS.

**LAB M 685 P-Laboratory Case Studies for Clinical Diagnosis (4)** *Rutledge* Clinical case presentations and discussions aimed at test selection, disease-induced alterations, efficient algorithms, factors confounding interpretation, testing economics. Prerequisite: completion of required clerkships. (Four weeks half-time) Offered: A.

**LAB M 699 P-WWAMI Laboratory Medicine Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

**LAB M 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWWSpS.

## Medical Education

E312 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Medical\\_Ed.html](http://www.washington.edu/students/genocat/academic/Medical_Ed.html)



Department Web Page:  
[depts.washington.edu/uwmeded](http://depts.washington.edu/uwmeded)

The Department of Medical Education is comprised of three divisions: General Medical Education, Biomedical and Health Informatics, and MEDEX Northwest. The Division of General Medical Education serves the medical school and medical education community through program support, evaluation, and research in the field of medical education. The Division of Biomedical and Health Informatics contributes to the conceptualization and development of innovative clinical, academic, and educational information systems, services, and tools for application within the Academic Medical Center, the University, regionally, and nationally. For more information, visit the Biomedical and Informatics Web site ([depts.washington.edu/uwmeded/dbi/dbi.html](http://depts.washington.edu/uwmeded/dbi/dbi.html)). The MEDEX Northwest Division is a regional program that selects experienced health care providers for training as physician assistants and is dedicated to improving access to medical care and emphasizes delivery of health care services to medically underserved populations in the Northwest. For more information, visit the MEDEX Web site ([www.washington.edu/medical/som/depts/medex/](http://www.washington.edu/medical/som/depts/medex/)).

The Department of Medical Education offers courses in the theory and application of medical education and biomedical informatics. Courses are designed for faculty, graduate and undergraduate students, post-graduates and fellows in the health sciences who desire further training in the methods, issues, research, and technology of medical education and biomedical informatics. MEDEX Northwest, a physician assistant training program, offers a program of study leading to a certificate with an optional degree available (a Bachelor of Clinical Health Services).

For the most up-to-date program information, see the Department of Medical Education's Web site ([depts.washington.edu/uwmeded/](http://depts.washington.edu/uwmeded/)) or contact the department, E312 Health Sciences, Box 357240, (206) 543-2259.

## Faculty

### Chair

Fredric M. Wolf

### Professors

Carline, Jan 1977; MEd, 1976, PhD, 1979, University of Washington; clinical evaluation, program evaluation.

Dohner, Charles W. \* 1967; PhD, 1966, Ohio State University; program evaluation, administration, faculty development.

Rosse, Cornelius \* 1967, (Adjunct); MD, 1964, DSc, 1983, University of Bristol (UK); knowledge representation in anatomy.

Scott, Craig S. 1979; MEd, 1970, California State University, Sacramento; PhD, 1973, University of Iowa; performance based teaching and assessment.

Stewart, Brent K. \* 1993, (Adjunct); PhD, 1988, University of California (Los Angeles); medical physics, informatics.

Wolf, Fredric M. \* 1997; MEd, 1977, PhD, 1980, Kent State University; clinical decision making/judgment, evaluation/dissemination of new technology.

### Associate Professors

Brinkley, James F. III \* 1988, (Research Adjunct); MD, 1974, University of Washington; PhD, 1984, Stanford University; computer applications in medicine and biology.

Chou, David 1998, (Adjunct); MD, 1974, University of Pittsburgh; MS, 1979, University of Minnesota; medical informatics, instrument automation, clinical chemistry.

Fine, James \* 1977, (Adjunct); MD, 1972, MS, 1977, University of Minnesota; enzymology, medical informatics.

Fuller, Sherrilynne S. \* 1988; PhD, 1984, University of Southern California; library and information management, biomedical and health informatics.

Goldberg, Harold I. 1986, (Adjunct); MD, 1977, Stanford University; internal medicine.

Kalet, Ira J. \* 1980; PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Norris, Thomas E. 1988, (Adjunct); MD, 1973, University of Texas (Galveston); rural health policy, primary care policy, geriatrics.

Robins, Lynne S. 1999; PhD, 1990, University of Michigan; cultural competence, physician-patient communication, qualitative research assessment, ethnography.

Smith, Curtis Scott 1987, (Adjunct); MD, 1980, University of Washington; general internal medicine.

### Assistant Professors

Astion, Michael L. \* 1991, (Adjunct); PhD, 1989, MD, 1989, University of Pennsylvania; neural networks, multimedia computer-aided tutorials, immunology.

Brock, Douglas M. 1985; PhD, 1997, MEd, 1995, University of Washington; assessment, measurement, information systems.

Dunbar, Peter J. 1991, (Adjunct); MBChB, 1978, University of Aberdeen (UK); pain management.

Langer, Steve G. 1996, (Adjunct); PhD, 1994, Oakland University; medical physics.

Tarczy-Hornoch, Peter 1992, (Adjunct); MD, 1989, Stanford University; neonatology and informatics.

Yarfitz, Stuart 1988; PhD, 1986, State University of New York (Buffalo); biomedical and health informatics.

### Instructor

Kim, Sara 1995, (Acting); MA, 1990, George Washington University; PhD, 1999, University of Washington; educational technology.

### Senior Lecturers

Ballweg, Ruth A. 1981; BS, 1969, Southern Oregon State College; women's health issues, physician assistant education.

Stoll, Henry 1978; BA, 1971, Brown University; physician assistant education and professional issues, curriculum development.

### Lecturers

Ambrozy, Donna M. 1995; MA, 1994, Eastern Michigan University; PhD, 1998, University of Washington; standardized patients, teaching methodology.

Blomstrand, Doreen K. 1990; PA-C, 1985, University of Washington; physician assistant education.

Flynn, Barbara G. 1994; BA, 1977, Seattle Pacific University; physician assistant education.

Fuentes, Rolando 1998; BHS, 1996, University of Washington; physician assistant education, underserved and minority population health care.

Gianola, Fred J. 1987; PA-C, 1973, University of Washington; physician assistant education.

Landel, Grace P. 1990; BA, 1978, University of California (Santa Cruz); MEd, 1999, University of Washington; physician assistant education.

MacLaren, Carol F. 1989; MS, 1980, PhD, 1985, University of Pennsylvania; educational research.

Mandel, Lynn S. 1983; PhD, 1983, University of Washington; assessment of psychomotor skills, program evaluation, study and instrument design.

Masuda, David 1997; MD, 1980, University of North Dakota; MS, 1996, University of Wisconsin; biomedical and health informatics.

Plummer, William T. 1992; BS, 1974, University of Nebraska; physician assistant education.

Schaad, Douglas C. 1975; MEd, 1974, PhD, 1986, University of Washington; educational outcomes, biomedical informatics, workforce analysis, viticulture.

Scott, Terry B. 1983; BS, 1993, PA-C, 1993, University of Washington; physician assistant education, underserved and minority population health care.

Wyse, Marilyn A. 1985; MA, 1974, PA-C, 1992, University of Washington; physician assistant education.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**MEDED 499 Undergraduate Research (\* max. 12)** Investigative research or directed readings in medical education and in biomedical and health informatics. Prerequisite: permission of instructor.

**MEDED 510 Topics in Medical Education Research (1/3, max. 12)** Selected research topics in medical education. Development of skills in critical analysis and production of original research. Optional: 1 additional credit for seminar focusing on application of issues in education practice. Credit/no credit only. Offered: AWSp.

**MEDED 511 Current Issues in Medical Education (2)** *Dohner, Robins, Scott, Wolf* Addresses current issues in medical education in the context of historic and contemporary developments. Topics include curriculum development, teaching, and learning, clinical knowledge and reasoning, assessment, professional development, program evaluation, and certification. Offered: A.

**MEDED 512 Leadership in Academic Medicine (1)** *Dohner, Robins, Scott, Wolf* Explores the theoretical and practical aspects of leadership in academic medicine. Topics include qualities of effective leadership, leadership styles, and impact of institutional organization and culture on leadership. Prerequisite: permission of instructor. Offered: S.

**MEDED 520 Teaching Methods in Medical Education (2)** *Ambrozy* Empirical and theoretical merits of different teaching methods as applied to medical education. Structuring and leading group discussions, using questions, organizing and delivering lectures, identifying styles of clinical supervision, providing constructive feedback, and presenting effective clinical demonstrations. Offered: W.

**MEDED 521 Evaluation of Learning in the Health Sciences (3)** *Carline* Basic issues and methods for evaluation of learning: cognitive performance, psychomotor skills, and reasoning abilities in classroom, laboratory, and clinical settings. Practical applications of instruments such as multiple-choice questions, essays, oral examinations, checklists, rating scales, simulations, and patient management problems. Recommended: 520. Offered: Sp.

**MEDED 522 Research in Medical Education (2)** *Scott* Individualized, problem-based overviews of research methods and research design pertinent to research and scholarship in medical education. Development and sequencing of research projects from conceptualization through literature review, including proposal development, project implementation, data management, analysis, and write-up. Assessment and critical reading of related literature stressed. Offered: A.

**MEDED 530 Medical Informatics (3)** *Masuda* Overview of biomedical and health informatics concepts, theories, and applications, including the historical evolution and the current and future research directions within the context of information flow in health care settings. Offered: A.

**MEDED 531 Computing Concepts for Medical Informatics (3)** *Kalet* Introduction to computing concepts underlying the solution of problems in medical information management, medical problem solving and medical informatics research. Algo-

gorithms, data structures, programming languages, network concepts, database modeling. Prerequisite: some prior experience with computer programming and application computers in medical care. Offered: A.

**MEDED 534 Biology for Informaticists (4)** *Yarfitz* A computing and information oriented treatment of the core concepts of human biology, addressing structure and function at three levels or organization: organism, cell, and gene. Each level includes examples of key anatomic and physiologic concepts, presented from a computational perspective and with the use of electronic resources. Offered: A.

**MEDED 536 Bioinformatics and Gene Sequence Analysis (3)** *Rose* Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Credit/no credit only. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with PABIO 536; Sp.

**MEDED 540 Critically Appraising and Applying Evidence in Health Care (2)** *Pinksky, Wolf* Literature appraisal skills for various articles (therapy effectiveness, diagnostic tests, literature reviews, clinical measurement, prognosis, quality of care, decision analysis, causation/etiology, guidelines, and economic evaluation). Appraisal of clinical information from literature, strengths/weaknesses of data, analyses, study design/applicability to a current patient's problem. Prerequisite: permission of instructor. Offered: jointly with HSERV 528W.

**MEDED 541 Introduction to Systematic Reviews and Meta-analysis of Evidence (2)** *Wolf* Conceptual understanding of the quantitative methods used to synthesize evidence. Methods for pooling evidence across independent studies, pooling binary/continuous outcomes, differences between fixed and random effects models, and guidelines for appraising published systematic reviews/meta-analyses. Prerequisite: introductory level courses in statistics, epidemiology or biostatistics. Prerequisite: permission of instructor. Offered: jointly with HSERV 529 Sp.

**MEDED 590 Selected Topics in Health Informatics (1-3, max. 12)** Computers and information technology are improving and changing healthcare education, research, and clinical practice. Informatics faculty and researchers from the UW and affiliated institutions present their research findings as well as discuss their views of national developments in their respective disciplines. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with HSMGMT 526 AWSp.

**MEDED 599 Independent Study or Research (\* max. 12)**

### MEDEX Northwest

**MEDEX 451 Anatomy and Physiology for the MEDEX Practitioner (6)** *Blomstrand* Anatomy and physiology of the following organ systems: HEENT, respiratory, cardiovascular, gastrointestinal, reproductive, renal, musculoskeletal, and neurologic. Required for entering students to the MEDEX program who have not satisfied program prerequisites in anatomy and physiology. Offered: S.

**MEDEX 452 Basic Clinical Pathology for the MEDEX Practitioner (6)** *Stoll* Basic pathological and pathophysiological concepts of diseases commonly encountered in primary-care practice. Pathophysiology studied per organ system. Offered: A.

**MEDEX 453 Basic Clinical Skills for the MEDEX Practitioner (6)** *Quinsey* Provides the student with mastery of a screening history and physical examination and thoroughness in data-collection skills. Branching examinations of major organ systems and

medical record-keeping and verbal presentation skills by the problem-oriented method are taught. Offered: A.

**MEDEX 454 Adult Medicine I (7)** *Fuentes, Scott* Problem-oriented approach to the diagnosis and management of common primary care conditions. Introduction to relevant laboratory and radiological procedures. Organ system approach covers HEENT, respiratory, cardiovascular, gastrointestinal, and dermatologic systems. Offered: W.

**MEDEX 455 Adult Medicine II (7)** *Fuentes, Scott* Continuation of 454. Introduction to relevant laboratory and radiological procedures. Organ system approach covers endocrine, renal, reproductive, hematologic, musculoskeletal, and neurological systems. Offered: Sp.

**MEDEX 456 Maternal and Child Health for the MEDEX Practitioner I (3)** *Quinsey* Designed to acquaint students with principles of prenatal care and primary-care pediatrics. Prenatal care, labor and delivery, newborn exam, developmental screening, growth and development. Offered: W.

**MEDEX 457 Behavioral Science Skills for the MEDEX Practitioner I (3)** *Lurie* Process skills and interpersonal skills needed for primary-care practice, assessment skills needed for the diagnosis of emotional problems, and management skills used in primary-care practice to deal with these problems. Offered: A.

**MEDEX 458 Behavioral Science Skills for the MEDEX Practitioner II (3)** *Lurie* In-depth coverage of common emotional problems seen in primary care. Topics include crisis intervention, child abuse, death and dying, life planning, behavioral modification, and family therapy techniques. Offered: W.

**MEDEX 459 Behavioral Science Skills for MEDEX Practitioner III (3)** *Lurie* In-depth approaches to assessment and management of specific primary-care problems, including posttraumatic stress disorders, SIDS, AIDS, violent patient, relevance of male/female issues to primary care, and emotional and sexual needs of disabled persons. Advanced interviewing skills with videotaped feedback included. Offered: Sp.

**MEDEX 460 Principles of Patient Management for the MEDEX Practitioner I (3)** *Stoll* Systematic approach to patient management applicable to a primary-care setting. Majority of course is devoted to drug therapy and its administration. The other half includes health maintenance, risk factor identification, and nonpharmacological models of therapy. Offered: W.

**MEDEX 461 Principles of Patient Management for the MEDEX Practitioner II (3)** *Stoll* Continuation of 460. Offered: Sp.

**MEDEX 462 Maternal and Child Health for the MEDEX Practitioner II (3)** *Quinsey* Continuation of 456. Emphasis on pediatric history taking and physical exam, and diagnosis and treatment of common pediatric problems. Offered: Sp.

**MEDEX 463 Clinical Clerkships for the MEDEX Practitioner I (19)** *Gianola, Gunter-Flynn* Full-time clinical clerkship spent in institution-based or specialty practice settings, such as occupational health, surgery, emergency medicine, psychiatry, or geriatrics. Offered: AWSpS.

**MEDEX 465 Clinical Clerkships for the MEDEX Practitioner II (19)** *Gianola, Gunter-Flynn* Continuation of clinical clerkships spent in institution-based or specialty practice settings, with emphasis on inpatient medicine. Offered: AWSpS.

**MEDEX 466 Family Practice Clerkship for the MEDEX Practitioner I (19)** *Ballweg* Family practice under the supervision of physicians throughout the Pacific Northwest. Common primary-care problems. Students and preceptors are educated in the utilization and management of the physician assistant in practice. Students keep computerized records of patient encounters and complete a variety of written assignments. Credit/no credit only. Offered: AWSpS.

**MEDEX 467 Family Practice Clerkship for the MEDEX Practitioner II (19)** *Ballweg* Further experience in primary-care practice with emphasis on independent patient management by the student supervised by family practitioners. Credit/no credit only. Offered: AWSpS.

**MEDEX 468 Emergency Medicine I for the MEDEX Practitioner (3)** *Wyse* Approach to the diagnosis and management of common emergency conditions for primary care physician assistants. Topics include multiple trauma, chest trauma, abdominal trauma, shock, and cardiac emergencies. Offered: W.

**MEDEX 469 Emergency Medicine II for the MEDEX Practitioner (3)** *Wyse* Approach to diagnosis and management of common emergency conditions for primary care physician assistant. Topics include poisonings and overdoses, environmental emergencies, thermal injuries, orthopedic emergencies, pediatric emergencies, and head trauma. Offered: Sp.

**MEDEX 499 Special Field Projects/Independent Study (1-12, max. 12)** Clinical clerkships and independent study activities for students enrolled in the MEDEX Northwest Physician Assistant Program. Offered: AWSpS.

## Medical History and Ethics

A204 Health Sciences Building



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Med\\_History\\_Ethics.html](http://www.washington.edu/students/genocat/academic/Med_History_Ethics.html)



Department Web page:  
[depts.washington.edu/mhdedept/](http://depts.washington.edu/mhdedept/)

The Department of Medical History and Ethics offers a program of study leading to a Master of Arts in Bioethics designed for health-care professionals who desire to augment their professional education and practice with specialized training in ethical theory, practical methods for case analysis and decision making, and research methods.

Upon completion of the Master of Arts degree, health professionals who return to practice settings are prepared to assume leadership roles related to clinical ethics in their institutions. Combining a professional degree with formal ethics training enables health professionals to make unique contributions to ethics research and teaching. The degree is ideally suited for individuals choosing a dual career in health care and ethics, who lack the background or interest to pursue a Ph.D. in philosophy and bioethics.

## Graduate Program

Graduate Program Coordinator  
A204 Health Sciences, Box 357120  
(206) 543-5145  
[mheinfor@u.washington.edu](mailto:mheinfor@u.washington.edu)

## Special Requirements

Applicants for the Master of Arts program must meet requirements for admission to the Graduate School and present a professional degree and work experience in a health-care setting. Additional information

concerning acceptable preparation may be obtained by contacting the graduate program coordinator.

Requirements for the degree include three full-time quarters in residence; completion of a program of study including courses in history of medicine, ethical theory, medical jurisprudence, and ethical case analysis; a written comprehensive exam; and a master's degree project.

## Faculty

### Acting Chair

Jack W. Berryman

### Professors

Benson, Keith R. \* 1981; MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Berryman, Jack W. \* 1975; MS, 1971, MA, 1974, University of Massachusetts; PhD, 1976, University of Maryland; history of exercise, sports medicine, and health behavior/philosophy.

Jecker, Nancy A. S. \* 1982; MA, 1982, Stanford University; MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Jonsen, Albert R. \* 1987, (Emeritus); MA, 1956, Gonzaga University; PhD, 1967, Yale University; philosophical, historical values affecting practice and delivery of health care.

Pearlman, Robert A. \* 1981, (Adjunct); MD, 1975, Boston University; gerontology.

Whorton, James C. \* 1970; PhD, 1969, University of Wisconsin; history of medicine, public health, pharmacy and alternative healing.

### Associate Professors

Diekema, Douglas S. 1990, (Adjunct); MD, 1985, University of North Carolina; MPH, 1993, University of Washington; pediatric emergency medicine.

Kuszler, Patricia Carol \* 1994, (Adjunct); MD, 1978, Mayo Medical School/graduate School; JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Sullivan, Mark D. 1985, (Adjunct); PhD, 1982, MD, 1984, Vanderbilt University; depression and chronic medical illness, chronic pain, ethics, quality of life.

### Assistant Professors

Braddock, Clarence H. \* 1993, (Adjunct); MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.

Durfy, Sharon J. \* 1991; PhD, 1990, University of Toronto (Canada); ethical aspects of genetic testing, counseling, research, public policy.

Tonelli, Mark R. 1993, (Adjunct); MD, 1989, University of Colorado (Boulder); pulmonary and critical care medicine.

### Senior Lecturer

McCormick, Thomas R. \* 1974; BDiv, 1960, Drake University; DMin, 1976, Southern Methodist University; biomedical ethics, particularly relating to neonatology, and problems related to death and dying.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**MHE 401 History of Modern Medicine (3) I&S** *Whorton* Survey of evolution of medical theory, practice, and institutions in European and American society from the late 18th century present. Medical background not required. Recommended: prior courses in sciences and/or history.

**MHE 402 Ethical Theory (3) I&S** *Jecker* Review of principal theories for normative ethical discourse, such as utilitarianism and deontology, and major metaethical commentary on those theories. Illustrated by classical and modern authors. Recommended: one basic course in ethics.

**MHE 404 Metaethical Theory (5) I&S** *Jecker* Study of major ethical writings in the twentieth century, with principal emphasis on the Anglo-American tradition. Recommended: one introductory philosophy course.

**MHE 411 Introduction to Bioethics (3) I&S** Basic concepts, principles, and methods of analysis, with application to some major issues in the field of bioethics. Case studies utilized to illustrate nature of questions arising in bioethics and to provide students with opportunity to develop skills in ethical analysis.

**MHE 413 History of Alternative Healing (3) I&S** *Whorton* Analysis of historical development of alternative healing in American society over last two centuries. Emphasis on evolution of theory, practice, and professional institutions for major alternative systems and interactions of alternative modalities with conventional medicine. Medical background not required.

**MHE 417 Disease in History (3) I&S** *Whorton* Study of Western civilization's experience with epidemic disease, the growth of understanding of the causes of disease, the formation of a philosophy of prevention, and the development of programs to protect the public health. Emphasis on the last two centuries. Medical background not required.

**MHE 422 History of Evolution Theory (5) I&S** *Benson* Development of evolution theory from its early-nineteenth-century roots through the work of Charles Darwin. Impact of evolution theory on society and the formulation of the theory in the twentieth century.

**MHE 424 Modern Biology in Historical Perspective (5) I&S** *Benson* Two diverse traditions of biology, natural history, and physiology, in their nineteenth-century development and their subsequent merging after Darwin's evolution theory. Emergence of specialty areas in biology after the beginning of the twentieth century.

**MHE 440 Philosophy of Medicine (5) I&S** *Jecker* Familiarizes students with central issues in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history of science, or history of medicine. Offered: jointly with PHIL 459.

**MHE 474 Justice in Health Care (5) VLP/IA&S** *Jecker* Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative

health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with PHIL 411.

**MHE 481 The Pursuit of Health in American Society (3) I&S** *Berryman, Whorton* Examination of the development of concern for personal health over the past two centuries, and of the evolution of philosophies and practices of health promotion. Emphasis on the influence of both medicine and popular culture on shaping of attitudes towards diet, exercise, dress, sex, and other health behavior.

**MHE 483 The Rise and Development of Sports Medicine (3) I&S** *Berryman* Evolution of medical thought related to exercise for good health, training for sport participation, and treatment of sport-related injuries. Begins with ancient period, concludes with present. Development of specialization in sports medicine, sport team physicians, preventive medicine, concepts of fitness and wellness as related to exercise prescription, and sports medicine clinics.

**MHE 485 Concepts of the Body in Nineteenth- and Twentieth-Century America (3) I&S** *Berryman* Investigation of ideas relating to corporeal self in nineteenth- and twentieth-century America. Evolution of physical ideals of manliness/femininity, how ideals related to surrounding culture, how different bodily activities developed to realize ideals. Athleticism, physiognomy, beauty contests, body building, decorations, cosmetics, anthropometry, artificial parts.

**MHE 498 Undergraduate Thesis (\*)**

**MHE 499 Undergraduate Research (\* max. 5)** Investigative work in history of the biomedical sciences.

**MHE 501 Alternative Approaches to Healing (2)** *Whorton* Philosophies and practices of the major alternative approaches to healing. Historical characterization of alternative medicine accompanied by presentations by practitioners of chiropractic, naturopathic, homeopathic, and traditional Chinese medicine.

**MHE 511 P-Medical Ethics (2)** Ethics course designed especially for first- and second-year medical students. Study of ethical problems arising in clinical setting of medicine, introducing students to philosophical analysis and argument in practical contexts. Seminar-discussion format with readings from contemporary authors.

**MHE 512 P-The Human Face of Medicine (2)** *McCormick* Foundation of human values undergirding medical practice. Images of physician—motivations for medicine, empathy versus detachment in doctor-patient relationship, health for the health-professional—the art of coping, limits of power—when medicine fails to cure, uses/abuses of technology, physician's role in public health issues, the healing process.

**MHE 513 P-Ethical Responsibilities of Medical Practice (2)** Provides intensive and practical guidance about management of principal ethical and legal problems that arise in clinical practice: informed consent, confidentiality, decisions regarding life-support, advance directives and surrogate decision-makers, duty to care for indigent and risky patients. Offered: one-week intensive; S.

**MHE 514 Legal, Ethical, and Social Issues in Public Health Genetics (3)** *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with PHG 512/LAW E 562; Sp.

**MHE 516 Ethical Frameworks for Public Health Genetics (2)** *Mastroianni* Case-based application of ethical principles in genetic medicine to range of problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: MHE 514/PHG 512. Offered: jointly with PHG 522; W.

**MHE 517 Preclinical Hospice Volunteer Training Elective (3)** *Farber, McCormick* Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with FAMED 546. Offered: WSp.

**MHE 518 Spirituality in Medicine (1, max. 3)** *Farber, McCormick* Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with FAMED 547.

**MHE 521 The Ethical Challenges of Modern Medicine (3)** *McCormick* Case-study approach to contemporary ethical issues in medicine, utilizing techniques of ethical analysis and argument in examining actual cases arising in our pluralistic culture, where values are often in conflict. Open to graduate and professional students and others with appropriate background.

**MHE 522 Ethical Problems Surrounding Death (3)** *McCormick* Issues arising in care and treatment of dying patients and their families, including truthful disclosure, use of life-supports, "euthanasia," coping with death and grief. Intersection of patient and professional values related to care in terminal phase of illness. Open to graduate and professional students and others with appropriate background.

**MHE 523 Biomedical Ethics (3)** *McCormick* Selected topics in medical ethics emphasizing methods of ethical reasoning about moral dilemmas and contributions of philosophical theories and principles to practical problems of medicine. Students provided with opportunities to test their value assumptions and analytical skills. Open to graduate and professional students and others with appropriate background.

**MHE 535 Medical Ethics and Jurisprudence (3)** *Jonsen* Relationship between bioethics and law. Review of basic concepts of both disciplines; their theoretical and practical connections. Analysis of principal legal cases and statutes illustrating such issues as informed consent to treatment, foregoing life support, research with human subjects, confidentiality, allocation of health care resources. For graduate and professional students.

**MHE 541 Exercise in Modern Medicine (1)** *Berryman* Survey of role and place of exercise in modern medicine. Historical and contemporary analysis of physical activity and sports medicine in the American health system. Presentations by clinicians about their experiences in: orthopaedics, exercise physiology, sports nutrition, sports psychology, pediatric sports medicine, special issues of female athletes, environmental medicine.

**MHE 545 Principles and Practice of Health Care Ethics (6)** Major topics of bioethics and principal analytic methods; their application to clinical practice and public policy. Research methodology and literature in bioethics. Open to majors and, by permission, other graduate and professional students with suitable background.

**MHE 546 Principles and Practice of Health Care Ethics (6)** Major topics of bioethics and principal analytic methods; their application to clinical practice and public policy. Research methodology and literature in bioethics. Open to majors and, by permission, other graduate and professional students with suitable background. Prerequisite: MHE 545.

**MHE 547 Principles and Practice of Health Care Ethics (6)** Major topics of bioethics and principal analytic methods; their application to clinical practice and public policy. Research methodology and literature in bioethics. Open to majors and, by permission, other graduate and professional students with suitable background. Prerequisite: MHE 546.

**MHE 595-Clinical Ethics Practicum (4-)** Students spend one week on each of four clinical services at University of Washington teaching hospitals. Under direction of clinicians, observe patient care activities, participate in care conferences, become familiar with relevant medical and ethical literature. For majors only.

**MHE 596 Masters Research Project (1-12, max. 12)** *Jecker, Jonsen* Research project culminating in a scholarly paper suitable for publication in a peer-review journal. Credit/no credit only. Majors only.

**MHE 600 Independent Study or Research (\*)**

## Medicine

RR512 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Medicine\\_Prog.html](http://www.washington.edu/students/genecat/academic/Medicine_Prog.html)



Department Web page:  
[depts.washington.edu/medweb/](http://depts.washington.edu/medweb/)

Active programs in teaching, research, and patient care are carried on at the University of Washington Medical Center, Seattle Veterans Affairs Medical Center, Harborview Medical Center, Pacific Medical Center, the Puget Sound Blood Center, the Northwest Kidney Center, and the Fred Hutchinson Cancer Research Center. Major affiliations for clinical teaching also exist with Providence Medical Center and Swedish Hospital Medical Center. There are many additional affiliations with community hospitals in Seattle, the state of Washington, and the WWAMI region. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

## Faculty

### Chair

William J. Bremner

### Professors

Abkowitz, Janis L. 1980; MD, 1977, Harvard University; hematology.

Abrass, Christine K. 1984; MD, 1973, Case Western Reserve University; nephrology.

Abrass, Itamar B. 1983; MD, 1966, University of California (San Francisco); gerontology.

Aderem, Alan A. \* 1996; PhD, 1979, University of Capetown (South Africa); macrophage development and differentiation, phagocytosis, signal transduction and the cytoskeleton.

Albers, John J. \* 1971, (Research); MS, 1967, PhD, 1969, University of Illinois; lipoprotein metabolism and pathophysiology.

- Alpers, Charles E. 1986, (Adjunct); MD, 1978, University of Rochester; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology.
- Altman, Leonard \* 1974, (Clinical); MD, 1969, Harvard University; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins.
- Anasetti, Claudio 1985; MD, 1980, University of Perugia (Italy); oncology.
- Appelbaum, Frederick R. 1978; MD, 1972, Tufts University; oncology.
- Austin, Melissa A. \* 1988, (Adjunct); PhD, 1985, University of California (Berkeley); genetic and cardiovascular disease epidemiology, quantitative methods.
- Bardy, Gust H. 1983; MD, 1977, Northwestern University; cardiology.
- Baskin, Denis G. \* 1979, (Research); PhD, 1969, University of California (Berkeley); histology, cytochemistry, neuroendocrinology.
- Beeson, Paul B. 1982, (Emeritus); MD, 1933, McGill University (Canada).
- Berk, Bradford Charles \* 1994, (Affiliate); MD, 1981, PhD, 1981, University of Rochester; cardiology.
- Bird, Thomas D. 1976; MD, 1968, Cornell University; neurology, neurogenetics.
- Bishop, Michael J. 1979, (Adjunct); MD, 1974, University of California (San Diego).
- Blagg, Christopher R. 1966; MD, 1954, MBChB, 1954, University of Leeds (UK); nephrology.
- Bomsztyk, Karol 1983; MD, 1977, University of Rochester; nephrology.
- Bornstein, Paul \* 1967; MD, 1958, New York University; cell-matrix interactions and gene regulation.
- Boyko, Edward J. \* 1989; MD, 1979, University of Pittsburgh; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus.
- Bremner, William J. 1982; MD, 1969, University of Washington; PhD, 1977, Monash University (Australia); endocrinology.
- Broudy, Virginia C. 1985; MD, 1980, University of California (San Francisco); hematology.
- Brown, B. Greg 1981; MD, 1969, PhD, 1969, Johns Hopkins University; cardiology.
- Bruce, Robert A. 1950, (Emeritus); MD, 1943, University of Rochester; cardiology.
- Brunzell, John D. \* 1975; MD, 1963, University of Washington; nutritional and metabolic aspects of lipoproteins and diabetes.
- Byers, Peter H. \* 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion.
- Caldwell, James H. 1983; MD, 1970, University of Missouri; cardiology.
- Carithers, Robert L. 1990; MD, 1969, University of Pennsylvania; gastroenterology/hepatology.
- Chait, Alan \* 1977; MBChB, 1967, MD, 1974, University of Capetown (South Africa); clinical nutrition with special emphasis on lipid metabolism.
- Charan, Nirmal B. 1980; MBBS, 1968, Christian Medical College of Ludhiana; respiratory disease.
- Chesnut, Charles \* 1974; MD, 1966, University of Florida; osteoporosis.
- Clark, Joan G. 1985; MD, 1974, Washington University; pulmonary and respiratory disease.
- Cobb, Leonard A. 1957, (Emeritus); MD, 1952, University of Minnesota; cardiology.
- Collier, Ann C. 1982; MD, 1978, Dartmouth College; infectious diseases.
- Collins, Steven J. \* 1982; MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.
- Copass, Michael K. 1971; MD, 1964, MA, 1964, Northwestern University; neurology/emergency services.
- Corey, Lawrence \* 1977; MD, 1971, University of Michigan; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus.
- Counts, Richard B. 1973; MD, 1967, Washington University; hematology.
- Couser, William G. 1982; MD, 1965, Harvard University; nephrology.
- Cummins, Richard 1981; MD, 1972, Case Western Reserve University; MPH, 1977, University of Washington; emergency medicine.
- Dale, David C. 1974; MD, 1966, Harvard University; internal medicine.
- Dale-Crunk, Beverly A. \* 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry.
- Deeb, Samir S. \* 1983, (Research); PhD, 1964, University of Illinois; genetic factors predisposing to hyperlipidemia and coronary artery disease.
- Deeg, H. Joachim 1994; DrMed, 1972, University of Bonn (Germany); oncology.
- Dennis, Melvin B. \* 1971, (Adjunct); DVM, 1961, Washington State University; comparative medicine, including animal models and experimental surgery.
- Deyo, Richard A. \* 1986; MD, 1975, Pennsylvania State University; health status measurement and evaluation of common medical practices.
- Disteche, Christine M. \* 1980, (Adjunct); PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.
- Dorsa, Daniel M. \* 1981, (Adjunct); PhD, 1977, University of California (Davis); neuropharmacology, neurochemistry.
- Drewnowski, Adam \* 1998, (Adjunct); PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.
- Eisenberg, Mickey \* 1978; MD, 1971, Case Western Reserve University; PhD, 1978, University of Washington; sudden cardiac arrest and acute myocardial infarction.
- Eliel, Leonard P. 1985, (Emeritus); MD, 1940, Harvard University; metabolism and endocrinology.
- Ensinn, John W. \* 1961, (Emeritus); MDCM, 1956, McGill University (Canada); the role of GI hormones in fuel homeostasis.
- Fefer, Alexander 1968; MD, 1964, Stanford University; oncology.
- Fields, Stanley \* 1995; MA, 1978, PhD, 1981, Cambridge University (UK); molecular genetics.
- Figley, Melvin M. 1958, (Emeritus); MD, 1944, Harvard University; thoracic and pulmonary radiology.
- Fihn, Stephan \* 1982; MD, 1977, St Louis University; MPH, 1981, University of Washington; internal medicine.
- Finch, Clement A. 1949, (Emeritus); MD, 1941, University of Rochester; hematology.
- Fujimoto, Wilfred Y. \* 1969; MD, 1965, Johns Hopkins University; metabolism, endocrinology, nutrition.
- Furlong, Clement E. \* 1977, (Research); PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.
- Gartler, Stanley M. \* 1957, (Emeritus); PhD, 1952, University of California (Berkeley); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation.
- Gilliland, Bruce C. \* 1970; MD, 1960, Northwestern University; rheumatology/immunology.
- Glomset, John A. \* 1977; MD, 1960, University of Uppsala (Sweden); membrane structure and function.
- Goodner, Charles J. \* 1962, (Emeritus); MD, 1955, University of Utah; metabolism and endocrinology.
- Greenberg, Philip D. \* 1978; MD, 1971, State University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.
- Handfield, Hunter 1979; MD, 1968, Columbia University; infectious diseases.
- Hansen, John A. 1977; MD, 1970, Stanford University; oncology.
- Harlan, John M. \* 1978; MD, 1973, University of Chicago; hematology, leukocyte-endothelial interaction.
- Hartwell, Leland H. \* 1968, (Adjunct); PhD, 1964, Massachusetts Institute of Technology; genetic analysis of chromosome transmission and of the control of division by hormones in yeast.
- Hazzard, William R. 2000; MD, 1962, Cornell University; gerontology and geriatric medicine.
- Heitkemper, Margaret M. \* 1981, (Adjunct); MN, 1975, University of Washington; PhD, 1981, University of Illinois; gastroenterology, enteral nutrition, gerontology.
- Henderson, Maureen M. \* 1975, (Emeritus); MBBS, 1949, DPH, 1956, University of Durham (UK); application of epidemiology to disease prevention, dietary prevention of disease.
- Henderson, William R. 1979; MD, 1973, University of California (San Francisco); allergy and infectious disease.
- Hildebrandt, Jacob \* 1966; PhD, 1966, University of Washington; respiratory physiology.
- Hirschmann, Jan V. 1976; MD, 1970, University of Washington; internal medicine.
- Hlastala, Michael P. \* 1972; PhD, 1969, State University of New York (Buffalo); respiratory physiology, inert gas analysis of respiratory function.
- Holmes, King K. \* 1967; MD, 1963, Cornell University; PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.
- Hooton, Thomas M. 1982; MD, 1973, University of Texas (Dallas); internal medicine.
- Hudson, Leonard D. 1973; MD, 1964, University of Washington; respiratory diseases.
- Johnson, Richard J. 1982; MD, 1979, University of Minnesota; nephrology.
- Kaushansky, Kenneth \* 1979; MD, 1979, University of California (Los Angeles); hematology.
- Kennedy, J. Ward 1966; MD, 1959, University of Rochester; cardiology.
- Kimmey, Michael 1979; MD, 1979, Washington University; gastroenterology/endoscopy.
- King, Mary-Claire \* 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.
- Kiviat, Nancy C. \* 1979, (Adjunct); MA, 1970, MD, 1975, University of Washington; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia.
- Klebanoff, Seymour \* 1962; MD, 1951, University of Toronto (Canada); PhD, 1954, University of London (UK); infectious disease.
- Knopp, Robert H. \* 1974; MD, 1964, Cornell University; metabolism and endocrinology.

- Koepsell, Thomas D. \* 1979, (Adjunct); MD, 1972, Harvard University; MPH, 1979, University of Washington; injury, cardiovascular epidemiology, neuroepidemiology, methods, application to health services.
- Koerker, Donna J. \* 1982; PhD, 1970, University of Michigan; endocrinology, intermediate metabolism of carbohydrates.
- Kreiss, Joan K. \* 1984; MD, 1978, Washington University; MPH, 1984, University of California (Los Angeles); epidemiology of AIDS, particularly in Africa.
- Lakshminarayan, S. 1977; MBBS, 1965, All-India Institute of Medical Science (India); pulmonary medicine.
- Larson, Eric B. \* 1977; MD, 1973, Harvard University; internal medicine.
- Lee, Sum Ping 1985; MD, 1970, University of Hong Kong; PhD, 1978, University of Auckland (New Zealand); gastroenterology.
- Lernmark, Ake \* 1988; MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity, with emphasis on insulin-dependent diabetes.
- Livingston, Robert B. 1982; MD, 1967, University of Oklahoma; oncology.
- Logerfo Sr., James P. \* 1974; MD, 1968, University of Rochester; MPH, 1974, University of Washington; quality-of-care assessment.
- Longstreth, W. T. Jr. \* 1981, (Adjunct); MD, 1975, University of Pennsylvania; MPH, 1982, University of Washington; neurology.
- Lukehart, Sheila A. \* 1980, (Research); PhD, 1978, University of California (Los Angeles); infectious diseases.
- Mannik, Mart \* 1966; MD, 1959, Case Western Reserve University; rheumatology.
- Martin, Paul J. 1978; MD, 1974, University of Pennsylvania; oncology.
- Martin, Thomas R. 1982; MD, 1973, University of Pennsylvania; pulmonary medicine.
- Matsumoto, Alvin M. 1982; MD, 1975, University of Washington; metabolism and endocrinology.
- Mayer, Jonathan D. \* 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, clinical applications, philosophy, human-environment relations.
- McArthur, James R. 1973, (Emeritus); MD, 1956, Harvard University; hematology.
- McDonald, George B. 1973; MD, 1967, Washington University; gastroenterology.
- Merriam, George R. 1991; MD, 1976, Harvard University; metabolism and endocrinology.
- Miller, Samuel I. \* 1995; MD, 1979, Baylor University; molecular pathogenesis of bacterial diseases.
- Monsen, Elaine R. \* 1969, (Adjunct); MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.
- Motulsky, Arno G. \* 1953, (Emeritus); MD, 1947, University of Illinois; medical genetics.
- Mullins, James I. \* 1994; PhD, 1978, University of Minnesota; cell biology and biochemistry.
- Neiman, Paul E. \* 1971; MD, 1964, University of Washington; oncology.
- Nelp, Wil B. 1962, (Emeritus); MD, 1955, Johns Hopkins University; nuclear medicine.
- Norris, Thomas E. 1988, (Adjunct); MD, 1973, University of Texas (Galveston); rural health policy, primary care policy, geriatrics.
- Olerud, John E. 1975; MD, 1971, University of Washington; dermatology.
- Olson, Maynard V. 1992; PhD, 1970, Stanford University; large-scale genome mapping and sequencing.
- Oram, John Fisher \* 1975, (Research); PhD, 1972, Pennsylvania State University; cellular lipid transport and metabolism, lipoprotein interactions.
- Otto, Catherine M. 1982; MD, 1979, University of Washington; cardiology.
- Pagon, Roberta A. 1979, (Adjunct); MD, 1972, Harvard University; medical genetics.
- Palmer, Jerry P. 1973; MD, 1970, State University of New York (Upstate Medical Center); metabolism and endocrinology, diabetes.
- Papayannopoulou, Thalia 1974; MD, 1961, DMedSc, 1964, University of Athens (Greece); hematology.
- Paulsen, C. Alvin 1959, (Emeritus); MD, 1952, University of Oregon; metabolism and endocrinology.
- Pearlman, Alan S. 1978; MD, 1970, Harvard University; cardiology.
- Pearlman, Robert A. \* 1981; MD, 1975, Boston University; gerontology.
- Perine, Peter L. \* 1981, (Adjunct); MD, 1966, University of Kansas; MPH, 1973, University of Washington; international health, sexually transmitted diseases.
- Petersdorf, Robert G. 1994; MD, 1952, Yale University.
- Piepkorn, Michael W. 1991; MD, 1973, University of Minnesota; PhD, 1980, University of Washington; dermatology.
- Pierson, David John 1976; MD, 1969, Johns Hopkins University; respiratory diseases.
- Plorde, James J. \* 1982, (Emeritus); MD, 1959, University of Minnesota; infectious diseases, antibiotic-resistant nosocomial infections.
- Pope, Charles E. 1964, (Emeritus); MD, 1957, Case Western Reserve University; gastroenterology.
- Porte, Daniel Jr. 1982, (Emeritus); MD, 1957, University of Chicago; metabolism and endocrinology.
- Press, Oliver W. \* 1982; PhD, 1977, MD, 1979, University of Washington; treatment of hematologic malignancies with monoclonal antibody immunocjugates.
- Preston, Thomas A. 1973; MD, 1962, University of Pennsylvania; cardiology.
- Price, Thomas H. 1975; MD, 1966, Johns Hopkins University; hematology.
- Probstfield, Jeffrey L. 1993; MD, 1967, University of Washington; cardiology.
- Psaty, Bruce M. \* 1984; PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, and pharmacoepidemiology.
- Ramsey, Paul G. 1980; MD, 1975, Harvard University; infectious diseases, internal medicine.
- Reid, Brian J. \* 1983; PhD, 1975, MD, 1980, University of Washington; genetic and cell-cycle abnormalities in neoplastic progression in Barrett's esophagus.
- Ritchie, James L. 1974; MD, 1967, Case Western Reserve University; cardiology.
- Robertson, H. Thomas 1975; MD, 1968, Harvard University; respiratory diseases.
- Root, Richard K. 1991; MD, 1963, Johns Hopkins University; infectious diseases.
- Rosen, Henry 1977; MD, 1972, University of Rochester; allergy and infectious diseases.
- Rosenstock, Linda \* 1981; MD, 1977, Johns Hopkins University; occupational/general internal medicine.
- Roth, Gerald J. 1984; MD, 1967, Harvard University; hematology.
- Rubin, Cyrus E. 1954, (Emeritus); MD, 1945, Harvard University; gastroenterology.
- Saunders, David R. \* 1969, (Emeritus); MD, 1957, McGill University (Canada); intestinal absorption, effect of drugs on GI mucosa.
- Schellenberg, Gerard D. 1981, (Research); PhD, 1978, University of California (Riverside); mapping of familial Alzheimer disease genes and cloning of Werner's syndrome gene.
- Schoene, Robert B. 1981; MD, 1972, Columbia University; respiratory diseases.
- Schuffler, Michael D. 1973; MD, 1966, University of Illinois; gastroenterology.
- Schwartz, Stephen Mark \* 1974, (Adjunct); MD, 1967, Boston University; PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.
- Scott, C. Ronald \* 1965, (Adjunct); MD, 1959, University of Washington; diagnosis and nutritional management of genetic disorders of children.
- Scribner, Belding H. 1957, (Emeritus); MD, 1945, Stanford University; MS, 1951, University of Minnesota; nephrology.
- Sherrard, Donald J. 1968; MD, 1960, University of Washington; nephrology.
- Simkin, Peter A. 1969; MD, 1961, University of Pennsylvania; rheumatology.
- Siscovick, David S. \* 1987; MD, 1976, University of Maryland; epidemiology.
- Slichter, Sherrill J. 1970; MD, 1963, George Washington University; hematology.
- Smith, Charles B. 1991, (Emeritus); MD, 1962, Harvard University; infectious diseases.
- Spence, Alexander M. 1974, (Adjunct); MD, 1965, University of Chicago; neurology, neuro-oncology.
- Stamatoyannopoulos, George 1964; MD, 1958, DMedSc, 1960, University of Athens (Greece); medical genetics.
- Stamm, Walter E. \* 1979; MD, 1971, Harvard University; infectious disease.
- Starkebaum, Gordon A. 1970; MD, 1970, Columbia University; rheumatology.
- Stevens, Dennis L. 1982; PhD, 1967, Montana State University; MD, 1971, University of Utah; infectious diseases.
- Stewart, Douglas 1972; MD, 1965, Harvard University; cardiology.
- Storb, Rainer F. 1976; MD, 1960, University of Freiburg (Germany); oncology.
- Stratton, John R. 1982; MD, 1973, Yale University; cardiology.
- Surawicz, Christina M. 1981; MD, 1973, University of Kentucky; gastroenterology.
- Swanson, Phillip D. 1964, (Adjunct); MD, 1958, Johns Hopkins University; PhD, 1964, University of London (UK); movement disorders, neurology.
- Sybert, Virginia 1979; MD, 1974, State University of New York (Buffalo); genetics and dermatology.
- Thomas, E. Donnell 1963, (Emeritus); MA, 1943, University of Texas (Austin); MD, 1946, Harvard University; oncology.
- Thompson, Arthur R. 1982; MD, 1966, PhD, 1972, University of Washington; hematology.
- Turck, Marvin 1964; MD, 1959, University of Illinois; infectious diseases.
- Van Citters, Robert L. \* 1962, (Emeritus); MD, 1953, University of Kansas; cardiovascular physiology.
- Verdugo, Pedro \* 1974, (Adjunct); MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.
- Volwiler, Wade 1949, (Emeritus); MD, 1943, Harvard University; gastroenterology.
- Wade, James C. 1997; MD, 1974, University of Utah; MPH, 1994, Johns Hopkins University; oncology.

Wallace, James F. 1968; MD, 1961, Washington University; internal medicine.

Wijsman, Ellen M. \* 1987, (Research); PhD, 1981, University of Wisconsin; human quantitative and population genetics.

Zager, Richard A. 1985; MD, 1969, Northwestern University; nephrology.

### Associate Professors

Ahmad, Suhail 1979; MBBS, 1968, University of Allahabad (India); nephrology.

Aitken, Moira L. 1982; MBChB, 1978, University of Edinburgh (UK); respiratory disease.

Andress, Dennis 1982; MD, 1978, University of Oklahoma; nephrology.

Back, Anthony L. 1984; MD, 1984, Harvard University; oncology.

Barnhart, Scott \* 1979; MD, 1979, George Washington University; occupationally related lung disease.

Belcher, Donald W. \* 1976; MD, 1962, University of Pennsylvania; ambulatory medicine.

Benditt, Joshua O. 1994; MD, 1982, University of Washington; pulmonary and critical care medicine.

Benedetti, Jacqueline K. \* 1980, (Adjunct); PhD, 1974, University of Washington; statistical methodology in infectious disease research, cancer clinical trials.

Bensinger, William I. 1981; MD, 1973, Northwestern University; oncology.

Berg, Daniel 1997; MD, 1985, University of Toronto (Canada); dermatological surgery.

Brodin, Carl \* 1989; MD, 1983, University of Colorado (Denver); hepatic effects of occupational solvent exposure; ventilatory decline in asbestos-exposed workers.

Buchwald, Dedra S. 1987; MD, 1981, University of California (San Diego); internal medicine.

Burke, Wylie 1984; PhD, 1974, MD, 1978, University of Washington; internal medicine.

Celum, Connie L. 1987; MD, 1984, University of California (San Francisco); infectious diseases.

Childs, Marian T. \* 1978, (Emeritus); PhD, 1950, University of California (Berkeley); nutrition.

Comess, Keith A. 1992; MD, 1979, University of Arizona; cardiology.

Coombs, Robert W. \* 1985; PhD, 1977, MD, 1981, Dalhousie University (Canada); diagnosis and pathogenesis of HIV infection.

Culver, Bruce H. 1974; MD, 1969, University of Washington; respiratory diseases.

Cusack, Barry J. 1982; MD, 1980, University College of Dublin (Ireland); gerontology.

Davidson, Robert C. 1968, (Emeritus); MD, 1953, University of Washington; nephrology.

Davis, Connie 1991; MD, 1980, University of Washington; nephrology.

Deem, Steven A. 1992, (Adjunct); MD, 1984, Southern Illinois University; critical care.

Disis, Mary L. 1990; MD, 1986, MS, 1986, University of Nebraska; oncology.

Doney, Kristine 1981; MD, 1972, University of Michigan; hematology/oncology.

Dugdale, David C. 1991; MD, 1982, University of Pennsylvania; general internal medicine.

Dugowson, Carin E. 1977; MD, 1976, University of Illinois; MPH, 1986, University of Washington; rheumatology.

Ellis, Georgiana K. 1982; MD, 1982, University of Washington; oncology.

Elmore, Joann G. 1996; MD, 1987, Stanford University; MPH, 1992, Yale University; clinical epidemiology.

Every, Nathan R. 1988; MD, 1988, Emory University; MPH, 1993, University of Washington; cardiology.

Fishbein, Daniel P. 1981; MD, 1980, Albert Einstein College of Medicine; cardiology.

Fleckman, Philip H. 1982; MD, 1973, Washington University; dermatology.

Fleet, Wendell P. 1972; MD, 1965, Creighton University; internal medicine.

Gardner, Gregory C. 1989; MD, 1984, Baylor University; rheumatology.

Gavrin, Jonathan R. 1991, (Adjunct); MD, 1978, Dartmouth College; pain management.

Geballe, Adam Philip \* 1988; MD, 1978, Duke University; virology.

Glenny, Robb \* 1987; MD, 1984, University of Virginia; determinants of regional pulmonary blood flow and ventilation distribution.

Goldberg, Harold I. 1986; MD, 1977, Stanford University; internal medicine.

Goldstein, Erika A. 1981; MD, 1981, University of Rochester; general internal medicine.

Goodman, Richard B. 1986; MD, 1982, University of Oklahoma; pulmonary and critical care medicine.

Gretch, David R. \* 1990, (Adjunct); PhD, 1990, MD, 1990, University of Iowa; research and diagnostics related to viral hepatitis.

Griep, Robert J. 1982; MD, 1958, University of Texas (Galveston); internal medicine/radiology.

Hickstein, Dennis D. 1982; MD, 1978, University of Nebraska; hematology.

Higano, Celestia S. 1982; MD, 1979, University of Massachusetts; oncology.

Hirsch, Irl B. 1990; MD, 1984, University of Missouri; metabolism and endocrinology/diabetes.

Hockenbery, David M. \* 1994; MD, 1982, Washington University; gastroenterology.

Idzerda, Rejean L. \* 1990; PhD, 1986, University of Washington; cyclic AMP signaling pathway in mammalian testis development and function.

Jobe, Kathleen A. 1986; MD, 1986, University of Colorado (Denver); internal medicine.

Kahn, Steven Emanuel 1986; MBChB, 1978, University of Capetown (South Africa); metabolism and endocrinology.

Kaufman, Joel D. \* 1988; MD, 1986, University of Michigan; MPH, 1990, University of Washington; epidemiology of occupational/environmental factors in respiratory, skin and cardiovascular disease.

Kavanagh, Terrance J. \* 1985, (Adjunct); MS, 1980, PhD, 1985, Michigan State University; free radical toxicology, glutathione metabolism, toxicology and aging.

Keifer, Matthew C. \* 1982; MD, 1982, University of Illinois; the human health effects of pesticide exposure.

Kimball, Ann M. \* 1992, (Adjunct); MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.

Kowdley, Kris V. 1993; MD, 1985, Mt Sinai School of Medicine; gastroenterology.

Kudenchuk, Peter J. 1986; MD, 1979, University of Washington; cardiology.

Lampe, Mary F. \* 1988; MS, 1976, University of Washington; PhD, 1984, University of North Carolina; medical technology education, molecular analysis of Chlamydia trachomatis pathogenesis.

Leboeuf, Renee C. \* 1977, (Adjunct); State University of New York (Buffalo); genetic and nutritional regulation of proteins involved in lipid transport.

Lehmann, Kenneth G. 1990; MD, 1979, University of California (San Diego); cardiology.

Lessler, Daniel \* 1990; MD, 1986, Stanford University; MHA, 1992, University of Washington; health services research pertaining to cost-effectiveness, quality of care, medical management.

Lindner, Armando 1970; MD, 1964, University of Buenos Aires (Argentina); nephrology.

Linker, David T. 1993; MD, 1976, Stanford University; cardiology.

Lipkin, Edward W. \* 1981; PhD, 1977, MD, 1978, Case Western Reserve University; mineral metabolism, nutrition support, non-human primate physiology.

Lipsky, Benjamin A. 1982; MD, 1973, Cornell University; internal medicine.

Madtes, David K. 1994; MD, 1979, University of Pittsburgh; pulmonary and critical care medicine.

Marra, Christina M. 1984, (Adjunct); MS, 1979, Oregon State University; MD, 1984, University of Oregon; neurology, infectious diseases.

Martin, Gary V. 1984; MD, 1980, University of Arizona; cardiology.

Martin, Thomas G. 1996; MD, 1977, Pennsylvania State University; general internal medicine.

McCormick, Wayne C. 1987; MD, 1983, Washington University; gerontology and preventative medicine.

McElrath, Margaret Juliana 1990; PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.

McGee, Steve R. 1987; MD, 1980, Washington University; general internal medicine.

McMullen, W. Russell 1981; MD, 1978, University of Cincinnati; internal medicine, emergency medicine.

McTiernan, Anne \* 1989, (Adjunct Research); PhD, 1982, University of Washington; breast and colon cancer, women's health, exercise and obesity.

Mengert, Terry J. 1984; MD, 1984, University of Washington; emergency medicine.

Miller, Richard A. 1981; MD, 1977, Harvard University; infectious diseases.

Nash, Richard A. 1994; MD, 1977, University of Manitoba (Canada); oncology.

Nelson, Judith Lee 1981; MD, 1977, University of California (Davis); rheumatology.

Nguyen, Toan D. 1994; MD, 1978, University of Chicago; gastroenterology.

Nielson, Christopher P. 1983; MD, 1978, University of California (Los Angeles); gerontology and geriatric medicine.

O'Brien, Kevin 1984; MD, 1984, University of Washington; cardiology.

Olson, Carin M. 1994; MD, 1978, Ohio State University; general internal medicine.

Ott, Susan M. 1980; MD, 1974, University of Washington; nephrology.

Oxorn, Donald C. 1998, (Adjunct); MD, 1978, McGill University (Canada); trauma and critical care.

Paauw, Douglas 1985; MD, 1979, University of Washington; general internal medicine.

Petersdorf, Effie Wang 1982; MD, 1982, McGill University (Canada); oncology.

Petersdorf, Stephen H. 1983; MD, 1983, Brown University; oncology.

Poole, Jeanne E. 1981; MD, 1980, University of Washington; cardiology.

Quinn, Lebris S. \* 1980, (Research); PhD, 1982, University of Washington; control of muscle precursor cell proliferation and differentiation; muscle growth.

- Radich, Jerald P. 1983; MS, 1979, Harvard University; MD, 1983, University of California (Davis); oncology.
- Raghu, Ganesh 1981; MD, 1974, University of Mysore (India); respiratory disease.
- Ralph, David D. 1981; MD, 1972, Stanford University; respiratory diseases.
- Raskind, Wendy H. 1982; PhD, 1977, MD, 1978, University of Washington; medical genetics.
- Raugi, Gregory J. 1980; MD, 1975, PhD, 1975, Duke University; dermatology.
- Riddell, Stanley R. 1985; MD, 1979, University of Manitoba (Canada); oncology.
- Rowley, Scott D. 1994; MD, 1978, University of Massachusetts; oncology.
- Sandmaier, Brenda M. 1987; MD, 1983, University of Alberta (Canada); oncology.
- Sasso, Eric H. 1984; MD, 1980, University of California (San Diego); rheumatology.
- Schmidt, Rodney 1984, (Adjunct); MD, 1984, PhD, 1984, University of Washington; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy.
- Schubach, William H. 1994; PhD, 1971, University of California (Santa Cruz); MD, 1974, Columbia University; oncology.
- Schwartz, Michael W. 1983; MD, 1983, Rush Medical College; metabolism and endocrinology.
- Skerrett, Shawn J. 1983; MD, 1978, New York University; pulmonary and critical care medicine.
- Smith, Curtis Scott 1987; MD, 1980, University of Washington; general internal medicine.
- Spach, David H. 1986; MD, 1986, Duke University; infectious diseases.
- Stadius, Michael L. 1993; MD, 1978, University of Oregon; cardiology.
- Stephens, Karen G. \* 1989, (Research); PhD, 1982, Indiana University; molecular genetics of human inherited disease; gene mapping, regulation, and imprinting.
- Stern, Eric J. 1992, (Adjunct); MD, 1985, University of Medicine and Dentistry of New Jersey; chest radiology.
- Stewart, Patricia S. 1982; MA, 1965, MD, 1969, University of West Virginia; oncology.
- Sugg, Nancy K. 1983; MD, 1983, University of Maryland; internal medicine.
- Swenson, Erik R. 1983; MD, 1979, University of California (San Diego); pulmonary medicine.
- Tait, Jonathan F. \* 1983, (Adjunct); MD, 1983, PhD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.
- Tempel, Bruce L. \* 1988, (Adjunct); PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.
- Thompson, John A. 1979; MD, 1979, University of Alabama; oncology.
- Van Voorhis, Wesley C. \* 1986; PhD, 1983, Rockefeller University; MD, 1984, Cornell University; infectious diseases.
- Watkins, Sandra L. 1981, (Adjunct); MD, 1981, University of Texas (Houston); nephrology.
- Weigle, David S. 1981; MD, 1978, Harvard University; endocrinology and metabolism.
- Wener, Mark H. \* 1980, (Adjunct); MD, 1974, Washington University; diagnostic immunology, immune complex diseases.
- Willson, Richard 1973; MD, 1962, University of Minnesota; gastroenterology.
- Wipf, Joyce E. 1984; MD, 1984, University of Minnesota; general internal medicine.
- Witherspoon, Robert P. 1976; MD, 1970, MS, 1970, Baylor University; oncology.
- Wood, Francis C. Jr. \* 1960, (Emeritus); MD, 1954, Harvard University; metabolism and endocrinology.
- Wood, Robert W. 1977; MD, 1970, University of Rochester; internal medicine.
- Yeung, Raymond S. 1997, (Adjunct); MD, 1982, University of Toronto (Canada); general and surgical oncology.
- Ziskind, Andrew A. 1999; MD, 1984, University of Pennsylvania; clinical programs.

### Assistant Professors

- Anawalt, Bradley D. 1989; MD, 1989, University of California (Davis); general internal medicine.
- Blau, Carl A. 1989; MD, 1986, Ohio State University; hematology.
- Braddock, Clarence H. \* 1993; MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.
- Bradley, Katharine A. 1990; MD, 1987, Stanford University; MPH, 1993, University of Washington; general internal medicine.
- Brentnall, Teresa A. 1991; MD, 1987, University of Washington; gastroenterology.
- Brodkin, Kayla I. 1989; MD, 1982, State University of New York (Stony Brook); gerontology and geriatric medicine.
- Bronner, Mary P. 1993, (Adjunct); MD, 1989, University of Pennsylvania; gastrointestinal and hepatic pathology, neoplastic progression and transplantation pathology.
- Carvalho, Paula G. 1984; MD, 1984, University of Washington; pulmonary and critical care medicine.
- Chauncey, Thomas R. 1985; MD, 1985, Rush Medical College; oncology.
- Cheng, Edith Y. 1987, (Adjunct); MS, 1979, Sarah Lawrence College; MD, 1987, University of Washington; genetics, perinatal medicine.
- Clurman, Bruce E. 1991; PhD, 1988, MD, 1989, Cornell University; oncology.
- Colven, Roy M. 1987; MD, 1987, University of Washington; dermatology.
- Cook, David G. \* 1998, (Research); PhD, 1991, Yale University; molecular mechanisms of Alzheimer's disease.
- Corson, Marshall A. 1994; MD, 1981, Baylor University; cardiology.
- Cummings, David E. \* 1987; MD, 1987, Harvard University; Genetic determinants of obesity. Interplay between body weight and reproduction.
- Curtis, Jared R. 1988; MD, 1988, Johns Hopkins University; MPH, 1994, University of Washington; pulmonary diseases and critical care medicine.
- Darmstadt, Gary L. 1995, (Adjunct); MD, 1989, University of California (San Diego); infectious diseases, dermatology.
- De Rook, Frances 1992; MD, 1987, University of Cincinnati; cardiology.
- Dewitt, Dawn E. 1990; MD, 1990, Harvard University; general internal medicine.
- Dominitz, Jason A. 1998; MD, 1991, University of Maryland; MS, 1996, Duke University; gastroenterology.
- Drachman, Jonathan G. 1989; MD, 1989, Harvard University; hematology.
- Duchin, Jeffrey S. 1995; MD, 1985, Rutgers University; infectious diseases and epidemiology.

- Durfy, Sharon J. \* 1991, (Adjunct); PhD, 1990, University of Toronto (Canada); ethical aspects of genetic testing, counseling, research, public policy.
- Evans, Timothy C. 1980; MD, 1974, PhD, 1976, University of Michigan; diabetes management.
- Fife, Laura E. 1994; MD, 1979, University of Utah; emergency medicine.
- Fitzgibbon, Dermot R. 1992, (Adjunct); MBChB, 1983, Cork Regional Hospital; pain management.
- Flowers, Mary E. 1994; MD, 1977, Centro de Ciencias da Saude da Universidade Federal do Rio Grande do Norte Brazil (Brazil); oncology.
- Gernsheimer, Terry B. 1984; MD, 1979, State University of New York (Stony Brook); hematology.
- Gold, Philip J. 1991; MD, 1991, University of Miami (Florida); oncology.
- Goss, J. Richard 1993; MD, 1987, Oregon Health Sciences University; MPH, 1995, University of Washington; internal medicine.
- Gralow, Julie R. 1992; MD, 1988, University of Southern California; oncology.
- Greenbaum, Carla J. 1987; MD, 1981, Brown University; metabolism, endocrinology and nutrition.
- Greenberg, Deborah L. 1990; MD, 1990, Washington University; general internal medicine.
- Gruenewald, David A. 1983; MD, 1983, University of Chicago; gerontology and geriatric medicine.
- Harrington, Robert D. 1989; MD, 1983, Tufts University; teaching and research studies involving HIV entry into CD4 cells.
- Holmberg, Leona A. 1987; PhD, 1983, Harvard University; MD, 1986, University of Miami; oncology.
- Hornung, Robin L. 1999, (Adjunct); MD, 1990, Yale University; MPH, 1996, University of North Carolina; dermatology.
- Horwitz, Marshall S. 1983; PhD, 1988, MD, 1990, University of Washington; transcription regulation.
- Hunt, Karen J. 1985; MD, 1982, Northwestern University; oncology.
- Jackson, J. Carey 1990; MPH, 1980, University of Hawaii; MD, 1986, Michigan State University; general internal medicine.
- Jarvik, Gail P. \* 1991; PhD, 1986, University of Michigan; MD, 1987, University of Iowa; quantitative genetics and genetic epidemiology, focusing on common diseases.
- John, Grace C. 1992; MD, 1987, University of Michigan; MPH, 1995, University of Washington; clinical epidemiology.
- Johnson, Kay M. 1991; MD, 1991, University of Minnesota; general internal medicine.
- Kapur, Vishesh 1993; MD, 1989, Yale University; pulmonary and critical-care medicine.
- Kearney, David J. 1996; MD, 1989, University of Missouri; gastroenterology.
- Kiem, Hans-Peter 1992; MD, 1987, University of Ulm (Germany); oncology/hematology.
- Kitahata, Mari M. 1991; MD, 1987, University of Pennsylvania; MPH, 1995, University of Washington; allergy and infectious diseases.
- Koelle, David 1988; MD, 1985, University of Washington; allergy and infectious diseases.
- Kuver, Rahul P. 1989; MD, 1989, University of Michigan; gastroenterology.
- Lafferty, William E. \* 1988, (Adjunct); MD, 1978, University of Kansas; STD, HIV/AIDS, surveillance and epidemiology of STD, managed care.

Laya, Mary B. 1993; MD, 1982, Creighton University; MPH, 1995, University of Washington; general internal medicine.

Levy, Wayne C. 1985; MD, 1985, Loma Linda University; cardiology.

Liles, W. Conrad 1990; MD, 1987, PhD, 1987, University of Washington; infectious diseases.

Linenberger, Michael L. 1986; MD, 1982, University of Kansas; hematology.

Lingappa, Jaisri \* 1999, (Adjunct); PhD, 1985, Harvard University; MD, 1987, University of Massachusetts; cell biology of virus assembly, host proteins involved in assembly of HIV and other viruses.

Maloney, David G. 1995; MD, 1985, PhD, 1991, Stanford University; medical oncology.

Marrazzo, Jeanne M. 1992; MD, 1988, Jefferson Medical College; MPH, 1994, University of Washington; infectious diseases.

Migeon, Mary 1988; MD, 1993, University of Washington; general internal medicine.

Montgomery, R. Bruce 1990; MD, 1987, Duke University; oncology.

Muczynski, Kimberly Ann 1989; MD, 1984, PhD, 1984, University of Washington; nephrology.

Nelson, Peter S. \* 1993; MD, 1986, University of Kansas; study of human carcinogenesis using tools of genomics and bioinformatics.

Pickett, Cheryl A. 1998; PhD, 1985, University of California (Davis); MD, 1988, University of Colorado (Denver); metabolism, endocrinology, nutrition.

Pinsky, Linda E. 1989; MD, 1989, University of Washington; general internal medicine.

Presland, Richard B. 1989, (Adjunct Research); PhD, 1987, University of Adelaide (Australia); molecular basis of epithelial cell differentiation.

Ramsey, Scott D. \* 1990; MD, 1990, University of Iowa; PhD, 1994, University of Pennsylvania; cost effectiveness analysis and health care economics.

Reed, May J. 1990; MD, 1986, Harvard University; geriatric medicine and gerontology.

Reilly, Dominic F. 1991; MD, 1988, University of Washington; general internal medicine.

Rhoads, Caroline S. 1989; MD, 1989, University of Pennsylvania; general internal medicine.

Rubinfeld, Gordon 1991; MD, 1987, Jefferson Medical College; MPH, 1996, University of Washington; pulmonary and critical care medicine.

Russell, David W. 1991; PhD, 1988, Rockefeller University; MD, 1989, Cornell University; hematology.

Ryan, Michael J. 1986; MD, 1986, University of Michigan; nephrology.

Sabath, Daniel E. \* 1989, (Adjunct); PhD, 1989, MD, 1989, University of Pennsylvania; regulation of gene expression in hematopoietic cells.

Shadlen, Marie-Florence 1995; MD, 1983, Brown University; gerontology and geriatric medicine.

Shankland, Stuart J. 1994; MBChB, 1983, University of Capetown (South Africa); nephrology.

Sheffield, John V. L. 1989; MD, 1989, Harvard University; general internal medicine.

Shuhart, Margaret C. 1991; MD, 1988, Dartmouth College; gastroenterology.

Staiger, Thomas O. 1990; MD, 1985, University of Washington; general internal medicine.

Stapleton, Ann E. 1987; MD, 1984, Albert Einstein College of Medicine; allergy and infectious diseases.

Stehman-Breen, Catherine O 1990; MD, 1990, University of Chicago; MS, 1996, University of Washington; nephrology.

Steinberg, Kenneth P. 1989; MD, 1985, New York Medical College; pulmonary and critical care medicine.

Sutton, Paul R. 1999; PhD, 1992, University of Illinois; MD, 1994, University of Chicago; internal medicine.

Tabet, Stephen R. 1991; MD, 1991, University of New Mexico; MPH, 1993, University of Washington; infectious diseases.

Thompson, William H. 1988; MD, 1988, Johns Hopkins University; pulmonary and critical care medicine.

Tonelli, Mark R. 1993; MD, 1989, University of Colorado (Boulder); pulmonary and critical care medicine.

Van Norman, Gail 1986, (Adjunct); MD, 1981, University of Washington.

Wald, Anna \* 1989; MD, 1985, Mt Sinai School of Medicine; MPH, 1994, University of Washington; epidemiology, natural history, and therapeutics of HSV and other herpes viruses infections.

Wallace, Jeffrey I. \* 1989; MD, 1984, University of Michigan; MPH, 1992, University of Washington; nutritional health and health promotion interventions for older adults.

Watanabe, Jill M. 1998; MD, 1990, MPH, 1991, Johns Hopkins University; general internal medicine.

Willerford, Dennis M. 1996; MD, 1995, Washington University; hematology.

Wong, Emily Y. 1995; MD, 1990, University of Washington; internal medicine.

Wu, Daniel Y. 1991; MD, 1991, PhD, 1991, Loma Linda University; oncology.

Yee, Cassian 1991; MD, 1986, University of Manitoba (Canada); oncology.

Zivin, Adam H. 1998; MD, 1991, Oregon Health Sciences University; cardiology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**MED 498 Undergraduate Thesis (\*)** *Paauw* Offered: AWSpS.

**MED 499 Undergraduate Research (\*)** *Paauw* Case studies, with laboratory research. Available to undergraduates and medical students. Offered: AWSpS.

**MED 505 P-Preceptorship in Medicine (1)** *Paauw* To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of department. Offered: AWSpS.

**MED 510 Health Issues of Sexual Minorities (1)** *Greenberg* Introduction to the special health care issues and barriers confronting persons identified as bisexual, gay, lesbian, or transgendered. Includes lectures, panels, and case presentations by faculty and community experts. Offered: Sp.

**MED 530 AIDS: A Multidisciplinary Approach (2)** *Koutsky, Kreiss* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of (HIV) infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Offered: jointly with EPI 530; A.

**MED 531 P-Human Genetics (\*)** *Stamatoyannopoulos* Weekly seminar dealing with a variety of topics in medical genetics given by faculty of the Division of Medical Genetics and related departments and divisions. Open to medical students with a good foundation in genetics.

**MED 532 Statistical Methods in Medical Genetics (2)** *Wijisman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Prerequisite: knowledge of genetics or permission of instructor. Offered: jointly with BIOST 532 and PHG 532. Offered: Sp.

**MED 533 P-Clinical Endocrinology (2)** *Cummings* Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated. Limited to second-year medical students. Offered: W.

**MED 547 Quantitative Methods in Medical Genetics (2)** Computational methods of use for medical genetics. Review of problem sets. Topics range from basic probability to linkage analysis. Prerequisite: genetics and permission of instructor.

**MED 549 Clinical Medical Genetics (1)** Review of current clinical advances in medical genetics. Includes lectures and discussion of cases from medical genetics clinic. Prerequisite: genetics or human genetics and permission of instructor. Offered: Sp.

**MED 550 P-An Introduction to Emergency Medicine (1)** *Mengert* Presentation of common medical and surgical emergencies and their urgent management, especially within the framework of rapid patient assessment and stabilization. Lecture topics include chest pain and myocardial infarction, basic arrhythmia management, and burn and wound care. Offered: Sp.

**CONJ 550 P-Clinical Infectious Diseases (3)** *Spach* See Conjoint Courses.

**MED 555 P-Mind, Body, and Pen: Writing and the Art of Becoming a Physician (1)** Provides forum for medical students to write about issues in medicine and medical education. Focuses on writing as a process for giving voice to the conflicting demands and dilemmas of becoming a physician. Explores personal narratives, dreams and disappointments, chronic illness and death, empathy and revulsion, authenticity and power. Offered: W.

**UCONJ 555 Principles of STD/HIV Research (3)** *Lukehart* See University Conjoint Courses.

**MED 599 P-Transfusion Machine (3)** *Reiner* Group discussions and didactic sessions cover broad category of transfusion medicine. Hands-on laboratory experience in red cell seriology/compatibility, coagulation, and histocompatibility with emphasis on diagnosis and management of clinical problems. Based at Puget Sound Blood Center. Prerequisite: fourth-year medical student standing; third-year student standing with permission of instructor.

**MED 604 P-Clinical Preceptorship in Internal Medicine (8)** *Shima (Forks), Thorson (Longview)* Working closely with primary-care physicians, the student is exposed to the private practice of internal medicine in a small community. Operating on a one-to-one basis with an internist, the student evaluates and manages inpatients and outpatients on a primary care, consultative, and emergency basis. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWSpS.

**MED 640 P-Dermatology Clinic (\* max. 5)** *Olerud* Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Two half-days per week. Prerequisite: MED 665. Offered: AWPpS.

**MED 642 P-Clinical Oncology (8)** *Stewart (Fred Hutchinson Cancer Research Center)* Students functioning as primary physicians are responsible for the workups and daily care of patients receiving marrow transplants, high-dose chemotherapy or immunotherapy on an intensive-care research ward. Emphasis is on the management and supportive care of patients with pancytopenia and immunosuppression, transplantation biology, cancer chemotherapy, and infectious disease problems. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 644 P-Management of Sexually Transmitted Diseases (2)** *Celum, Handsfield* Instruction and clinical experience in diagnosis, treatment, management, and parent counseling of sexually transmitted diseases. Instruction in genitourinary physical examination skills; relevant laboratory techniques and management of patients with STDs. Prior to the elective, each student must review a packet of didactic materials. Prerequisite: MED 665, SURG 665, and OB GYN 665. Offered: AWPpS.

**MED 645 P-Clinical Geriatric Medicine (8)** *Matsumoto* Full time spent caring for patients in a half-day outpatient clinic each week, work up and follow inpatients on the geriatric evaluation unit, actively participate in twice-weekly attending and multidisciplinary team rounds, attend weekly conferences of the Division of Gerontology. Prerequisite: MED 665. (Limit: one student.) Offered: AWPpS.

**MED 650 P-Advanced Medical Genetics (\* max. 5)** *Jarvik, Horwitz, Stamatoyannopoulos* Summer course intended for third-year students who would like to increase their background in specific areas of medical genetics. Involves seeing patients with the instructor, reviewing the literature, analyzing clinical information, and writing a review on a selected topic. Prerequisite: HUBIO 554. Offered: S.

**MED 665 P-Clinical Clerkship (\* max. 24)** *Paauw* Third-year medical students assume increasing responsibility for care of hospitalized patients in a teaching-hospital setting and participate in a four-week outpatient experience emphasizing continuity of care. Daily rounds with resident and attending physicians, with lectures and conferences. Progress evaluated by supervising physicians and a written examination. (Twelve weeks, full-time.) Offered: AWPpS.

**MED 666 P-Advanced Clinical Clerkship in Internal Medicine-WWAMI (12)** *Paauw* Advanced clinical clerkship in internal medicine in three small urban communities. Supervised, structured experience in dealing with situations commonly encountered by the practicing internist. Continuity of care and the relationship between care given in the ambulatory setting and in the hospital, as well as by other community health services, is emphasized. Prerequisite: MED 665. (Six weeks, full time. Limit: six students.) Offered: AWPpS.

**CONJ 677 P-Clinical Allergy and Immunology (\* max. 12)** *Henderson* See Conjoint Courses.

**MED 678 P-Clinical Dermatology (8)** *Olerud* Participation in dermatology clinics and inpatient consultations at University of Washington Medical Center, Harborview Medical Center, Children's Hospital Medical Center, and Veterans Administration Hospital. Journal club and clinical conferences each week with entire staff. A continuing series of teaching seminars and weekly dermatopathology conferences. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 679 P-Clinical Gastroenterology (8)** *Lee, Novan (Sacred Heart Spokane)* Participation in consulting ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University and Veterans Administration hospitals, and at Pacific and Harborview medical centers, plus directed tutorial work. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWPpS.

**MED 680 P-Rheumatology (8)** *Mannik* Full-time inpatient-outpatient clerkship in rheumatology. Clinical experience provided in diagnosis and treatment of rheumatic diseases, utilizing outpatient clinics and hospitalized patients at the University of Washington Medical Center, Harborview Medical Center, or VAMC. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. Prerequisite: MED 665. Offered: AWPpS.

**MED 681 P-Clinical Dermatologic Surgery/Pathology (8)** Dermatologic surgery and pathology elective for senior medical students. Instruction in Mohs surgery, conventional skin surgery, cosmetic procedures, wound healing and closure, and intraoperative and postoperative patient management. Prerequisite: MED 665 and MED 678.

**MED 682 P-Clinical Cardiology and Electrocardiography (8)** *Caldwell (Veterans Administration Hospital), Comess (Harborview Medical Center), Eiriksson (Boise Veterans Administration Medical Center), Herzog (Anchorage Veterans Administration Hospital), Mascette (Madigan Hospital Medical Center), Otto (University of Washington Medical Center)* Clerkship in clinical cardiology-combined inpatient-outpatient assignments, ECG interpretation. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 683 P-Clinical Respiratory Disease and Critical Care Medicine (8)** *Lakshminahrayan (Veterans Administration Hospital), Pierson (Harborview Medical Center), Roth (Madigan) Thompson (Boise Veterans Administration Medical Center), Tonelli (University of Washington Medical Center)* Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing and interpretation. Inpatient and outpatient teaching rounds, conferences, and basic science integration. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 684 P-Clinical Hematology/Oncology (8)** *Broudy (Harborview Medical Center), Collins (Boise Veterans Administration Medical Center), Kaushansky (University of Washington Medical Center), Roth (Veterans Administration Hospital), Zuckerman (Boise Veterans Administration Medical Center)* Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 685 P-Clinical Genetics (\* max. 24)** *Bird, Byers, Motulsky, Stamatoyannopoulos* Full-time clinical clerkship in medical genetics. Provides extensive exposure to variety of genetic diseases and genetic counseling. Students work in three clinics (Monday, Tuesday, Thursday), response to in-house consultation requests, attend rounds at Children's Hospital and Medical Center and University of Washington Medical Center and seminars at University of Washington Medical Center (Wednesday, Friday). Prerequisite: MED 665. Offered: AWPpS.

**MED 688 P-Ward Medicine Subinternship (\* max. 24)** *R. Jones (Madigan Hospital Medical Center), McGee (Veterans Administration Medical Center), McMahan (Anchorage), Schoene (Providence), Sheffield (Harborview Medical Center)* Students act in the capacity of interns on the medical wards under supervision of house staff and visiting physicians.

They attend all regular medicine rounds and conferences as their schedules permit. Prerequisite: MED 665. (Four or six weeks.) Offered: AWPpS.

**MED 689 P-Clinical Infectious Diseases (8)** *Stamm (University of Washington Medical Center)* Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferences, and seminars. (Four weeks.) *Cooper (Madigan Army Medical Center), Corey (Fred Hutchinson Cancer Research Center), Holmes (Harborview Medical Center), Miller (Veterans Administration Hospital), Novan (Spokane), Stevens (Boise Veterans Administration Hospital)*. Participate in consulting service throughout hospital to learn microbiological aspects of infectious diseases through the clinical laboratories. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 690 P-Cardiology Subinternship (8)** *Ritchie (University of Washington Medical Center)* Students act in the capacity of interns on the cardiology service under the supervision of house officer. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 691 P-Primary Care (8/12)** *Paauw* Six-week, full-time ambulatory care block in primary care internal medicine. Students participate in several clinics at University of Washington Medical Center following a panel of patients in medicine, rheumatology, and virology clinics. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

**MED 692 P-Clinical Endocrinology and Metabolism (\* max. 12)** *Weigle (Seattle-based program), Bunner (Madigan)* Clerkship in clinical endocrinology and metabolism combined inpatient and outpatient assignments at selected hospitals. Prerequisite: MED 665. Offered: AWPpS.

**MED 693 P-Nephrology and Fluid Balance (8)** *Couser (University of Washington Medical Center), Narasimhan (Boise Veterans Administration Hospital), Novan (Spokane Sacred Heart), Sherrard (Veterans Administration Hospital), Zager (Harborview Medical Center)* Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, see consults with renal fellow and attending, and work up patients in renal clinics, participate in seminars with clerks from all three hospitals. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

**MED 694 P-Harborview Evening Clinic (2)** *Chew* A longitudinal elective for senior medical students who assume primary responsibility for a panel of medical patients in an outpatient clinic. Direct care of patients is supplemented by didactic sessions dealing with issues in ambulatory care. Students are strongly encouraged to participate for four quarters. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

**MED 695 P-Clinical Aspects of Aging (8)** *McCormick (Harborview Long Term Care Service and Harborview Medical Center)* Work with elderly patients as subintern with Senior Care Program. Inpatient and ambulatory setting in nursing homes and patients' homes. Interdisciplinary approach. Prerequisite: MED 665. Offered: AWPpS.

**MED 697 P-Medicine Special Electives (\* max. 24)** *Paauw* Special clerkship, externship, or research opportunities that can at times be made available at institutions other than University of Washington. Faculty can advise students of opportunities. Students wishing to elect this course should obtain from Dean's office a special assignment form at least three months before preregistration. Prerequisite: permission of department. (Two, four, six, or twelve weeks.) Offered: AWPpS.

## Microbiology

G315 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/MicrobiologyM.html](http://www.washington.edu/students/genocat/academic/MicrobiologyM.html)



Department Web page:  
[depts.washington.edu/micro/](http://depts.washington.edu/micro/)

Microbiology is a natural science that deals with microorganisms such as bacteria, fungi, protozoa, algae, and viruses. It is concerned with the nature and properties of these organisms, their effects on humans and the environment, and how they can be exploited to provide useful products.

## Graduate Program

Graduate Program Coordinator  
 G315 Health Sciences, Box 357242  
 (206) 543-2572  
[advmicro@u.washington.edu](mailto:advmicro@u.washington.edu)

The Department of Microbiology offers a graduate program leading to the Doctor of Philosophy degree. Students interested in graduate work should obtain the necessary application forms from the department.

The choice of an adviser and research problem are matters of mutual consent between the student and a faculty member. The course work taken by a graduate student depends to a certain extent upon the student's background and chosen area of specialization, but in general, courses are chosen from the fields of microbiology, immunology, biochemistry, genetics, and cell biology. A master's degree program either with or without thesis is available on a very limited basis. An M.S. degree is not necessarily a prerequisite for the Ph.D. degree.

Applicants are evaluated by a committee that considers the student's grades, scores on the Graduate Record Examination, research experience, letters of recommendation, and any other data that might provide an indication of the student's capabilities for success in a career in science.

Students are normally admitted into the graduate program only in autumn quarter, and all application materials should be received by the department no later than the preceding December 31. Graduate Record Examination aptitude scores are required as part of the application, and the examination should be taken no later than October. Three letters of recommendation must also be sent directly to the department.

Students with a variety of academic backgrounds are accepted for graduate study in microbiology, but it is highly desirable that their undergraduate preparation include at least a year of general chemistry and a year of college physics, courses in organic chemistry and quantitative analysis, calculus, one year of biology, and courses in genetics, biochemistry, and microbiology.

Students in the Ph.D. program are usually supported by funds from training grants, research grants, or teaching assistantships.

## Faculty

### Chair

James I. Mullins

### Professors

Champoux, James J. \* 1972; PhD, 1970, Stanford University; DNA replication, tumor virology.

Clark, Edward A. \* 1984; PhD, 1977, University of California (Los Angeles); lymphocyte surface molecules, lymphocyte activation and cell communication.

Corey, Lawrence \* 1977, (Adjunct); MD, 1971, University of Michigan; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus.

Coyle, Marie B. \* 1973; PhD, 1965, Kansas State University; DNA probes and GLC for rapid identification of mycobacteria and corynebacteria.

Cutler, Jim E. 1995, (Affiliate); PhD, 1972, Tulane University; mycology, host-parasite relationships, molecular biology.

Emerman, Michael 1994, (Affiliate); PhD, 1986, University of Wisconsin; molecular biology of HIV.

Evans, Charles A. 1946, (Emeritus); MD, 1937, PhD, 1943, University of Minnesota; microbial flora of human skin, medical virology.

Fields, Stanley \* 1995, (Adjunct); MA, 1978, PhD, 1981, Cambridge University (UK); molecular genetics.

Floss, Heinz G. \* 1987, (Adjunct); PhD, 1961, Technical University of Munich (Germany); bioorganic and natural products chemistry.

Galloway, Denise A. \* 1982, (Research); PhD, 1976, City University of New York; viral pathogenesis and neoplasia.

Gilliland, Bruce C. \* 1970, (Adjunct); MD, 1960, Northwestern University; rheumatology/immunology.

Gordon, Milton \* 1959, (Adjunct); PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants, sequence of agrobacteria.

Greenberg, Philip D. \* 1978, (Adjunct); MD, 1971, State University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.

Groman, Neal B. \* 1950, (Emeritus); PhD, 1950, University of Chicago.

Hakomori, Sen-itiroh \* 1967; MD, 1951, DMedSc, 1956, Tohoku University (Japan); role of glycosphingolipids in defining antigenicity, cellular interaction, and signal transduction.

Holmes, King K. \* 1967, (Adjunct); MD, 1963, Cornell University; PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.

Hu, Shiu-Lok 1988; PhD, 1978, University of Wisconsin; molecular virology, immunology and vaccine research.

Janis, Burton 1996, (Affiliate); MD, 1963, Northwestern University; infectious diseases.

Katze, Michael Gerald \* 1987; PhD, 1980, Hahnemann Medical College; regulation of viral gene expression at the translational level.

Kenny, George E. \* 1961, (Adjunct); PhD, 1961, University of Minnesota; human immune response to infectious diseases, detection and biology of mycoplasmas.

Klebanoff, Seymour \* 1962, (Adjunct); MD, 1951, University of Toronto (Canada); PhD, 1954, University of London (UK); infectious disease.

Lamont, Richard J. \* 1988, (Adjunct); PhD, 1985, University of Aberdeen (UK); pathogenic mechanisms and taxonomy of oral bacteria.

Lidstrom, Mary E. \* 1990; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

Linial, Maxine L. \* 1982, (Research); PhD, 1970, Tufts University; retroviral replication and genetics, retroviral transformation.

Lory, Stephen \* 1984; PhD, 1980, University of California (Los Angeles); biochemistry, genetics of microbial virulence factors.

Lukehart, Sheila A. \* 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); infectious diseases.

Mannik, Mart \* 1966, (Adjunct); MD, 1959, Case Western Reserve University; rheumatology.

Miller, Robert C. 1995; PhD, 1969, University of Pennsylvania; genetics and molecular biology.

Miller, Samuel I. \* 1995; MD, 1979, Baylor University; molecular pathogenesis of bacterial diseases.

Mullins, James I. \* 1994; PhD, 1978, University of Minnesota; cell biology and biochemistry.

Nester, Eugene W. \* 1962; PhD, 1959, Case Western Reserve University; genetics and biochemistry of bacterial-plant cell interactions, tumorigenesis.

Rubens, Craig E. \* 1984, (Adjunct); PhD, 1978, Medical University of South Carolina; MD, 1982, University of Washington; molecular pathogenesis of Group B streptococcal infections in newborn infants.

Sherris, John C. \* 1959, (Emeritus); MBBS, 1948, MD, 1950, University of London (UK); medical microbiology, antibiotic action and resistance.

Staley, James T. \* 1971; PhD, 1967, University of California (Davis); microbial ecology, bacterial systematics, general microbiology.

Stuart, Kenneth Daniel \* 1985, (Adjunct); PhD, 1969, University of Iowa; molecular biology of protozoan pathogens.

Tarr, Phillip I. 1983, (Adjunct); MD, 1980, Yale University; gastroenterology/infectious diseases.

Vessella, Robert L. 1989, (Adjunct); PhD, 1974, University of Mississippi; tumor markers and immunology.

### Associate Professors

Bundtzen, Robert 1996, (Affiliate); MD, 1975, University of Washington; infectious diseases.

Fritsche, Thomas R. \* 1981; MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites; medical microbiology.

Geballe, Adam Philip \* 1988, (Adjunct); MD, 1978, Duke University; virology.

Haigwood, Nancy L. \* 1994; PhD, 1980, University of North Carolina; host immunity in the control and prevention of AIDS.

Herwig, Russell P. \* 1983, (Adjunct Research); PhD, 1989, University of Washington; environmental microbiology, bioremediation, molecular microbial ecology, microbial phylogenetics.

Hill, Walter E. \* 1992, (Affiliate); PhD, 1972, University of Washington; genetic methods for detecting and characterizing foodborne microbial pathogens.

Hughes, Kelly T. \* 1989; PhD, 1984, University of Utah; genetics, gene regulation, microbial physiology, and metabolism.

Janis, Mary K. 1996, (Affiliate); PhD, 1982, University of Utah; immunology, pathology.

Lampe, Mary F. \* 1988, (Adjunct); MS, 1976, University of Washington; PhD, 1984, University of North Carolina; medical technology education, molecular analysis of Chlamydia trachomatis pathogenesis.

Lara, Jimmie Cano \* 1972; PhD, 1970, University of California (Riverside); microbial physiology and crytology, sporulation and gas vesicle synthesis and regulation.

Leigh, John A. \* 1985; PhD, 1983, University of Illinois; bacterial physiology, biochemistry, genetics.

Moseley, Stephen L. \* 1985; PhD, 1981, University of Washington; molecular basis of pathogenesis in E. coli diarrhea.

Overbaugh, Julie Maureen \* 1988; PhD, 1983, University of Colorado (Boulder); molecular mechanisms of virus-host cell interactions/retroviral pathogenesis/aids.

Paznokas, John Lawrence 1988, (Affiliate); PhD, 1974, St. Louis University.

Traxler, Beth A. \* 1992; PhD, 1987, Carnegie Mellon University; bacterial physiology, genetics, and membrane protein biochemistry.

### Assistant Professors

Bohach, Gregory A. 1992, (Affiliate); PhD, 1985, West Virginia University; medical microbiology.

Cookson, Brad T. \* 1991; MD, 1991, PhD, 1991, Washington University; cellular immune response to intracellular bacteria, microbial pathogenesis, clinical microbiology.

Law, Che-Leung 1990, (Affiliate); PhD, 1990, University of Minnesota; immunology, B cell activation and development.

Mittler, John E. 1999, (Research); PhD, 1992, University of California (Irvine).

### Senior Lecturers

Anderson, Denise G. 1982; MS, 1985, University of Washington; microbiology laboratory teaching.

Bicknell, Mary 1975; MS, 1962, University of Washington; microbiology laboratory teaching.

Fulton, Janis R. 1983; MS, 1977, Montana State University; microbiology laboratory teaching.

### Lecturers

Barnes, Glover W. \* 1969; MA, 1955, PhD, 1961, State University of New York (Buffalo); tissue, organ immunology.

Chandler, Mark S. 1998; PhD, 1998, University of Illinois; microbiology laboratory teaching.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**MICROM 402 Fundamentals of General Microbiology Laboratory (3) NW** *Bicknell, Fulton* Isolation of a broad range of nonpathogenic bacteria from natural sources, using selective and enrichment techniques, with microscopic and biochemical identification. Related exercises include genetics, quantitation, and growth kinetics. Prerequisite: BIOL 201; recommended: MICROM 410 which may be taken concurrently. Offered: ASp.

**MICROM 410 Fundamentals of General Microbiology I (3) NW** *Lara, Traxler* Survey of the microbial world, metabolism, biosynthesis, regulation, growth, structure, and function. Required for students majoring in microbiology; recommended for students majoring in biology. Prerequisite: BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

**MICROM 411 Gene Action (5) NW** *Hughes, Manoil* Molecular genetics: description of fundamental genetic processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focuses on prokaryotic organisms. Prerequisite: BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with GENET 411; W.

**MICROM 412 Fundamentals of General Microbiology III (3) NW** *Leigh* Structure, biochemical properties, and genetics of the major groups of prokaryotes. Prerequisite: either BIOL 201 or BIOL 203; recommended: either CHEM 223, CHEM 237, or CHEM 335; MICROM 410. Offered: Sp.

**MICROM 431 Prokaryotic Recombinant DNA Techniques (3) NW** *Anderson* Laboratory course emphasizing concepts and techniques/methodologies in recombinant DNA research employing bacteria and their viruses. Topics and experiments/demonstrations include genomic and plasmid DNA isolation, restriction mapping, cloning, transposon mutagenesis, sequencing, and Western and Southern blotting. No auditors. Prerequisite: either BIOL 201 or MICROM 301. Offered: W.

**MICROM 435 Microbial Ecology (3) NW** *Staley* Consideration of the various roles that microorganisms, particularly bacteria and cyanobacteria, play in environmental processes. The interrelationships among microorganisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Prerequisite: BIOL 203. Offered: even years; Sp.

**MICROM 440 Introductory Bacteriology for Medical Technologists (1) NW** *Anderson* Limited introduction to basic microbiology, with focus on structure, metabolism, and genetics of medically important organisms. Open only to medical technology students. Credit/no credit only. Offered: A.

**MICROM 441 Introduction to Immunology (4) NW** General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: BIOL 202; recommended: either GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with IMMUN 441; A.

**MICROM 442 Medical Bacteriology (3) NW** *Cookson, Lampe* Medically important bacterial pathogens are discussed in terms of the clinical, therapeutic, and epidemiological aspects of diseases caused by them, molecular mechanisms of pathogenesis and their identification in the clinical laboratory. Laboratory course 443 coordinates. Prerequisite: BIOL 202; recommended: MICROM 410; MICROM 441. Offered: W.

**MICROM 443 Medical Microbiology Laboratory (3) NW** *Anderson, Coyle, Fritsche, Fulton* Required for medical technology students, microbiology majors; elective for medical students. Procedures for isolation and identification of pathogenic bacteria, testing their susceptibility to antibiotics. No auditors. Prerequisite: BIOL 201; recommended: MICROM 410. Offered: AW.

**MICROM 444 Medical Mycology and Parasitology (4) NW** *Anderson, Coyle, Fritsche, Fulton* Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis. For medical technology students, microbiology majors, and medical students as an elective. Prerequisite: BIOL 202; recommended: immunology. Offered: Sp.

**MICROM 445 Medical Virology (2) NW** *Mullirus, Thouless* An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined. Prerequisite: BIOL 201; recommended: MICROM 441. Offered: jointly with PABIO 445; Sp.

**MICROM 450 Molecular Biology of Viruses (3) NW** *Champoux* Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduates and graduate students in the biological sciences. Coverage includes bacterial and animal viruses, with an emphasis on the molecular mechanisms of viral gene expression and regulation. Prerequisite: BIOL 201; recommended: MICROM 410, MICROM 411, GENET 371, or GENET 372. Offered: Sp.

**MICROM 495- Honors Undergraduate Research (\*-)** *Leigh* Specific problems in microbiology or immunology. Offered: AWSpS.

**MICROM 496 Undergraduate Library Research (2)** *Leigh* Introduction to library research and to the microbiological literature. Topics are assigned and supervised by staff members. Credit/no credit only. Offered: AWSpS.

**MICROM 499- Undergraduate Laboratory Research (\*)** *Leigh* Specific problems in microbiology or immunology. Credit/no credit only. Offered: AWSpS.

**MICROM 500 Introduction to Research (\* max. 20)** Introduction to research areas of the faculty and the techniques employed in their investigations. Credit/no credit only. Prerequisite: graduate standing in microbiology or permission of instructor. Offered: AWSpS.

**MICROM 510 Physiology of Bacteria (3)** *Traxler* Topics of current interest concerning the molecular biology and physiology of bacteria. Prerequisite: MICROM 410 and BIOC 440, 441, and 442, or permission of instructor. Offered: odd years; W.

**MICROM 518 Microbial Degradation of Toxic Contaminants (3)** *Herwig, Strand* Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with CEE 542/ESC 518; Sp.

**MICROM 520 Seminar (1)** *Hughes* Credit/no credit only. Offered: AWSp.

**MICROM 522 Current Research in Microbiology (1)** *Hughes* Weekly student and faculty seminar presentations based on the current literature. Credit/no credit only. Prerequisite: graduate standing in microbiology. Offered: AWSp.

**MICROM 526 Research of Cell Surface Problems (1)** *Traxler* Weekly research seminar and discussion of scientific literature pertaining to the process of membrane protein biogenesis. Credit/no credit only. Prerequisite: permission of instructor.

**MICROM 527 Genetic Approach to Complex Biological Processes (1)** *Hughes* Current research as it applies to genetic approaches to complex biological processes in the area of microbiology. Offered: AWSpS.

**MICROM 528 Salmonella Genetics (1)** *Hughes* Review current literature in the area of gene regulation in *Salmonella typhimurium* and related studies in *Escherichia coli*. Prerequisite: graduate student standing; advanced undergraduates by permission of instructor. Offered: AWSpS.

**MICROM 530 Biology and Evolution of Prokaryotes (4)** *Leigh, Staley* Selected eubacterial and archaeobacterial groups studied. Students enrich, isolate, and characterize their own cultures as part of the laboratory. Prerequisite: MICROM 402, MICROM 412 or equivalents; open to qualified undergraduates by permission of instructor. Offered: even years; A.

**MICROM 532 Seminar in General Microbiology (1, max. 15)** *Leigh* Weekly seminar concerning research topics in the genetics and biochemistry of selected bacteria. Credit/no credit only. Prerequisite: MICROM 410, permission of instructor. Offered: AWSpS.

**MICROM 540 Virology (3)** *Katze* Lecture-seminar course concerning host-viral interactions. Prerequisite: permission of instructor. Offered: even years; W.

**MICROM 552 Pathogenic Microbiology (4)** *Katze, Lory* Introduction to concepts and techniques of general microbiology, to major groups of infectious agents affecting the human body, and to mechanisms and models of pathogenesis. Prerequisite: BIOL 201, BIOL 202, BIOL 203, or equivalent and some basic immunology; for dental students, others by permission of instructor. Offered: Sp.

**MICROM 553 Molecular Mechanisms of Bacterial Pathogenesis (3)** *Lory, Moseley, Rubens* Mechanisms of bacterial pathogenesis explored at the molecular, genetic, and cellular levels through selected models as presented in the current scientific literature. Prerequisite: MICROM 411 or equivalent. Offered: odd years; A.

**MICROM 554 Seminar in Molecular and Medical Microbiology (1, max. 15)** *Lory, Moseley* Weekly one-hour seminar in which recent advances in molecular biology of microbial pathogenesis or the current research of the participants is presented and discussed critically. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**MICROM 555 Advanced Clinical Microbiology (2.5)** *Cookson, Fritsche, Limaye* Attendance at daily plate rounds of the Division of Clinical Microbiology. Designed to increase understanding of clinical microbiological work and its application to the care of the patient. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor. Offered: AWSp.

**MICROM 556 Clinical Microbiology Training and Research (\* max. 12)** *Fritsche* Training in clinical microbiology and applied research. Attendance at daily laboratory rounds in addition to bench-side training and research. For medical students and microbiology graduate students only. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor.

**MICROM 560 Research and Journal Club in Retrovirology (1)** *Linial* Weekly research seminar and discussion of literature in areas of retroviral replication and transformation. Prerequisite: graduate or permission of instructor. Offered: AWSpS.

**MICROM 562 Oncogene and Retrovirus Research Seminar (1)** *Linial, Overbaugh* Weekly discussions of ongoing research related to retroviral replication, retroviral oncogenes and pathology. Prerequisite: graduate standing or permission of instructor. Offered: AWSpS.

**MICROM 585 Research in Cell and Molecular Biology (1, max. 15)** *Champoux* Weekly research seminar. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MICROM 588 Research in Applied Microbiology (1)** *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 588; AWSpS.

**MICROM 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**MICROM 700 Master's Thesis (\*)** Credit/no credit only.

**MICROM 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.

## Molecular Biotechnology



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Molecular\\_Biotech.html](http://www.washington.edu/students/gencat/academic/Molecular_Biotech.html)



Department Web page:  
[www.mbt.washington.edu](http://www.mbt.washington.edu)

The Department of Molecular Biotechnology was created with the conviction that the future of biology and medicine lies in the ability to apply a multidisciplinary approach to the analysis of complex systems. The cellular interactions in the immunologic and neural networks regulate some of the most complex behaviors and responses of living organisms. The 100,000 genes that dictate the complex system of human development constitute another example. The organization of these genes on the chromosome, their sequence polymorphism, transcriptional control, and evolutionary relationships must be analyzed to understand fully the intricacies of development. Progress in understanding these systems is directly correlated to the sophistication of the available research tools. The department is committed to training students to focus on the development and/or the application of powerful new tools to leading-edge problems in biology and medicine. The nature of the tools will change in response to the challenges posed by contemporary biology.

## Graduate Program

Graduate Program Coordinator  
K336 Health Sciences, Box 357730  
(206) 616-7297  
[gradprog@mbt.washington.edu](mailto:gradprog@mbt.washington.edu)

The graduate program in molecular biotechnology trains students to bring the knowledge and recent advances in a variety of disciplines—e.g., physics, chemistry, engineering, and computer sciences—to bear on the complex problems of modern biology and medicine. The program emphasizes extensive research experience within an interdisciplinary and state-of-the-art research environment.

The program has a broad, interdisciplinary nature. Therefore, each student's educational objectives will differ. Students are guided by their Dissertation Supervisory Committee to obtain knowledge of selected topics in four areas, as well as a thorough knowledge of topics related to their chosen area of research. The four areas are (1) molecular/cell biology and genetics, (2) chemistry, (3) physics and instrumentation, and (4) applied mathematics or computer science. This requirement can be met through a combination of molecular biotechnology courses, additional elective courses, and reading assignments tailored to the student's background and specific interests.

## Doctor of Philosophy

The molecular biotechnology graduate program is designed to educate and stimulate students at the interface of biological, physical, and computational sciences. Students are trained to focus on the development and/or application of new tools to challenging biological problems. These tools include the development of new chemistries, instruments, and computer hardware or software for the analysis of DNA, proteins, or cells. The goal of the program is to provide students with a sound background in molecular and cellular biology, and a broad access to research expertise in disciplines outside biology. Accordingly, the faculty brings together skills in applied mathematics, biology, chemistry, computer sciences, physics, and instrument design. Particular areas of expertise include immunology, protein chemistry, nucleic-acid chemistry, analytical cytogenetics, large-scale DNA mapping and sequencing (genomics), and computational biology.

## Research Facilities

The department is currently housed in the H- and K-wings in the Health Sciences Complex. Students in the department are assigned space in the laboratories of faculty members with whom they do their rotations or dissertation research. State-of-the-art research facilities are available in the department for cellular, protein, and DNA analysis. Extensive computer and library resources are also available to students.

## Admission Requirements

Admission to the Graduate School requires that a prospective student hold a baccalaureate degree from an accredited college or university in the United States or its equivalent in a foreign country. Students are required to have a cumulative GPA of 3.00 ("B") or better, and to have taken and received high scores on the Graduate Record Examination (generally in the 80th percentile or higher).

In addition to completing the application requirements for the Graduate School, an applicant should also forward the following items to Graduate Student Services, Department of Molecular Biotechnology, Box 357730, University of Washington, Seattle, WA 98195-7730: (1) the MBT admissions form available through the department Web site or through the program office; (2) a copy of the Graduate School Application; (3) official school transcripts; (4) official copies of Graduate Record Examination scores for the general test, as well as the results of an advanced-subject test; (5) a statement of objective; (6) a curriculum vitae, if available; (7) TOEFL scores, if applicable; and (8) three letters of recommendation with evaluation forms, available from the MBT Web site or through the program office. Students are admitted for autumn quarter only. The application deadline is January 15.

## Faculty

### Acting Chair

Barbara J. Trask

### Professors

Aebersold, Rudolf Hans \* 1993; PhD, 1983, University of Basel (Switzerland); developing technologies to analyze proteins and proteomes, biochemistry of cellular signaling pathways.

Green, Philip \* 1994; PhD, 1976, University of California (Berkeley); mathematical and computer methods for genome analysis.

Hood, Leroy E. \* 1992, (Affiliate); MD, 1964, Johns Hopkins University; PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

King, Mary-Claire \* 1995, (Adjunct); PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

Siegel, Andrew F. \* 1983, (Adjunct); MS, 1975, PhD, 1977, Stanford University; statistics, computing, corporate finance, investments, data analysis.

Trask, Barbara J. \* 1992; PhD, 1985, University of Leiden (Netherlands); molecular cytogenetics, large-scale genome organization and polymorphism, genomics of olfaction.

Van Den Engh, Ger \* 1992; PhD, 1976, University of Leiden (Netherlands); flow cytometry, quantitative cytogenetics, instrument design and development.

### Associate Professors

Goverman, Joan M. \* 1992; PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.

Kruglyak, Leonid \* 1998, (Affiliate); PhD, 1990, University of California (Berkeley); genetic linkage analysis, population genetics, analysis of gene expression arrays.

Nickerson, Deborah A. \* 1992; PhD, 1978, University of Tennessee; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics.

Ostrander, Elaine A. \* 1994, (Affiliate); PhD, 1987, Oregon Health Sciences University; study of human cancer susceptibility genes.

Yates, John R. III \* 1992, (Affiliate); PhD, 1987, University of Virginia; biological mass spectrometry, protein sequencing, computational methods for data analysis.

### Assistant Professor

Nelson, Peter S. \* 1993, (Adjunct); MD, 1986, University of Kansas; study of human carcinogenesis using tools of genomics and bioinformatics.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**MBT 450 Introduction to Molecular Biotechnology (2)** *Trask* Highlights of the current research interests of Molecular Biotechnology faculty. Topics cover the interface between biology and technology for DNA and protein analysis. Credit/no credit only. Offered: A.

**MBT 499 Undergraduate Research (1-5, max. 12)** Individual research projects in Molecular Biotechnology related to: human genetics, cytogenetics, large-scale sequencing and mapping, protein structure and function, and computational analysis of protein and DNA sequences. Offered: AWSpS.

**MBT 501 Introduction to Research (1-9, max. 15)** Laboratory rotations for first year graduate students. Research projects in faculty labs covering various laboratory methods. Prerequisite: graduate student in MBT. Offered: AWSpS.

**MBT 510 Technologies for Genome Analysis (3)** *Goverman, Nickerson, Trask* Discussion of current and newly-emerging technologies in genome analysis with regard to applications in biology and medicine and to potential advantages and limitations. Prerequisite: permission of instructor. Offered: A.

**MBT 520 Technologies for Protein Analysis (3)** *Aebersold* Discussion of current and newly-emerging technologies in protein analysis with regard to applications in biology and medicine and to potential advantages and limitations. Prerequisite: permission of instructor. Offered: W.

**MBT 530 Advanced Instrumentation for Genome Analysis (3)** *van den Engh* Presentation of principles and use of instruments for genome analysis. Discussion of limitations of present instruments and potential improvements. Theory of electrophoretic and fluorescence-based DNA analysis techniques. Prerequisite: permission of instructor. Offered: Sp.

**MBT 550 Seminar in Molecular Biotechnology (1, max. 12)** *Trask* Presentation of independent research by invited outside speakers and members of the Department of Molecular Biotechnology. Emphasis on new and original contributions to the field of molecular biotechnology. Credit/no credit only. Offered: AWSp.

**MBT 551 Seminars in Computational Biology (1)** *Green* Presentation and discussion of current topics in computational biology by guest speakers. Prerequisite: permission of instructor. Offered: AWSp.

**MBT 560 Molecular Biotechnology Literature Conference (1, max. 12)** *Goverman* A weekly presentation and discussion by faculty, postdoctorates, and graduate students on state-of-the-art research in molecular biotechnology. Journal Club sessions, during which results gleaned from current literature are discussed and critically analyzed, alternating with Research in Progress sessions, during which students and postdoctorates presents their own research work. Prerequisite: permission of instructor. Credit/no credit only. Offered: AWSp.

**MBT 561 Research Discussions (1)** Oral and written presentations of research objectives, techniques, results and perspectives obtained through laboratory rotations and independent research. Emphasis is placed on improving oral presentation skills. Prerequisite: graduate student standing, permission of Graduate Program Director. Offered: AWSp.

**MBT 599 Special Topics in Molecular Biotechnology (\* max. 12)** Prerequisite: permission of instructor. Offered: AWSp.

**MBT 600 Independent Study or Research (\*)** Credit/no credit only.

**MBT 700 Master's Thesis (\*)** Credit/no credit only.

**MBT 800 Doctoral Dissertation (\*)** Credit/no credit only.

## Neurological Surgery

700 9th Avenue, Harborview Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Neurological\\_Surgery.html](http://www.washington.edu/students/genecat/academic/Neurological_Surgery.html)



Department Web page:  
[www.neurosurgery.washington.edu](http://www.neurosurgery.washington.edu)

The Department of Neurological Surgery is dedicated to teaching and research in the entire spectrum of diseases of the central and peripheral nervous system. Instruction in this area is provided for medical students and postgraduate physicians.

The department's medical-student instruction includes participation in the human-biology curriculum as well as in elective basic-science and clinical experiences. These are available at Harborview Medical Center, University of Washington Medical Center, Veterans Affairs Puget Sound Health Care Center, and Children's Hospital and Regional Medical Center. The department also has several course offerings correlating research and clinical problems of the nervous system, including the neuroscience research seminar, and clinical and basic-science correlates of the epilepsies.

Selected medical students also may elect research experience within the Department of Neurological Surgery. The department research facilities are housed in the Medical Research Tower of the University of Washington Medical Center, at Harborview Research and Training Building, and at Veterans Affairs Puget Sound Health Care System. Investigations are under way at these institutions in many areas of neurophysiology, in behavioral research, in light and electron microscopic examination of the anatomy of the nervous system, in cerebrovascular physiology, and in neuro-oncology.

In addition to undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The eight-year program emphasizes preparation for a career in academic neurosurgery.

## Faculty

### Chair

H. Richard Winn

### Professors

Alvord, Ellsworth C. \* 1960, (Adjunct); MD, 1946, Cornell University; neuropathology, experimental allergic encephalitis, multiple sclerosis, brain tumors.

Chatrian, Gian E. 1981, (Emeritus); MD, 1951, University of Naples (Italy); electroencephalography and clinical neurophysiology.

Cohen, Wendy A. 1987; MD, 1975, Harvard University; neuroradiology.

Dikmen, Sureyya S. \* 1974, (Adjunct); PhD, 1973, University of Washington; clinical neuropsychology, neuropsychological and psychosocial outcomes in traumatic head injury.

Dodrill, Carl B. 1973; MS, 1967, PhD, 1970, Purdue University; human neuropsychology, epilepsy, EEG and performance, antiepileptic medications and performance.

Domino, Karen B. 1986, (Adjunct); MA, 1974, University of New Mexico; MD, 1978, University of Michigan; neuroanesthesia.

Eskridge, Joseph M. 1987; MD, 1981, University of Louisville; neuroradiology.

Fraser, Robert T. \* 1976; PhD, 1976, University of Wisconsin; psychology.

Gruss, Joseph S. 1991, (Adjunct); MBChB, 1969, University of Witwatersrand (S Africa); craniofacial and maxillofacial surgery.

Harris, A. Basil 1967; MD, 1954, University of Alabama; neurosurgery, neuroanatomy, microvascular, arteriovenous malformations, epilepsy mechanisms.

Jaffe, Kenneth M. \* 1981, (Adjunct); MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects, electromyography.

Kelly, William A. 1959, (Emeritus); MD, 1954, University of Cincinnati; neurosurgery, neuroendocrinology.

Lam, Arthur M. 1986; MD, 1974, Western Ontario University (Canada); neuroanesthesia.

Levy, Rene H. \* 1970; PhD, 1970, University of California (San Francisco); metabolic interactions among antiepileptic drugs and between cytokines and drugs.

Loeser, John D. 1969; MD, 1961, New York University; pain, neurophysiology.

Maravilla, Kenneth R. 1986; MD, 1970, State University of New York (Brooklyn); neuroradiology and neurosurgery.

Miller, John W. 1999; MD, 1977, PhD, 1981, University of Illinois; epilepsy and clinical neurophysiology.

Morrison, Richard S. \* 1994; PhD, 1982, University of California (Los Angeles); genetic pathways regulating neuronal cell death in disease and injury.

Ojemann, George A. 1966; MD, 1959, University of Iowa; neurophysiology, organization of higher functions in brain, language, memory.

Roberts, Theodore S. 1985; MS, 1952, MD, 1955, University of Wisconsin; neurological surgery, stereotaxic surgery, pituitary and cerebrovascular disease.

Rubel, Edwin W. \* 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Schwartzkroin, Philip A. \* 1978; PhD, 1972, Stanford University; mechanisms of cortical excitability.

Shaw, Cheng-Mei \* 1963, (Adjunct); MD, 1950, National Taiwan University; neuropathology, immunopathology, neurotoxicology, congenital malformation.

Spence, Alexander M. 1974, (Adjunct); MD, 1965, University of Chicago; neurology, neuro-oncology.

Westrum, Lesnick E. \* 1966; MD, 1963, University of Washington; PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Winn, H. Richard \* 1983; MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

### Associate Professors

Anderson, Gail \* 1981, (Adjunct); PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Chapman, Jens R. 1990; MD, 1983, Technical University of Munich (Germany); orthopaedics, spine trauma/reconstruction.

Dalley, Robert W. 1987; MD, 1982, University of Utah; neuroradiology.

Ellenbogen, Richard G. 1997; MD, 1983, Brown University; pediatric neurosurgery, neuro-oncology, complex spine.

Geyer, Jeffrey R. 1984; MD, 1977, Wayne State University; hematology/oncology.

Goodkin, Robert 1987; MD, 1964, Chicago Medical School; neurological surgery.

Haynor, David R. \* 1979, (Adjunct); PhD, 1971, University of California (Berkeley); MD, 1979, Harvard University; medical image processing and segmentation, image deformation, functional MRI, expression arrays.

Kliot, Michel 1990; MD, 1984, Yale University; peripheral nerve injury and diseases, nerve injury/regeneration.

Newell, David W. 1982; MD, 1982, Case Western Reserve University; clinical neurosurgery and neurovascular mechanizing of cerebral ischemia.

Ojemann, Linda M. 1974; MD, 1960, University of Illinois; neurology, treatment of epilepsy.

Shaffrey, Christopher I. 1999; MD, 1986, University of Virginia; spinal disorders including fractures, tumors, spinal deformity, and degenerative conditions.

Silber, John R. 1990, (Research); PhD, 1977, University of Florida; DNA repair in human brain, mechanisms of human neurocarcinogenesis.

Silbergeld, Daniel L. 1984; MD, 1984, University of Cincinnati; brain tumors, epilepsy.

Stelzer, Keith J. 1990; PhD, 1985, University of Kansas; MD, 1989, University of California (Los Angeles); therapeutic radiology.

Temkin, Nancy R. \* 1977; PhD, 1976, State University of New York (Buffalo); clinical trials, recovery models, statistical modeling of epileptic phenomena, survival analysis.

Wenzel, Jurgen 1993, (Research); DSc, 1975, Humboldt University (Germany); neuroanatomy and epilepsy research, brain development.

Wilensky, Alan J. 1975; MD, 1967, Western Ontario University (Canada); PhD, 1973, University of Toronto (Canada); neurology, treatment of epilepsy, testing and use of anticonvulsants.

### Assistant Professors

Baxter, Alexander B. 1994; MD, 1985, University of Michigan; neuroradiology.

Becker, Kyra J. 1996; , MD, 1989, Duke University; stroke, neurophysiology.

Bobola, Michael S. 1997, (Research); PhD, 1991, University of New Hampshire.

D'Ambrosio, Raimondo 1998, (Research); PhD, 1995, University of Milan.

Jarvik, Jeffrey G. 1993; MD, 1987, University of California (San Diego); neuroradiology, outcomes research.

Mirza, Sohail K. 1989; MD, 1989, University of Colorado (Denver); spinal surgery/spine biomechanics.

Rostomily, Robert C. 1987; MD, 1987, Case Western Reserve University; surgery of adult brain and cranial base tumors, molecular biology of nervous system tremors.

West, G. Alexander 1988; PhD, 1984, MD, 1989, University of Virginia; vascular disease, epilepsy, brain and spinal cord trauma.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**NEUR S 498 Undergraduate Thesis (\*) Silber** Offered: AWSpS.

**NEUR S 499 Undergraduate Research (\*) Silber** Investigation of special problems as an intimate member of the research team in the neurological surgery laboratories. Research to lead to a thesis, if desired. List of projects available on request. Prerequisite: permission of instructor. Offered: AWSpS.

**NEUR S 505 P-Preceptorship in Academic Neurosurgery (1) Winn** Opportunity for first- and second-year medical students to observe the research, teaching, and patient-care activities of academic neurosurgery. Prerequisite: permission of instructor. Offered: AWSpS.

**NEUR S 680 P-Neurological Surgery Clerkship (\* max. 8) Newell, Silbergeld** Student serves clinical clerkship as an intimate member of the staff, participating in inpatient and outpatient care, both preoperative and postoperative, involving neurological surgery patients. University of Washington Medical Center or a University-affiliated hospital may be selected, subject to approval of the department. Prerequisite: HUBIO 563. (Four weeks.) Offered: AWSpS.

**NEUR S 697 P-Neurological Surgery Special Electives (\* max. 24) Winn** By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWSpS.

**NEUR S 699 P-WWAMI Neurological Surgery Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

## Neurology

RR650 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genccat/academic/Neurology.html](http://www.washington.edu/students/genccat/academic/Neurology.html)

Neurology, previously a division of the Department of Medicine, became an independent department at the University of Washington School of Medicine in autumn of 1995. The four-year residency program (including an internship) has been expanded and offers superb training in all facets of neurology in a setting of great institutional strength in fundamental neuroscience research. In addition, the Department of Neurology offers exceptional training programs in the Division of Pediatric Neurology and in the Epilepsy Center. A clinical-clerkship program provides basic training in neurology patient care. The Neurology Department is active in teaching, research, and patient care at the University of Washington Medical Center, Seattle Veterans Affairs Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, and the Fred Hutchinson Cancer Research Center. Medical students, interns, neurology residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

## Faculty

### Chair

Bruce Robert Ransom

### Professors

Bird, Thomas D. 1976; MD, 1968, Cornell University; neurology, neurogenetics.

Chance, Phillip F. 1998; MD, 1978, University of Tennessee; pediatric neurology and genetics.

Dodrill, Carl B. 1973; MS, 1967, PhD, 1970, Purdue University; human neuropsychology, epilepsy, EEG and performance, antiepileptic medications and performance.

Farrell, Donald F. 1971; MD, 1965, George Washington University; neurology, clinical neurophysiology including intraoperative monitoring, evoked potentials.

Fraser, Robert T. \* 1976; PhD, 1976, University of Wisconsin; psychology.

Kraft, George Howard \* 1969, (Adjunct); MD, 1963, Ohio State University; electromyography, rehabilitation of central nervous system diseases, multiple sclerosis.

Longstreth, W. T. Jr. \* 1981; MD, 1975, University of Pennsylvania; MPH, 1982, University of Washington; neurology.

Miller, John W. 1999; MD, 1977, PhD, 1981, University of Illinois; epilepsy and clinical neurophysiology.

Ransom, Bruce Robert \* 1995; MD, 1972, PhD, 1972, Washington University; neurology, movement disorders, neuroscience research.

Sarnat, Harvey B. 1992; MD, 1966, University of Illinois; pediatric neurology, neuromuscular diseases, neurodevelopment.

Schellenberg, Gerard 1983, (Research); PhD, 1978, University of California (Riverside); neurogenetics of Alzheimer's Disease, aging.

Spence, Alexander M. 1974; MD, 1965, University of Chicago; neurology, neuro-oncology.

Stahl, William L. \* 1975; PhD, 1963, University of Pittsburgh; neurochemistry of brain ATPase systems.

Sumi, Shuzo Mark 1966, (Emeritus); MD, 1956, University of Toronto (Canada); neuropathology, neuromuscular disease, neurodegenerative diseases.

Swanson, Phillip D. 1964; MD, 1958, Johns Hopkins University; PhD, 1964, University of London (UK); movement disorders, neurology.

### Associate Professors

Marra, Christina M. 1984; MS, 1979, Oregon State University; MD, 1984, University of Oregon; neurology, infectious diseases.

Milstein, Jerrold M. 1980; MD, 1964, University of Minnesota; pediatric neurology.

Spain, William \* 1981; MD, 1977, Columbia University; neurology, neurobiology.

Tapscott, Stephen J. \* 1986; MD, 1982, University of Pennsylvania; neurology, molecular biology.

Wilensky, Alan J. 1975; MD, 1967, Western Ontario University (Canada); PhD, 1973, University of Toronto (Canada); neurology, treatment of epilepsy, testing and use of anticonvulsants.

### Assistant Professors

Becker, Kyra J. 1996; , MD, 1989, Duke University; stroke, neurophysiology.

Bowen, James D. 1982; MD, 1982, Johns Hopkins University; multiple sclerosis.

Brown, Angus M. 1999, (Research); PhD, 1990, University of Manchester (UK); neuroscience research.

Cramer, Steven C. 1997; MD, 1988, University of Southern California.

Fern, Robert \* 1996; PhD, 1992, University College, London (UK); cellular mechanisms of ischemic neonatal brain injury (cerebral palsy).

Graf, William D. 1988, (Adjunct); MD, 1983, Freie University of Berlin (Germany); congenital defects.

Holmes, Mark D. 1990; MD, 1977, Ohio State University; neurology/EEG.

Kraus, Eric E. 1991; MD, 1991, University of Minnesota; general neurology.

Kuratani, John D. 1999; MD, 1990, Tulane University; pediatric epilepsy, EEG.

Leverenz, James B. 1992; MD, 1985, University of Washington; neurology, psychiatry and behavioral sciences, Alzheimer's.

Neugebauer, Karla \* 1999; PhD, 1990, University of California (San Francisco); transcription and splicing regulators studied with high resolution light microscopy.

Pinter, Joseph D. 1990; MD, 1990, University of California (Los Angeles); pediatric neurology.

Rho, Jong M. 1994; MD, 1987, University of Cincinnati; pediatric neurology.

Shadlen, Michael N. \* 1995, (Adjunct); PhD, 1985, University of California (Berkeley); MD, 1988, Brown University; visual perception.

Sotero de Menezes, Marcio 1996; MD, 1984, Rio de Janeiro State University (Brazil); pediatric neurology.

Tirschwell, David L. 1991; MD, 1991, Cornell University; neurology, stroke.

Van Brederode, Johannes F. M. 1987, (Research); MS, 1982, University of Amsterdam (Netherlands); PhD, 1987, Medical College of Wisconsin; neurophysiology of epilepsy.

Yang, Claire C. 1993, (Adjunct); MD, 1988, Vanderbilt University; neurourology and electrophysiology testing.

Yuen, Eric C. 1996; MD, 1989, University of Chicago; EMG, peripheral neuropathy.

Zunt, Joseph R. 1991; MD, 1991, University of Minnesota; infectious disease, neuroepidemiology of AIDS/HIV.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**NEURL 495 Community Rehabilitation of the Neurologically Impaired: Internship (\* max. 5)** *Fraser, Clemmons* Supervised work with a neurologically disabled vocational rehabilitation population within a multidisciplinary vocational rehabilitation unit. Offered: AWSpS.

**NEURL 505 P-Preceptorship in Neurology (1)** *Kraus* Provides an opportunity for first and second year medical students to gain personal experience with neurology practice situations by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: Sp.

**NEURL 510 Pathophysiology of Neurological Disease (2)** *Fern* Analysis of the clinical features of a number of the major neurological diseases, integrated with a state-of-the-art overview of the cellular, molecular, and whole-system research pertaining to the disease.

**NEURL 536 Topics in Clinical Neurology (1)** *Spain* Lectures on epilepsy, stroke, coma, drug overdose, dementia, headache, myelopathies, infectious disease. Offered: S.

**NEURL 646 P-Clinical Electroencephalography (\* max. 12)** *Farrell, Holmes* For third- and fourth-year medical students. Clinical applications of electroencephalography long-term EEG-video-audio monitoring, computer-averaged evoked potentials. Prerequisite: completion of Human Biology series. Offered: AWSpS.

**NEURL 681 P-Seizure Clinic Clerkship (2.5)** *A. Wilensky* Evaluation and follow-up of patients with seizure disorders. Limited contact with inpatients. Prerequisite: MED 665 and permission of instructor. Offered: AWSpS.

**NEURL 686 P-Clinical Neurology (8)** *Swanson* Clerkship including both inpatient and outpatient experiences and didactic sessions on neurological subjects. Student assigned to one of the affiliated hospitals and supervised by neurology residents and full-time staff. Offered: AWSpS.

**NEURL 687 P-Advanced Clinical Clerkship in Child Neurology (\* max. 8)** *Pinter* Advanced course in neurology dealing with neurological disease in children. Supervision by child neurology residents and attending. Prerequisite: NEURL 665, third and fourth year medical students. (Limit: one student.) Offered: AWSpS.

**NEURL 697 P-Neurology Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions outside the WWAMI region. Students should obtain special assignment form from the Dean's Office at least one month prior to preregistration. Prerequisite: permission of department adviser. Offered: AWSpS.

**NEURL 699 P-WWAMI Neurology Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of advisor. Offered: AWSpS.

## Obstetrics and Gynecology

BB617 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Obstetrics.html](http://www.washington.edu/students/genocat/academic/Obstetrics.html)



Department Web page:  
[gynoncology.obgyn.washington.edu](http://gynoncology.obgyn.washington.edu)

The Department of Obstetrics and Gynecology is involved with teaching, patient care, and research in the areas of normal and abnormal human reproduction: growth and development of the fetus, normal and complicated obstetrics, and surgical and medical diseases of the female reproductive system, including endocrinology, oncology, infectious disease, urogynecology, psychosocial problems, primary and preventive health care, and ethics.

## Faculty

### Chair

Steven G. Gabbe

### Professors

Benedetti, Thomas J. \* 1979; MD, 1973, University of Washington; perinatal medicine.

Bremner, William J. 1982, (Adjunct); MD, 1969, University of Washington; PhD, 1977, Monash University (Australia); endocrinology.

Brown, Zane A. \* 1977; MD, 1966, Temple University; insulin requiring diabetes complicating pregnancy, genital herpes complicating pregnancy.

Clifton, Donald K. 1981; PhD, 1979, University of California (Los Angeles); reproductive physiology.

Eschenbach, David A. 1976; MD, 1968, University of Wisconsin; gynecology and infectious disease.

Figge, David C. 1956, (Emeritus); MD, 1950, Northwestern University; gynecologic oncology.

Gabbe, Steven G. 1996; MD, 1969, Cornell University; perinatal medicine, high-risk pregnancy, diabetes in pregnancy.

Greer, Benjamin E. 1980; MD, 1966, University of Pennsylvania; gynecologic oncology.

Knopp, Robert H. \* 1974, (Adjunct); MD, 1964, Cornell University; metabolism and endocrinology.

Merriam, George R. 1991, (Adjunct); MD, 1976, Harvard University; metabolism and endocrinology.

Patton, Dorothy L. 1981; PhD, 1981, University of Washington; infectious disease.

Shy, Kirkwood K. \* 1979; MD, 1973, Wayne State University; epidemiologic applications to problems in obstetrics and gynecology.

Soules, Michael R. 1980; MD, 1972, University of California (Los Angeles); reproductive endocrinology.

Spadoni, Leon R. 1960, (Emeritus); MD, 1957, University of Washington; reproductive endocrinology.

Steiner, Robert A. \* 1977; PhD, 1975, University of Oregon; neuroendocrinology.

Stenchever, Morton A. 1977, (Emeritus); MD, 1956, State University of New York (Buffalo); gynecology, reproductive genetics, medical education.

Tamimi, Hisham K. 1977; MD, 1969, Cairo University (Egypt); gynecologic oncology.

Vontver, Louis A. 1977; MD, 1960, University of Minnesota; MED, 1970, University of Washington; medical education, gynecology.

## Associate Professors

Battaglia, David 1980; MS, 1978, PhD, 1985, University of Washington; gamete biology.

Easterling, Thomas R. 1985; MD, 1981, University of North Carolina; perinatal medicine, hypertension during pregnancy.

Fenner, Dee E. 1999; MD, 1985, University of Missouri; urologic gynecology, fecal incontinence.

Goff, Barbara A. 1993; MD, 1986, University of Pennsylvania; gynecologic oncology.

Koh, Wui-Jin 1984, (Adjunct); MD, 1984, Loma Linda University; therapeutic radiology.

Moore, Donald E. 1977; MD, 1967, Case Western Reserve University; reproductive endocrinology.

Prince, C. Edward 1980, (Emeritus); MD, 1955, University of Washington; gynecology.

Shields, Laurence E. 1993; MD, 1987, University of Texas (San Antonio); perinatal medicine.

Walker, Edward A. 1983; MD, 1983, University of Washington; consultation-liaison psychiatry, medically unexplained physical symptoms.

## Assistant Professors

Atkinson, M. Wendy 1997; MD, 1988, Baylor University; perinatal medicine, prevention of preterm birth and treatment of preterm labor.

Baker, Valerie Lynn 1998; MD, 1988, MS, 1988, Harvard University; reproductive endocrinology.

Cheng, Edith Y. 1987; MS, 1979, Sarah Lawrence College; MD, 1987, University of Washington; genetics, perinatal medicine.

Eckert, Linda O. 1992; MD, 1987, University of California (San Diego); gynecology.

Fujimoto, Victor Y. 1993; MD, 1986, University of California (San Diego); reproductive neuroendocrinology, physiology of the menstrual cycle.

Hitti, Jane 1993; MD, 1989, University of Vermont; MPH, 1995, University of Washington; perinatal medicine, HIV and pregnancy.

Klein, Nancy A. 1993; MD, 1985, Vanderbilt University; reproductive aging in women, assisted reproductive technology.

Lentz, Gretchen M. 1986; MD, 1986, University of Washington; urogynecology.

Miller, Leslie R. 1990; MD, 1990, University of Washington; contraception, reproductive endocrinology, sexually transmitted disease.

Paley, Pamela J. 1997; MD, 1990, Loyola University (Chicago); gynecologic oncology.

Reed, Susan D. 1991; MS, 1979, Sarah Lawrence College; MD, 1986, Stanford University; gynecology, evidence-based medicine and clinical outcomes studies, hormone replacement therapy.

Wasser, Samuel K. \* 1982; PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**OB GYN 498 Undergraduate Thesis (\*)** *Vontver* By arrangement.

**OB GYN 499 Undergraduate Research (\*)** *Vontver*

**OB GYN 550 P-Voluntary Pregnancy Termination: An Overview of Medical and Social Issues (2)** *Easterling, Miller* A flexible curriculum which allows the medical student to observe in an abortion clinic, read articles and a textbook on abortion. Can be used by medical student as elective credit.

**OB GYN 579 P-Obstetric and Gynecologic Investigation (\*)** *Vontver* The investigation may cover any one of the following fields: toxemias of pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology, genetics. By arrangement.

**OB GYN 665 P-Introduction to Obstetrics and Gynecology, UH-HMC (\* max. 12)** *Vontver* Introductory clerkship providing comprehensive medical care and counseling to female patients. Includes management and delivery of obstetrical patients, diagnosis and management of gynecologic diseases, hospital rounds, outpatient clinics, seminars, tutorial, and community health-care agencies for women. Rotations occur at UWMC and Harborview Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: six students.)

**OB GYN 666 P-Introduction to Obstetrics and Gynecology, Boise (\* max. 12)** *Vontver* Clerkship equivalent to 665 offered at Boise, Idaho (WWAMI). Includes experience in several private physician offices. Prerequisite: HUBIO 565. (Six weeks. Limit: two students. Not offered summer quarter.)

**OB GYN 667 P-Introduction to Obstetrics and Gynecology, Madigan (\* max. 12)** *Vontver* Clerkship equivalent to 665 offered at Madigan Army Medical Center, Tacoma. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

**OB GYN 668 P-Introduction to Obstetrics and Gynecology, Spokane (12)** *Vontver* Clerkship equivalent to 665 offered at Spokane (WWAMI). Includes experience in several private physicians' offices. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

**OB GYN 669 P-Introduction to Obstetrics and Gynecology, Swedish (12)** *Vontver* Clerkship equivalent to 665 offered at Swedish Hospital Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.) Not offered summer quarter.

**OB GYN 670 P-Introduction to Obstetrics and Gynecology, GH-Central (12)** *Vontver* Clerkship equivalent to 665 offered at the Central facility of Group Health Cooperative of Puget Sound in Seattle. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.)

**OB GYN 671 P-Introduction to Obstetrics and Gynecology, Anchorage (12)** *Vontver* Clerkship equivalent to 665 offered at Anchorage, Alaska (WWAMI). Includes experience in several private physicians' offices as well as Providence Hospital. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

**OB GYN 672 P-Introduction to Obstetrics and Gynecology, GH-East (12)** *Vontver* Clerkship equivalent to 665 offered at the Eastside facility of Group Health Cooperative of Puget Sound in Redmond. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.)

**OB GYN 673 P-Introduction to Obstetrics and Gynecology, Military, Madigan (12)** *Vontver* Clerkship equivalent to 665 offered at Madigan Army Medical Center. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.)

**OB GYN 675 P-Introduction to Obstetrics and Gynecology, Highline (12)** Clerkship equivalent to 665 offered at Highline Community Hospital. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: four students.)

**OB GYN 676 P-Introduction to Obstetrics and Gynecology, Missoula (12)** Clerkship equivalent to 665 offered in Missoula, Montana. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.)

**OB GYN 681 P-Gynecological Oncology Subspecialty (8)** *Vontver* Experience in reproductive tract malignancy, chemotherapy, and radiation therapy. Student follows selected patients through primary surgery, recovery, and initial adjuvant treatment, as well as continuing treatment in both clinic and inpatient settings. Prerequisite: basic OB GYN Clerkship. (Limit: two students each four weeks.)

**OB GYN 682 P-antenatal High-Risk Obstetrics (8)** *Vontver* Four weeks on high-risk antenatal obstetrics ward and clinic. Students responsible for initial workups, daily laboratory evaluations, continuing care of high-risk antepartum patients. Weekly conference with obstetrics attending; presentation of one or more topics per rotation. Excellent coordination with resident and attending staff required to maintain patient-care continuity. (Limit: two students each four weeks.)

**OB GYN 684 P-Endocrinology of Reproduction (\* max. 12)** *Vontver* The biochemistry of steroids. Steroid metabolism as related to clinical problems. Diagnosis and treatment of endocrine disorders. Case studies with special emphasis on modern methods of investigation and assisted reproductive technology. (Limit: one student each four weeks.)

**OB GYN 685 P-Obstetrics/Gynecology Preceptorship (\* max. 8)** *Vontver* Close working relationship with physician in private practice of obstetrics and gynecology, including: hospital rounds, surgery, deliveries, and office and business aspects of private practice as individually arranged. Forty hours minimum can be arranged to fit schedule not to exceed 8 credits. Prerequisite: OB GYN 665 or equivalent and permission of instructor. (Limit: two students.)

**OB GYN 697 P-Obstetrics and Gynecology Special Electives (\* max. 24)** *Vontver* By arrangement, for qualified students, special clerkship or research opportunities can sometimes be made available at other institutions. Students wishing this course should obtain special assignment form one month before preregistration. Department evaluates student performance. Prerequisite: permission of instructor.

**OB GYN 698 P-Introduction to Obstetrics and Gynecology, Away (\* max. 12)** *Vontver* Clerkship equivalent to 665 at sites being evaluated as permanent WWAMI sites (currently includes Rock Springs, Tacoma (St. Joseph), Evergreen, and Lewiston). By arrangement. Subject to Dean's Office approval. Department evaluates student performance. Prerequisite: HUBIO 565; permission of instructor.

## Ophthalmology

RR801 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Ophthalmology.html](http://www.washington.edu/students/genecat/academic/Ophthalmology.html)



Department Web page:  
[depts.washington.edu/opthweb/](http://depts.washington.edu/opthweb/)

The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and its adnexae as well as the visual system.

Medical-student instruction is provided, including multiple electives in the clinical years. Graduate physicians are provided with three years of residency training at the affiliated hospitals. A two-year ophthalmic plastics and orbit, and a one-year refractive surgery/cornea fellowship are offered. Patient care is provided under the supervision of full- and part-time faculty physicians at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Medical Center, and Children's Hospital and Regional Medical Center.

Clinical research programs relate to eye diseases. Laboratory research encompasses neurophysiology of vision, morphology of the retina and visual system, corneal wound healing and biochemistry of ocular tissues. Postdoctoral training is offered in all these disciplines.

## Faculty

### Chair

Steven E. Wilson

### Professors

Clark, John I. 1982, (Adjunct); PhD, 1974, University of Washington; structural and developmental basis of lens-cell transparency and cataract formation.

Hendrickson, Anita E. \* 1969, (Adjunct); PhD, 1964, University of Washington; neuroanatomy, morphology and development of primate retina.

Kalina, Robert E. 1967; MD, 1960, University of Minnesota; vitreoretinal diseases.

Kinyoun, James L. 1978; MD, 1971, University of Nebraska; vitreoretinal diseases.

Milam, Ann H. 1971, (Emeritus); PhD, 1967, University of Texas (Southwestern); electron microscopy, ophthalmic pathology, retinitis pigmentosa, retinal cell biology.

Orcutt, James C. 1982; PhD, 1976, MD, 1977, University of Colorado (Denver); orbit, oculoplastics, neuro-ophthalmology.

Pagon, Roberta A. 1979, (Adjunct); MD, 1972, Harvard University; medical genetics.

Palczewski, Krzysztof \* 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Patton, Dorothy L. 1981, (Adjunct); PhD, 1981, University of Washington; infectious disease.

Saari, John C. \* 1974; PhD, 1970, University of Washington; retinal biochemistry.

Wilson, Steven E. 1998; MD, 1984, University of California (San Diego); corneal wound healing.

### Associate Professors

Chuang, Elaine L. 1993; MD, 1979, University of Texas (San Antonio); vitreoretinal diseases, ocular inflammation.

Fritsche, Thomas R. \* 1981, (Adjunct); MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites; medical microbiology.

Weiss, Avery H. 1991; MD, 1974, Miami University (Ohio); pediatric ophthalmology, strabismus.

### Assistant Professors

Chen, Philip P. 1996; MD, 1991, Yale University; glaucoma.

Gordon, Sharona E. \* 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Harrison, Devin A. 1997; MD, 1989, St Louis University; cornea and external disease.

Kim, Jeehee 1997; MD, 1992, University of Chicago; cornea and external disease.

Rieke, Frederick Martin \* 1997, (Adjunct); PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Saperstein, David A. 2000; MD, 1987, Pennsylvania State University; vitreoretinal diseases, macular degeneration.

Sires, Bryan S. 1995; PhD, 1986, MD, 1990, Northwestern University; plastic and reconstructive surgery.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**OPHTH 498 Undergraduate Thesis (\*)** *Kinyoun (University of Washington Medical Center)* Thesis-based research in vision and ophthalmology. Elective. Offered: AWSpS.

**OPHTH 499 Undergraduate Research (\*)** *Kinyoun (University of Washington Medical Center)* Laboratory or clinical research in morphology, biochemistry, immunology, experimental pathology, or clinical studies of the eye and visual system. Offered: AWSpS.

**OPHTH 501 P-Ophthalmology Preceptorship (1)** *Kinyoun* Individualized experiences with one or more of the full-time faculty members of the department covering research, teaching, and patient care. Student observes activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- and second-year medical student standing and permission of instructor. Offered: AWSpS.

**OPHTH 681 P-Ophthalmology Clerkship (4)** *Sires (Harborview Medical Center)* Students gain experience in the diagnosis and treatment of common ocular disorders. Basic examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

**OPHTH 682 P-Ophthalmology Clerkship (4)** *Swedberg (Pacific Medical Center)* Student works with a clinical faculty member in the diagnosis and treatment of ocular diseases in both outpatient and inpatient populations. Experience in common ocular disorders is gained. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

**OPHTH 683 P-Pediatric Ophthalmology Clerkship (4)** *Weiss (Children's Hospital and Regional Medical Center)* Student examines and observes treatment of children with ocular diseases and learns to differentiate trivial from potentially blinding disorders.

Programmed text in general ophthalmology furnished. Prerequisite: University of Washington student and completion of human biology series. (Two weeks, full-time. Limit: one student.) Offered: WS.

**OPHTH 685 P-Ophthalmology Clerkship (4)** *Orcutt (VA Puget Sound Health Care System)* Participation in diagnosis and treatment of medical and surgical ocular disease. Outpatient examinations, inpatient surgery, as well as neuro-ophthalmologic, retinal, and glaucoma consultations. Basic techniques involved in tonometry, ophthalmoscopy, and biomicroscopy of eye. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

**OPHTH 686 P-Ophthalmology Clerkship (4)** *Gorman (Group Health Central)* Diagnosis and treatment of ocular diseases in outpatients. Weekly assignment to Group Health ophthalmologist responsible for the care of walk-in and urgent patients, which may demonstrate findings pertinent to the future practice of primary-care physicians. Examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

**OPHTH 687 P-Ophthalmology Clerkship (4)** *Kinyoun (University of Washington Medical Center)* Diagnosis and management of commonly seen eye diseases. Subspecialty clinics include cornea, retina, neuro-ophthalmology, glaucoma, contact lenses, and strabismus. Student attends regularly scheduled conferences in ophthalmic basic and clinical science. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

**OPHTH 688 P-Ophthalmology Clerkship (8)** *Kinyoun, Werner* Four-week externship at Alaska Native Medical Center in Anchorage. Opportunity to learn and practice common eye examination techniques, including slit-lamp biomicroscopy, tonometry, and funduscopy. Patients seen three days a week; two days spent in the operating room. Prerequisite: completion of human biology series, MED 665, and SURG 665; fourth-year medical students only. Offered: AWSpS.

**OPHTH 697 P-Ophthalmology Special Electives (\* max. 24)** *Kinyoun* By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions or clinics other than the UW. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWSpS.

## Orthopaedics

BB1043 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Orthopaedics.html](http://www.washington.edu/students/genecat/academic/Orthopaedics.html)



Department Web page:  
[www.orthop.washington.edu](http://www.orthop.washington.edu)

The Department of Orthopaedics is actively involved in quality patient care, teaching, and research concerning bone and joint problems. Special areas of expertise include foot and ankle, hand and microvascular, hip and knee, arthritis, sports medicine, pediatric orthopaedics, shoulder and elbow, spine, trauma, and tumors.

In addition to providing instruction for medical students, the department provides education at the graduate, residency, and post-residency levels. Selected medical students may elect research experience in the department. A fully approved residency offers opportunities to carry out fundamental and clinical

cal research. Residents may work toward the Master of Science degree by meeting the requirements of the Graduate School and the academic unit offering the degree program.

## Faculty

### Chair

Frederick A. Matsen

### Professors

Bigos, Stanley J. 1981; MD, 1975, University of Missouri; orthopaedics, spine.

Chesnut, Charles \* 1974, (Adjunct); MD, 1966, University of Florida; osteoporosis.

Conrad, Ernest U. III 1986; MD, 1979, University of Virginia; orthopaedics, tumors and bone transplantation.

Eyre, David R. \* 1985; PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Hansen, Sigvard T. 1968; MD, 1961, University of Washington; orthopaedics, foot, ankle and amputations.

Mann, Frederick A. 1993, (Adjunct); MD, 1975, Indiana University; emergency and trauma radiology.

Matsen, Frederick A. III \* 1973; MD, 1968, Baylor University; orthopaedics, bone and joint research, robotics.

Olerud, John E. 1975; MD, 1971, University of Washington; dermatology.

Richardson, Michael L. 1984, (Adjunct); MD, 1975, Baylor University; bone and joint radiology and musculoskeletal radiology.

Sangeorzan, Bruce J. 1986; MD, 1981, Wayne State University; orthopaedics, trauma, and foot and ankle deformity.

Schoene, Robert B. 1981, (Adjunct); MD, 1972, Columbia University; respiratory diseases.

Sidles, John Arthur 1984; PhD, 1983, University of Washington.

Simkin, Peter A. 1969, (Adjunct); MD, 1961, University of Pennsylvania; rheumatology.

Smith, Nathan J. \* 1965, (Emeritus); MD, 1945, University of Wisconsin; sports medicine.

Staheli, Lynn T. 1975, (Emeritus); MD, 1959, University of Utah; pediatric orthopaedics.

Tencer, Allan Fred \* 1988; PhD, 1981, McGill University (Canada).

Trumble, Thomas E. 1989; MD, 1979, Yale University; orthopaedics, hand and microvascular surgery.

Wilson, Anthony J. 1994, (Adjunct); MBChB, 1972, Otago University (New Zealand); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT.

### Associate Professors

Belza, Basia \* 1991, (Adjunct); MN, 1982, University of Virginia; PhD, 1991, University of California (San Francisco); chronic illness, gerontology, fatigue prevention and management in rheumatic diseases.

Benirschke, Stephen K. 1985; MD, 1979, Case Western Reserve University; traumatology.

Bruckner, James 1990; MD, 1984, Creighton University; orthopaedics, tumors and bone transplantation.

Chapman, Jens R. 1990; MD, 1983, Technical University of Munich (Germany); orthopaedics, spine trauma/reconstruction.

Clark, John M. Jr. 1982; PhD, 1975, MD, 1976, University of Chicago; orthopaedics, hip and knee arthritis.

Gardner, Gregory C. 1989, (Adjunct); MD, 1984, Baylor University; rheumatology.

Gillespy, Thurman 1990, (Adjunct); MD, 1980, Thomas Jefferson University; musculoskeletal radiology, orthopaedics.

Graney, Daniel O. \* 1966, (Adjunct); PhD, 1965, University of California (San Francisco); gross anatomy, clinical anatomy, computers in teaching.

Greenlee, Theodore K. 1971; MD, 1959, Northwestern University; general orthopaedics.

Hanel, Douglas Paul 1992; MD, 1977, St Louis University; orthopaedics, hand/microvascular surgery.

Henley, Michael Bradford 1988; MD, 1979, University of Washington; orthopaedics, trauma, post-traumatic reconstruction, spinal trauma.

Larson, Roger V. 1982; MD, 1973, University of Utah; orthopaedics, arthroscopy, sports medicine and knee ligament reconstruction.

Mosca, Vincent S. 1985; MD, 1978, University of Rochester; pediatric orthopaedics, the child's foot, limb length discrepancies.

Newell, David W. 1982, (Adjunct); MD, 1982, Case Western Reserve University; clinical neurosurgery and neurovascular mechanizing of cerebral ischemia.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Raskind, Wendy H. 1982, (Adjunct); PhD, 1977, MD, 1978, University of Washington; medical genetics.

Routt, Milton L. 1988; MD, 1983, University of Texas (Galveston); orthopaedics, traumatology.

Simonian, Peter Todd 1992; , 1991, University of Southern California; orthopaedics, general, sports medicine.

Smith, Douglas G. 1989; MD, 1984, University of Chicago; orthopaedics, traumatology, foot, ankle, amputations.

Teitz, Carol Claire 1974; MD, 1974, Yale University; orthopaedics, arthroscopy, sports medicine.

### Assistant Professors

Allan, Christopher H. 1998; MD, 1992, Northwestern University; hand and microvascular surgery.

Bellabarba, Carlo 1999; MD, 1992, McGill University (Canada); spine trauma and reconstruction, orthopaedic trauma.

Chansky, Howard Alan 1992; MD, 1987, University of Pennsylvania; orthopaedics, general.

Ching, Randal Preston \* 1986; PhD, 1992, University of Washington; orthopaedic biomechanics.

Diab, Mohammad 1990; MD, 1990, Stanford University; pediatric orthopaedics.

Kadel, Nancy J. 1999; MD, 1988, University of Washington; orthopedic surgery, foot/ankle.

Mills, William J. 1989; MS, 1985, University of Minnesota; MD, 1989, University of Colorado (Denver); traumatology, knee ligament injury.

Mirza, Sohail K. 1989; MD, 1989, University of Colorado (Denver); spinal surgery/spine biomechanics.

Newman-Gage, Helen 1993, (Affiliate); MD, 1984, University of Washington.

Nork, Sean E. 1997; MD, 1992, University of California (San Diego); traumatology.

O'Kane, John 1993; MD, 1993, University of Vermont; family medicine, sports medicine, team care.

Smith, Kevin L. 1995; MD, 1990, Southern Illinois University; shoulder and elbow orthopaedics.

Song, Kit M. 1986; MD, 1985, University of Iowa; pediatric orthopaedics, spinal deformities of children.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

### ORTHP 495 Athletic Health Care Administration

(3) Organizational management of athletic health-care aspects of operating organized athletic programs. For health professionals, school or community-based administrators/athletic directors/coaches, university-based health educators. Overview; generating awareness; needs assessment; educating coaches, student trainers; establishing central training room; standardization of procedures; record keeping; evaluation.

### ORTHP 496 Advanced Athletic Health Care (3)

Advanced sports medicine course on the prevention and management of athletic injuries. For coaches, school nurses, medical students. Problem-solving and hands-on approach emphasize wellness, conditioning, skills of injury evaluation, steps to recovery through rehabilitation, taping techniques, emergency first aid procedures.

### ORTHP 498 Undergraduate Thesis (\*) Eyre

Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopaedics, and develops a thesis for recognition. Offered: AWSpS.

### ORTHP 499 Undergraduate Research (\*) Eyre

Investigation of pertinent musculoskeletal problems in the orthopaedic laboratories as part of the research group. Offered: AWSpS.

### ORTHP 505 P-Preceptorship in Orthopaedic Surgery (1)

Opportunity for first- and second-year medical students to gain experience with clinical faculty members in the community. Students observe general aspects of private practice from a longitudinal perspective. Prerequisite: permission of department. Offered: AWSpS.

### ORTHP 585 P-Sports Medicine (2) Teitz

Lectures, patient problem presentations, and seminar discussions to explore impact of exercise and sport participation on various body systems. Includes nutritional concerns, biomechanics of certain sports injuries and cardiovascular, pulmonary, and musculoskeletal concerns. Prerequisite: second-year medical student standing. Offered: Sp.

### ORTHP 675 P-Preceptorship in Orthopaedics

(\* max. 4) *Simonian* Student spends full time with the preceptor during all his or her working day in order to gain a better understanding of the diagnosis and the management of problems of the musculoskeletal system as seen in the private orthopaedic practice. Prerequisite: SURG 665 or HUBIO 553 and permission of department. (Two weeks, full-time.) Offered: AWSpS.

### ORTHP 676 P-Pediatric Orthopaedics (\* max. 8)

*Diab, Mosca, Song* Acquaints students with all aspects of musculoskeletal problems in childhood. Didactic conferences and seminars, and opportunities for active participation in both inpatient and outpatient care at Children's Hospital and Medical Center, and correlative anatomy and pathology. Prerequisite: SURG 665 or HUBIO 553. (Four weeks, full-time.) Offered: AWSpS.

### ORTHP 677 P-Musculoskeletal Trauma (\* max. 8)

*Benirschke, Chapman, Hanel, Hansen, Henley, Mills, Mirza, Nork, Routt, Sangeorzan, Smith* Harborview Medical Center. Emergency room, wards, operating

room, and outpatient clinics. Instruction in general and special clinics, including hand, hip, foot, and fracture, with emphasis placed on physical examination of the patient. Students take correlative anatomy and pathology. Prerequisite: SURG 665, HUBIO 553. (Four weeks, full-time.) Offered: AWSpS.

#### ORTHP 678 P-Musculoskeletal Oncology (8/12)

*Conrad* In-depth experience on musculoskeletal oncology service with primary involvement in initial evaluation, staging, treatment, and postoperative follow-up of patients with various musculoskeletal malignancies. Elective involves experience in surgical, oncologic, radiologic, and pathologic principles of managing sarcomas. Prerequisite: basic orthopaedic elective or permission of instructor. Offered: AWSpS.

#### ORTHP 680 P-General Orthopaedic Clerkship (\* max. 8)

*Chansky* Veteran's Administration Hospital: structured to provide a basic education in the fundamentals of the musculoskeletal system. Heavy emphasis is placed on the reconstructive alternatives in the treatment of degenerative joint diseases. Prerequisite: completion of HUBIO series; third- and fourth-year students. Enrollment limited to three. Offered: AWSpS.

#### ORTHP 681 P-University of Washington Medical Center Orthopaedics (8)

*Allan, Bigos, Bruckner, Clark, Conrad, Larson, Matsen, Mirza, Simonian, Smith, Teitz, Trumble* Orthopaedic subspecialty clerkship at University of Washington Medical Center. Preceptor-based outpatient, inpatient, emergency, or operative orthopaedic care. Students work primarily in one subspecialty area and in one general orthopaedic clinic. For students who plan careers in orthopaedic surgery. Prerequisite: completion of HUBIO series, third- and fourth-year medical students. Offered: AWSpS.

#### ORTHP 682 P-Outpatient Orthopaedics (8)

Outpatient orthopaedic experience at University of Washington Medical Center. Emphasis on physical exam, diagnosis, radiographic evaluation, and non-operative treatment. Rotation through general orthopaedics as well as all subspecialty areas. For students who plan careers in primary care. Prerequisite: completion of HUBIO series. Offered: AWSpS.

#### ORTHP 685 P-Spine Resource Clinic Elective (2)

*Bigos* Four-week part-time clerkship examining musculoskeletal pathology of the spine. Introduction to physical and non-physical problems that can block the patient's response to treatment and complicate care and outcome. Promotes understanding of the role of helping patients identify and act upon options. Prerequisite: any level medical student. Offered: AWSpS.

#### ORTHP 697 P-Orthopaedic External Elective (\* max. 12)

*Simonian* Special arrangements can be made for students desiring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutes. Prerequisite: HUBIO 553 and permission of department. Offered: AWSpS.

#### ORTHP 699 P-WWAMI Orthopedics Special Electives (\* max. 24)

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

## Otolaryngology—Head and Neck Surgery

BB1165 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Otolaryngology.html](http://www.washington.edu/students/genecat/academic/Otolaryngology.html)



Department Web page:  
[depts.washington.edu/otoweb/](http://depts.washington.edu/otoweb/)

The Department of Otolaryngology—Head and Neck Surgery provides clinical care for patients with a broad spectrum of disorders affecting the head and neck region, including the ears, nose, and throat. A major portion of departmental effort is directed toward basic research in the areas of sensorineural hearing disorders, physiology of the larynx, and cancer treatment and rehabilitation. The department supports a number of research fellows and advanced degree candidates, and is responsible for a four-year residency program and for the training of medical students in subjects relevant to the specialty.

## Faculty

### Chair

Ernest A, Jr Weymuller

### Professors

Coltrera, Marc Dante 1986; MD, 1981, Yale University; otolaryngology/head and neck surgery.

Duckert, Larry Gene 1978; MD, 1972, PhD, 1977, University of Minnesota; otology/neurotology.

Fuchs, Albert F. \* 1969, (Adjunct); PhD, 1966, Johns Hopkins University; oculomotor physiology.

Gates, George A. 1993; MD, 1959, University of Michigan; otology/neurotology, cochlear implantation.

Kuhl, Patricia K. \* 1976, (Adjunct); MA, 1971, PhD, 1973, University of Minnesota; speech perception.

Manning, Scott C. 1995; MD, 1980, Tulane University; pediatric otolaryngology/head and neck surgery.

Orcutt, James C. 1982, (Adjunct); PhD, 1976, MD, 1977, University of Colorado (Denver); orbit, oculoplastics, neuro-ophthalmology.

Rubel, Edwin W. \* 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Spelman, Francis A. \* 1961, (Adjunct); PhD, 1975, University of Washington; biophysics of implanted cochlea, bioinstrumentation for primate research.

Stanley, Robert B. 1993; MD, 1976, Duke University; otolaryngology/head and neck surgery, trauma, maxillofacial surgery.

Weymuller, Ernest A, Jr. 1978; MD, 1966, Harvard University; otolaryngology/head and neck surgery.

### Associate Professors

Futran, Neal David 1995; DMD, 1982, University of Pennsylvania; MD, 1987, State University of New York (Downstate Medical Center); oral maxillofacial surgery.

Hillel, Allen D. \* 1983; MD, 1976, Stanford University; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease.

Inglis, Andrew F. Jr. 1983; MD, 1981, Medical College of Pennsylvania; pediatric otolaryngology/head and neck surgery.

Lippe, William R. 1988, (Research); PhD, 1972, University of California (Irvine); neurobiology.

Makielski, Kathleen H. 1985; MD, 1978, University of Michigan; otolaryngology/head and neck surgery.

Norton, Susan J. \* 1991; PhD, 1982, University of Washington; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals.

Oesterle, Elizabeth C. 1992, (Research); PhD, 1987, Purdue University; hair cell regeneration and supporting-cell functioning.

Rees, Thomas 1971; MA, 1969, University of Redlands; PhD, 1972, University of Washington; audiology.

Robinson, Lawrence R. \* 1989, (Adjunct); MD, 1982, Baylor University; clinical neurophysiology and pain after amputation.

Schubert, Mark M. \* 1974, (Adjunct); DDS, 1974, MSD, 1981, University of Washington; oral medicine/oral oncology.

Sie, Kathleen C. Y. 1984; MD, 1984, University of Michigan; pediatric otolaryngology/head and neck surgery.

Tempel, Bruce L. \* 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Werner, Lynne A. \* 1986, (Adjunct); PhD, 1980, Loyola University (Chicago); auditory development, infant psychoacoustics.

### Assistant Professors

Calderon, Rosemary 1987, (Adjunct); PhD, 1988, University of Washington; mental health and deafness, childhood psychopathology, early intervention.

Kujawa, Sharon Guilds 1997; PhD, 1993, University of Arizona; audiology.

Mills, David 1995, (Research); PhD, 1971, Stanford University; cochlear mechanics, otoacoustic emissions, development of mammalian cochlear function.

Phillips, James O. 1998, (Research); PhD, 1993, University of Washington; vestibular neurobiology, neuronal control of eye and head movements during gaze shifts in primates

Stone, Jennifer S. 1998, (Research); PhD, 1993, Boston University; hair cell regeneration.

Yueh, Bevan 1997; MD, 1989, Stanford University; otolaryngology-head and neck surgery, outcomes research.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

#### OTOHN 498 Undergraduate Thesis (\*)

*Rubel, Weymuller* Student works directly with department faculty in selecting a suitable area for laboratory or clinical research in the area of otolaryngology, and develops a thesis for recognition. Offered: AWSpS.

#### OTOHN 499 Undergraduate Research (\*)

*Rubel, Weymuller* Research opportunities offered under direction in the area of otolaryngology. (Twelve weeks.) Offered: AWSpS.

#### OTOHN 501 P-Preceptorship in Otolaryngology—Head and Neck Surgery (1)

*Hillel* One morning a week for a total of 30 hours per quarter spent observing patient care in either inpatient or outpatient settings at the University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: OTOHNS office. Offered: AWSpS.

**OTOHN 680 P-Introduction to Clinical Otolaryngology—Head and Neck Surgery (4/8, max. 24)**

*Hillel, Makielski, Manning, Stanley, Weymuller* Introduction to surgical subspecialty of otolaryngology-head and neck surgery. Structured to allow broad introduction to breadth of specialty. Students see patients in clinic, join inpatient rounds, have opportunity to go to operating room. Rotations at UWMC, VAH, HMC, CHMC, PMC/Swedish. Prerequisite: human biology series; recommended: MED 665 or SURG 665. Offered: AWSpS.

**OTOHN 683 P-Otolaryngology—Head and Neck Surgery Externship (\* max. 8)**

*Madigan Army Medical Center* Individual externship training at outpatient clinic, where visits average twelve hundred per month, supplemented by inpatient assignments. Students may reside at the hospital during externship, using facilities of bachelor officer quarters and hospital mess. Prerequisite: completion of human biology series. (Two or four weeks, full-time.); recommended: MED or SURG 665. Offered: AWSpS.

**OTOHN 686 P-Otolaryngology—Head and Neck Surgery: Medical and Surgical Aspects (\* max. 12)**

*Weymuller* Clinical in-depth study for the student whose interest lies in pathology of the head and neck. Reasonable flexibility to arrange course content that provides exposure to all aspects of patient care. Prerequisite: permission of chairman; recommended: MED 665 or SURG 665. Offered: AWSpS.

**OTOHN 697 P-Otolaryngology—Head and Neck Surgery Special Electives (\* max. 24)**

*Weymuller* By specific arrangement. Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of chairman. Offered: AWSpS.

**OTOHN 699 P-WWAMI Otolaryngology—Head and Neck Surgery Special Electives (\* max. 24)**

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

## Pathology

C516 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Pathology.html](http://www.washington.edu/students/genocat/academic/Pathology.html)



Department Web page:  
[www.pathology.washington.edu](http://www.pathology.washington.edu)

Pathology is both a basic biological science and a specialty of medicine. As a basic science, it deals with the natural history and mechanisms of initiation and expression of disease processes. The principal aim of the pathologist is to understand disease manifestations and processes in whatever terms are required. Therefore, the techniques of the pathologist range from those of the physicist and physical chemist through those of the physiologist to the realm of the epidemiologist. Present emphasis in the department is on cellular and molecular pathology, environmental pathology, and analysis of disease by methods of cell and molecular biology, recombinant DNA techniques, light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and the establishment and analysis of animal models of disease.

## Graduate Program

Graduate Program Coordinator  
C516 Health Sciences, Box 357470  
(206) 616-7551

The Department of Pathology offers graduate training in experimental pathology, with an emphasis on the cellular and molecular biological basis of disease, leading to the Doctor of Philosophy degree in experimental pathology. The aim of the graduate program is to train individuals for a career in the scientific investigation of basic disease mechanisms. The program encompasses students and faculty members with diverse interests, which range from investigation of specific disease conditions to the molecular basis of alterations in cell function and of gene expression. Faculty members' interests include the normal and pathological aspects of cardiovascular biology, tumor biology, environmental effects on normal processes, biology of aging, neurobiology, immune response, inflammation and repair, immunopathology and biology of extracellular matrix, as well as fundamental processes that underlie disease, such as regulation of gene expression and protein synthesis, structure and function of oncogenes, viral and nonviral transformation, chromatin structure, mutagenesis and DNA repair, and genetic recombination. The department's graduate faculty comprises 40 members, who are located at the Health Sciences Center, Veterans Affairs Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, and Fred Hutchinson Cancer Research Center. Approximately 30 full-time students are pursuing the Ph.D. degree.

Students in the program are expected to fulfill coursework requirements during the first two years. In line with the diversity of faculty members' interests within the department, course requirements are kept to a minimum to provide students with maximum flexibility.

The Ph.D. program in experimental pathology is designed to prepare students for careers as practicing scientists in biomedical research. The emphasis of the program is on development of skills in hypothesis generation and testing, including the design, accomplishment and critical interpretation of experiments. Experimental pathology uses the full range of biomedical research techniques (including biochemistry, molecular biology, cell biology, animal modeling) to attempt to elucidate the mechanisms underlying human disease. Graduates of the program usually continue research careers at biotechnology companies or universities/research institutes.

## Special Requirements

Prospective candidates are expected to have had undergraduate experience in biology, physics, chemistry, and mathematics, and acceptable scores on the Graduate Record Examination, including advanced biology or chemistry. Those wishing to matriculate toward both the M.D. and Ph.D. degrees must gain admission to both the Graduate School and the School of Medicine.

## Financial Aid

Funding for students is provided from departmental and University funds, training grants, a variety of institutional fellowships, and research grants of individual faculty members.

## Research Facilities

The department emphasizes the cellular and molecular approach to the investigation of the pathogenesis of disease in mammalian species. Special facilities exist for training in electron microscopy; cell, tissue, and organ culture; recombinant DNA techniques; histochemistry and cytochemistry; analytical biochemistry; immunology; and molecular and cell biology.

## Residency Training Program

The department supervises an internship and residency-training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Persons who complete the residency program are eligible for certification by the American Board of Pathology. For additional information, contact the Resident Program Director, Department of Pathology, Box 356100.

## Faculty

### Chair

Nelson Fausto

### Professors

Albers, John J. \* 1971, (Adjunct Research); MS, 1967, PhD, 1969, University of Illinois; lipoprotein metabolism and pathophysiology.

Alpers, Charles E. 1986; MD, 1978, University of Rochester; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology.

Alvord, Ellsworth C. \* 1960; MD, 1946, Cornell University; neuropathology, experimental allergic encephalitis, multiple sclerosis, brain tumors.

Benjamin, Denis R. \* 1982; MBChB, 1968, University of Witwatersrand (S Africa); pediatric pathology, hematopathology, nutrition, circadian rhythms.

Bowen-Pope, Daniel \* 1979; PhD, 1979, University of California (Berkeley); gene regulation, growth factors and receptors.

Byers, Peter H. \* 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion.

Chi, Emil Y. \* 1972, (Research); PhD, 1971, University of California (Santa Barbara); lung structures and function, mast cell secretion and inflammation.

Clowes, Alexander W. \* 1980, (Adjunct); MD, 1972, Harvard University; general and vascular surgery.

Collins, Steven J. \* 1982, (Adjunct); MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.

Disteche, Christine M. \* 1980; PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.

Eary, Janet F. 1980, (Adjunct); MD, 1980, Michigan State University; nuclear medicine.

Eisen, Harvey \* 1986, (Affiliate); PhD, 1967, University of Toronto (Canada); host-parasite interactions, generation of genetic diversity.

Fausto, Nelson \* 1994; MD, 1960, Sao Paulo State University (Brazil); liver regeneration, tumor biology, carcinogenesis, growth factors.

Friend, Stephen H. 1997, (Affiliate); PhD, 1979, MD, 1981, Indiana University; molecular biology of embryonal tumor, molecular pharmacology, tumor suppressor genes.

Galloway, Denise A. \* 1982, (Adjunct Research); PhD, 1976, City University of New York; viral pathogenesis and neoplasia.

Groudine, Mark \* 1982, (Adjunct); MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity in development and transformation.

Harlan, John M. \* 1978, (Adjunct); MD, 1973, University of Chicago; hematology, leukocyte-endothelial interaction.

Hellstrom, Ingegerd 1966, (Affiliate); DrMed, 1966, Karolinska Institute (Sweden); tumor immunology.

Johnson, Richard J. 1982, (Adjunct); MD, 1979, University of Minnesota; nephrology.

Kiviat, Nancy C. \* 1979; MA, 1970, MD, 1975, University of Washington; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia.

Loeb, Lawrence A. \* 1978; MD, 1961, New York University; PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.

Martin, George \* 1957; MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, Alzheimer's disease, Werner's syndrome.

McDougall, James K. \* 1982; PhD, 1971, University of Birmingham (UK); cell cycle, genetic instability and neoplasia.

Miller, Arthur D. \* 1987, (Affiliate); PhD, 1982, Stanford University; retrovirus biology, gene transfer, gene therapy.

Monnat, Raymond J. Jr. \* 1982; MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.

Mottet, N. Karle \* 1959, (Emeritus); MD, 1952, Yale University; effects of trace elements, especially methylmercury and arsenic, on growth and development.

Narayanan, A. Sampath \* 1971, (Research); PhD, 1967, University of Madras (India); connective tissue, periodontal disease, regulation of fibroblast growth, matrix synthesis.

Neiman, Paul E. \* 1971, (Adjunct); MD, 1964, University of Washington; oncology.

Nicosia, Roberto F. 1999; MD, 1976, University of Rome (Italy); PhD, 1984, Medical College of Pennsylvania; vascular and renal pathology.

Norwood, Thomas H. \* 1973; MD, 1968, University of Maryland; somatic cell genetics, pathobiology of aging, mitotic cell cycle regulation.

Page, Roy C. \* 1967; DDS, 1957, University of Maryland; PhD, 1967, University of Washington; connective-tissue pathology, chronic inflammation, immunopathology, periodontal disease.

Piepkorn, Michael W. 1991; MD, 1973, University of Minnesota; PhD, 1980, University of Washington; dermatology.

Rabinovitch, Peter S. \* 1980; MD, 1979, PhD, 1980, University of Washington; cellular aging, preneoplastic disease, cell cycle abnormalities, DNA change.

Raines, Elaine W. \* 1975, (Research); MS, 1975, University of California (San Francisco); growth factors, matrix, integrins, disintegrins, atherosclerosis, smooth muscle cells, macrophages.

Reay, Donald T. 1982; MD, 1963, University of Utah; MPA, 1978, Seattle University; forensic medicine.

Reichenbach, Dennis D. 1966, (Emeritus); MD, 1958, University of Washington; cardiovascular pathology, myocardial cell injury.

Reidy, Michael A. \* 1980; PhD, 1976, Cambridge University (UK); identification of migration specific genes, expression of matrix metalloproteinases.

Rohrschneider, Larry R. \* 1982, (Affiliate); PhD, 1973, University of Wisconsin; control of growth, differentiation, transformation by the c-fms proto-oncogene.

Sale, George E. 1977; MD, 1968, Stanford University; immunopathology of bone marrow transplantation, graft-versus-host.

Sarnat, Harvey B. 1992; MD, 1966, University of Illinois; pediatric neurology, neuromuscular diseases, neurodevelopment.

Schwartz, Stephen Mark \* 1974; MD, 1967, Boston University; PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.

Shaw, Cheng-Mei \* 1963; MD, 1950, National Taiwan University; neuropathology, immunopathology, neurotoxicology, congenital malformation.

Shulman, Howard M. 1982; MD, 1971, University of California (Los Angeles); graft-versus-host disease; venocclusive disease of the liver.

Smith, Gerald R. \* 1983, (Affiliate); PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.

Spence, Alexander M. 1974; MD, 1965, University of Chicago; neurology, neuro-oncology.

Stamatoyannopoulos, George 1964, (Adjunct); MD, 1958, DMedSc, 1960, University of Athens (Greece); medical genetics.

Sumi, Shuzo Mark 1966, (Emeritus); MD, 1956, University of Toronto (Canada); neuropathology, neuromuscular disease, neurodegenerative diseases.

Todaro, George J. \* 1983, (Adjunct); MD, 1963, New York University; growth regulation in normal and tumor cells.

Vessella, Robert L. 1989, (Adjunct); PhD, 1974, University of Mississippi; tumor markers and immunology.

Wight, Thomas \* 1978; PhD, 1972, University of New Hampshire; connective tissue biology and pathology, proteoglycans metabolism, atherosclerosis.

Wolf, Norman S. \* 1968; DVM, 1953, Kansas State University; PhD, 1960, Northwestern University; hematopoietic stem cell dynamics and transplantation, aging at the cellular level.

### Associate Professors

Fligner, Corinne L. 1983; MD, 1976, University of New Mexico; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology.

Hackman, Robert C. 1982; MD, 1971, Stanford University; infectious and pulmonary complications in immunocompromised patients.

Kapur, Raj P. \* 1988; MD, 1988, University of Southern California; human embryology, birth defects.

Myerson, David \* 1985; PhD, 1979, Albert Einstein College of Medicine; the pathology of viral disease in humans.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Patterson, Kathleen 1992; MD, 1976, University of Iowa; pediatric pathology.

Porter, Peggy L. 1987; MD, 1987, University of New Mexico; cytology and breast cancer.

Rosenfeld, Michael E. \* 1992, (Adjunct); PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

Schmidt, Rodney 1984; MD, 1984, PhD, 1984, University of Washington; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy.

Silbergeld, Daniel L. 1984, (Adjunct Research); MD, 1984, University of Cincinnati; brain tumors, epilepsy.

Stephens, Karen G. \* 1989, (Adjunct Research); PhD, 1982, Indiana University; molecular genetics of human inherited disease; gene mapping, regulation, and imprinting.

Swisshelm, Karen \* 1980; PhD, 1989, University of Washington; senescence, breast cancer, gene expression, DNA methylation, cytogenetics.

Tait, Jonathan F. \* 1983, (Adjunct); MD, 1983, PhD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.

Tapscott, Stephen J. \* 1986, (Adjunct); MD, 1982, University of Pennsylvania; neurology, molecular biology.

Thorning, David R. 1982; MD, 1965, University of Kansas; anatomic pathology, pulmonary pathology, tissue biology, electron microscopy.

True, Lawrence D. \* 1990; MD, 1971, Tulane University; urologic pathology, nuclear aspects of tumor differentiation.

Yeung, Raymond S. 1997, (Adjunct); MD, 1982, University of Toronto (Canada); general and surgical oncology.

### Assistant Professors

Born, Donald E. 1987; PhD, 1986, MD, 1987, University of Virginia; family medicine, sports medicine, team care.

Bornfeldt, Karin E. \* 1991; PhD, 1991, Linköping University (Sweden); atherosclerosis, vascular biology, intercellular signaling, diabetics.

Bronner, Mary P. 1993; MD, 1989, University of Pennsylvania; gastrointestinal and hepatic pathology, neoplastic progression and transplantation pathology.

Finn, Laura S. 1998; MD, 1989, Pennsylvania State University; pediatric pathology.

Franklin, Christopher C. 1997; PhD, 1989, University of Missouri; molecular and cellular biology, cellular signaling, protein kinase phosphatase.

Horwitz, Marshall S. 1983, (Adjunct); PhD, 1988, MD, 1990, University of Washington; transcription regulation.

Jin, Lee-Way 1996; MD, 1985, National Taiwan University; PhD, 1993, University of California (San Diego); molecular analysis and animal modeling of Alzheimer's disease.

Lawton, Thomas J. 1999; MD, 1990, University of Michigan; clinicopathologic research in breast cancer with particular interest in lobular carcinoma.

Murry, Charles E. \* 1989; PhD, 1989, MD, 1989, Duke University; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation.

Nelson, Peter S. \* 1993, (Adjunct); MD, 1986, University of Kansas; study of human carcinogenesis using tools of genomics and bioinformatics.

Rhim, Jonathan A. 1995; MD, 1989, George Washington University; molecular mechanisms of medical disease.

Tkachuk, Douglas C. 1995; MD, 1982, University of Manitoba (Canada); pathogenesis of acute leukemia.

### Lecturers

Pendergrass, William R. 1980; PhD, 1977, University of Washington; DNA replication, caloric restriction, gerontology, invitro senescence.

Taylor, Shari L. 1996; MD, 1991, University of Nebraska; liver/GI/transplant pathology, hepatic neoplasia, autoimmune liver disease.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscaat/](http://www.washington.edu/students/crscaat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**PATH 410 Introduction to Pathology (3)** *Narayanan* Basic pathologic processes, including cell and tissue involvement in degenerative processes, cell death, inflammation and repair, immunopathologies, cell

cycle events, carcinogenesis, and responses to alterations in hormone and growth factor levels. Illustrative disease conditions are reviewed. Required for physical therapy students. Others with suitable biology background by permission of instructor. Offered: A.

**PATH 444- General and Systemic Pathology ([2-3]-, max. 5)** *Page* Basic pathologic processes that underlie disease, including cell alterations, genetic and developmental pathology, environmental pathology, neoplasia, immunopathology, inflammation, infection, and systemic diseases. Correlates gross, functional, and biochemical alterations. For first-year dental students and graduate students. Requires reasonable grounding in biological and chemical sciences. Prerequisite for nondental students: permission of instructor.

**PATH 450 Cell Biology of Aging (3)** *Martin, Rabinovitch, Wolf* Pathophysiology of aging at cell and tissue levels (cell replication limits, telomere shortening, accrual of oxidative damage, caloric restriction effects, loss of postreplicative cells, longevity assurance genes). Proseminar based on student participation. Undergraduate honors students, graduate students with biology, zoology, genetics or medical sciences back grounds. Prerequisite: permission of instructor. Offered: W.

**PATH 498 Undergraduate Thesis (\*)** Elective.

**PATH 499 Undergraduate Research (\*)** Elective.

**PATH 500 Molecular Basis of Disease (3)** *Kapur* Designed for first and second year graduate students to introduce the concepts of general pathology at the cellular and molecular levels.

**PATH 501 Pathology Proseminars (1)** Small group discussions and presentations by students based on critical reading of original papers, or on concurrent seminars, in many areas of experimental pathology and medicine. Topic varies by quarter. Prerequisite: permission of instructor. Offered: AWSpS.

**PATH 507 Introduction to Pathology Research (2)** *Bornfeldt, Swisshelm* Current developments and approaches to investigation of the molecular and cellular basis of disease. Members of the Pathology faculty present and discuss their own research projects. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

**CONJ 508 EM Methods and Interpretation (3-5)** See Conjoint Courses.

**PATH 510 Introduction to Pathology Methods (3)** *Bowen-Pope* Laboratory course designed to introduce graduate students to the fundamentals of image analysis, histology, histopathology, post mortem evaluation, surgical pathology, and other methods used to investigate disease etiology, progression, and manifestation in humans and in animal models. Prerequisite: permission of instructor. Offered: Sp.

**PATH 511 Topics in Experimental Pathology (1-2, max. 10)** *Bornfeldt* Focus on areas of research relevant to experimental pathology. Prerequisite: permission of instructor. Offered: AWSpS.

**C MED 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10)** See Comparative Medicine courses.

**C MED 514 Comparative Pathology Conference (1, max. 6)** See Comparative Medicine courses.

**PATH 520 Experimental Pathology Seminar (1)** Review of current research in various areas of experimental pathology by members of the department and visiting scientists. Credit/no credit only.

**CONJ 520 Anatomy and Autopsy (1/2)** *Fligner* See Conjoint Courses.

**PATH 522 Hematopathology Seminar (2)** *Sabath* Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with LAB M 522; even years.

**PATH 530 Human Cytogenetics (\* max. 4)** *Disteche* Sources and methods of preparation and identification of human chromosomes. Molecular structure and mapping of chromosomes. Human cytogenetic pathology: karyotype-phenotype interactions, chromosome breakage, and cancer cytogenetics. Prerequisite: permission of instructor. Offered: even years.

**PATH 551 Experimental and Molecular Pathology (2-5, max. 20)** Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. Prerequisite: permission of instructor.

**PATH 552 Contemporary Anatomic Pathology (2-5, max. 30)** *Schwartz* Study of recent developments in anatomic pathology. Subject includes areas of basic science and review of systemic pathology. Recent developments and interpretation of these findings are stressed. For pathology residents, fellows, and trainees. Credit/no credit only. Prerequisite: permission of instructor.

**PATH 555 Environmental Pathology (3)** *Monnat, Rhim* Modern morphologic, cell biological, and molecular approaches to environmental disease associated with exposure/predisposition. Lectures, seminar discussion, and student presentations. Prerequisite: PATH 410 or PATH 444 or HUBIO 520; recommended: ENV H 514 and ENV H 515. Offered: alternate years.

**CONJ 560, 561 Tumor Biology (3, 2)** See Conjoint Courses.

**PATH 563 Neuropathology (\*)** *Alvord, Shaw, Sumi* Course consists of ten parts. Conferences on gross neuropathology (brain cutting and clinicopathologic correlations) held at six hospitals. Weekly neurology or surgical neuropathology conferences, neuropathology slide show, and neuropathology laboratory case studies. Prerequisite: permission of instructor.

**PATH 564 Neuropathology Brain Modeling (4)** *Alvord* Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain).

**PATH 571 Neuroanatomic Pathology (\*)** *Alvord, Shaw, Sumi* The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental, intersegmental, and suprasegmental components. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: 563.

**PATH 572 Neuropathologic Reactions (\*)** *Alvord, Shaw, Sumi* The reactions of the nervous system, considered in terms of congenital malformations, inflammations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system as a whole. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: PATH 563.

**PATH 584 Neuropathology Brain Modeling Laboratory (4)** *Alvord* Clinically important, functional neuroanatomic study based on embryologic motor, sensory, and association cells and simple reflexes,

followed by the more elaborate suprasegmental elements (cerebellum, colliculi, forebrain). Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in constructing a brain model. Prerequisite: PATH 564, which may be taken concurrently.

**PATH 600 Independent Study or Research (\*)** Credit/no credit only.

**PATH 679 P-Pathology Summer Clerkship (\* max. 24)** Dissection, writeup, and literature review of autopsy and surgical pathology specimens by students. Emphasis on etiology and pathogenesis of disease as a biological process. Designed for students who have not completed organ systems as covered in Human Biology courses. Offered at University of Washington Medical Center, Harborview Medical Center, Veterans Administration Hospital, Madigan Army Medical Center, and Swedish Hospital. Prerequisite: HUBIO 520 and completion of first year of medical school.

**PATH 680 P-Diagnostic Pathology Clerkship—University of Washington Medical Center (\* max. 24)** *Fligner, Bronner* Medical student participation in dissection and study of autopsy and surgical pathology cases. Cases worked up under senior staff, including dissection, microscopic examination, and literature review. Attendance at pathology conferences and seminars expected. Prerequisite: third- or fourth-year student standing.

**PATH 681 P-Diagnostic Pathology Clerkship—Harborview Medical Center (\* max. 24)** *Reichenbach* For description and prerequisite, see 680.

**PATH 682 P-Diagnostic Pathology Clerkship—Veterans Administration Hospital (\* max. 24)** *Thorning* For description and prerequisite, see 680.

**PATH 683 P-Diagnostic Pathology Clerkship—Medical Examiner's Office (\* max. 24)** *Harruff* For description and prerequisite, see 680.

**PATH 685 P-Diagnostic Pathology Clerkship—Sacred Heart Hospital, Spokane (\* max. 24)** *Williamson* For description and prerequisite, see 680.

**PATH 687 P-Diagnostic Pathology Clerkship—Children's Hospital and Medical Center (\* max. 24)** *Patterson* For description and prerequisite, see 680.

**PATH 688 P-Diagnostic Pathology Clerkship—Madigan Army Medical Center (\* max. 24)** *Kelley* For description and prerequisite, see 680.

**PATH 689 P-Diagnostic Pathology Clerkship—Valley Medical Center (\* max. 24)** *Treseler* For description and prerequisite, see 680.

**PATH 690 P-Diagnostic Pathology Clerkship—Northwest Medical Center (\* max. 24)** *Patton* For description and prerequisite, see 680.

**PATH 691 P-Diagnostic Pathology Clerkship—General Hospital of Everett (\* max. 24)** *Lipo* For description and prerequisite, see 680.

**PATH 692 P-Diagnostic Pathology Clerkship—Group Health Cooperative (\* max. 24)** *Mullen* For description and prerequisite, see 680.

**PATH 697 P-Pathology Special Electives (\* max. 24)** By specific arrangement, students can have clerkships, externships, or research opportunities at institutions other than the University of Washington. Students who wish to elect this course should obtain Special Assignment forms from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor.

**PATH 700 Master's Thesis (\*)**

**PATH 800 Doctoral Dissertation (\*)**

## Pediatrics

RR314 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genca/academic/Pediatrics.html](http://www.washington.edu/students/genca/academic/Pediatrics.html)



Department Web page:  
[www.peds.washington.edu](http://www.peds.washington.edu)

Pediatrics involves the study of physical and behavioral development of man, in health and disease, from conception to maturity.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives. Faculty members participate in teaching the basic curriculum and offer 24 electives, including the general pediatrics clerkship at multiple WWAMI sites. A residency program is offered with a wide variety of electives in addition to traditional hospital-inpatient and clinic experience. Postdoctoral fellowship training is available in many subspecialty areas of pediatrics. The major teaching hospitals in Seattle are Children's Hospital and Medical Center, University of Washington Medical Center, and Harborview Medical Center.

## Faculty

### Chair

F. Bruder Stapleton

### Professors

Bennett, Forrest C. 1977; MD, 1970, University of Minnesota; child development and handicapped children.

Bergman, Abraham 1964; MD, 1958, Case Western Reserve University; ambulatory pediatrics.

Bernstein, Irwin D. 1980; MD, 1967, New York University; hematology, oncology.

Chance, Phillip F. 1998; MD, 1978, University of Tennessee; pediatric neurology and genetics.

Chen, Shi-Han 1972, (Research); PhD, 1968, University of Texas (Austin); pediatric genetics.

Christie, Dennis L. 1979; MD, 1968, Northwestern University; gastroenterology.

Clarren, Sterling K. 1978; MD, 1973, University of Minnesota; congenital defects.

Connell, Frederick A. \* 1978, (Adjunct); MD, 1972, New York University; maternal and child care, health services.

Coombs, John B. 1983; MD, 1972, Cornell University; rural health policy, nutrition and medicine.

Corey, Lawrence \* 1977, (Adjunct); MD, 1971, University of Michigan; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus.

Deisher, Robert W. 1949, (Emeritus); MD, 1944, Washington University; adolescent medicine.

Eddy, Allison A. 1997; MD, 1975, McMaster University (Canada); nephrology.

Emanuel, Irvin \* 1966; MA, 1956, University of Arizona; MD, 1960, University of Rochester; MS, 1966, University of Washington; epidemiology of maternal and child health problems, childhood factors in adult diseases.

Fantel, Alan G. \* 1973, (Research); PhD, 1974, University of Washington; embryology, teratology.

French, James W. 1984; MD, 1963, University of Michigan; pediatric cardiology.

Gleason, Christine A. 1997; MD, 1979, University of Rochester; neonatology.

Guntheroth, Warren G. 1958; MD, 1952, Harvard University; pediatric cardiology.

Guralnick, Michael J. 1986; MS, 1964, PhD, 1967, Lehigh University; developmental disabilities, peer relations, social and language development, evaluation systems.

Hayden, Patricia 1958, (Emeritus); MD, 1953, University of Rochester; congenital defects.

Hodson, W. Alan 1966; MD, 1959, University of Manitoba (Canada); MMSc, 1964, Ohio State University; neonatal and respiratory diseases.

Jaffe, Kenneth M. \* 1981, (Adjunct); MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects, electromyography.

Lemire, Ronald J. 1968; MD, 1962, University of Washington; teratology.

Mackler, Bruce 1957, (Emeritus); MD, 1943, Temple University; developmental biology.

Marcuse, Edgar K. 1971; MD, 1967, Stanford University; MPH, 1973, University of Washington; general pediatrics.

McLaughlin, John F. 1977; MD, 1970, Northwestern University; congenital defects.

Mirkes, Philip E. 1979, (Research); PhD, 1970, University of Michigan; human embryology.

Murray, Jeffrey P. 1980, (Adjunct); MD, 1974, University of Rochester; pediatric anesthesiology.

Neff, John 1982; MD, 1960, Harvard University; children with special health care needs.

Novack, Alvin H. 1979, (Emeritus); MD, 1958, Temple University; general pediatrics.

Ochs, Hans D. 1969; MD, 1962, University of Freiburg (Germany); immunology.

Osborne, William R. 1975, (Research); PhD, 1972, University of London, King's College (UK); pediatric genetics.

Pagon, Roberta A. 1979; MD, 1972, Harvard University; medical genetics.

Ramsey, Bonnie W. 1978; MD, 1976, Harvard University; cystic fibrosis, pulmonary.

Redding, Gregory J. 1980; MD, 1974, Stanford University; pediatric pulmonary medicine.

Rivara, Frederick P. \* 1984; MD, 1974, University of Pennsylvania; pediatric epidemiology and injury prevention and research.

Robertson, William O. 1963, (Emeritus); MD, 1949, University of Rochester; general pediatrics, toxicology.

Rubens, Craig E. \* 1984; PhD, 1978, Medical University of South Carolina; MD, 1982, University of Washington; molecular pathogenesis of Group B streptococcal infections in newborn infants.

Ruvalcaba, Rogelio 1977; MD, 1957, University of Guadalajara (Mexico); endocrinology.

Sanders, Jean E. 1975; MD, 1970, University of Iowa; hematology, oncology.

Sarnat, Harvey B. 1992; MD, 1966, University of Illinois; pediatric neurology, neuromuscular diseases, neurodevelopment.

Scott, C. Ronald \* 1965; MD, 1959, University of Washington; diagnosis and nutritional management of genetic disorders of children.

Shepard, Thomas H. 1962, (Emeritus); MD, 1948, University of Rochester; embryology.

Smith, Nathan J. \* 1965, (Emeritus); MD, 1945, University of Wisconsin; sports medicine.

Stapleton, F. Bruder 1996; MD, 1972, University of Kansas; nephrology.

Stevenson, James G. 1976; MD, 1970, Baylor University; pediatric cardiology.

Tapper, David 1983, (Adjunct); MD, 1970, University of Maryland; pediatric surgery.

Tarr, Phillip I. 1983; MD, 1980, Yale University; gastroenterology/infectious diseases.

Wedgwood, Ralph J. 1962, (Emeritus); MD, 1947, Harvard University; rheumatology.

Weinberger, Edward 1979, (Adjunct); MD, 1979, Harvard University; pediatric radiology.

Wilson, Christopher B. \* 1980; MD, 1972, University of California (Los Angeles); T cell development, innate immunity, host defenses to infection.

Woodrum, David E. 1971; MD, 1965, University of Illinois; neonatology.

Zimmerman, Jerry J. 1998; PhD, 1975, MD, 1979, University of Wisconsin; critical-care medicine.

### Associate Professors

Andrews, Robert G. 1979; MD, 1976, University of Minnesota; hematology/oncology.

Astley, Susan J. \* 1980, (Adjunct); PhD, 1990, University of Washington; etiology, diagnosis, prevention of fetal alcohol syndrome.

Brewer, David K. 1978, (Adjunct); MD, 1972, Harvard University; pediatric radiology, angiography, computed tomography.

Brownstein, Dena R. 1986; MD, 1982, University of Washington; pediatric emergency medicine.

Burns, Jane L. 1982; MD, 1978, University of Washington; infectious diseases.

Cotner, Thomas M. 1982, (Research); PhD, 1978, Massachusetts Institute of Technology; developmental biology.

Davis, Robert L. \* 1991; MD, 1983, University of California (San Diego); MPH, 1993, University of Washington; childhood immunization, including adverse events; perinatal and pediatric epidemiology.

Del Beccaro, Mark A. 1985; MD, 1985, University of Washington; pediatric emergency medicine.

Diekema, Douglas S. 1990; MD, 1985, University of North Carolina; MPH, 1993, University of Washington; pediatric emergency medicine.

Frenkel, Lisa M. 1994; MD, 1987, University of Kansas; infectious diseases.

Geyer, Jeffrey R. 1984; MD, 1977, Wayne State University; hematology/oncology.

Gibson, Ronald L. Jr. 1982; MD, 1982, PhD, 1982, Washington University; pulmonology.

Graham, Elinor A. 1982; MD, 1970, University of Rochester; MPH, 1993, Johns Hopkins University; general pediatrics.

Grossman, David C. 1988; MD, 1982, University of California (Los Angeles); MPH, 1990, University of Washington; general pediatrics.

Haberker, Charles M. 1988, (Adjunct); MD, 1974, Columbia University; anesthesiology.

Hays, Ross M. \* 1983, (Adjunct); MD, 1978, University of Washington; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects, electromyography.

Herndon, S. Paul 1973; MD, 1970, George Washington University; pediatric cardiology.

Holm, Vanja A. 1962, (Emeritus); MD, 1954, Karolinska Institute (Sweden); child development.

Jackson, J. Craig 1979; MD, 1979, Vanderbilt University; neonatal and respiratory diseases.

Jardine, David 1987, (Adjunct); MD, 1980, Johns Hopkins University; pediatric anesthesiology.

Jones, Thomas K. 1983; MD, 1978, Jefferson Medical College; pediatric cardiology.

Kahn, Stuart J. 1985; MD, 1985, University of Medicine and Dentistry of New Jersey; rheumatology.

Kawabori, Isamu 1973; MD, 1966, University of Washington; pediatric cardiology.

Kletter, Gad B. 1995; MD, 1982, Sackler School of Medicine (Israel); pediatric endocrinology.

Lynn, Anne 1981, (Adjunct Research); MD, 1975, Stanford University; pediatric anesthesiology.

Marshall, Susan G. 1979; MD, 1980, University of California (Los Angeles); neonatal and respiratory diseases.

Martin, Lynn D. 1994, (Adjunct); MD, 1982, University of Washington; pediatric anesthesiology.

Massagli, Teresa L. \* 1985, (Adjunct); MD, 1982, Yale University; medical and rehabilitation outcome after spinal cord injury in children.

Matthews, Dana C. 1984; MD, 1981, University of Washington; hematology/oncology.

Mayock, Dennis Edward 1985; MD, 1975, Ohio State University; neonatology and respiratory diseases.

Milstein, Jerrold M. 1980; MD, 1964, University of Minnesota; pediatric neurology.

Moseley, Stephen L. \* 1985, (Adjunct); PhD, 1981, University of Washington; molecular basis of pathogenesis in *E. coli* diarrhea.

Murphy, Janet Haworth 1974; MBChB, 1967, Victoria University (UK); neonatal biology and respiratory disease.

Pendergrass, Thomas W. 1978; MD, 1971, University of Tennessee; MPH, 1979, University of Washington; hematology, oncology.

Pihoker, Catherine 1997; MD, 1987, Albany Medical College; endocrinology.

Portman, Michael A. 1992; MD, 1980, University of Cincinnati; pediatric cardiology.

Quan, Linda 1977; MS, 1969, Dartmouth College; MD, 1971, University of Washington; pediatric emergency medicine.

Rosenbaum, David M. 1983, (Adjunct); MD, 1977, Albert Einstein College of Medicine; pediatric radiology.

Sherry, David Dan 1984; MD, 1977, Texas Technological University; immunology/rheumatology.

Shugerman, Richard P. 1984; MD, 1984, University of Alabama; general pediatrics.

Smith, Mark S. 1977; MD, 1969, University of Virginia; adolescent medicine.

Spiers, Philip S. 1989, (Research); PhD, 1966, Oxford University (UK); SIDS.

Standaert, Thomas A. 1971, (Research); PhD, 1970, Duke University; neonatal and respiratory diseases.

Taylor, James A. Jr. 1987; MD, 1980, University of North Carolina; general pediatrics.

Wallace, Carol A. 1983; MD, 1973, University of Michigan; immunology/rheumatology.

Watkins, Sandra L. 1981; MD, 1981, University of Texas (Houston); nephrology.

Weiss, Avery H. 1991, (Adjunct); MD, 1974, Miami University (Ohio); pediatric ophthalmology, strabismus.

Wright, Jeffrey A. 1988; MD, 1978, University of Missouri; general pediatrics.

### Assistant Professors

Cecchin, Frank 1995; MD, 1987, East Carolina University; cardiology, pediatric.

Christakis, Dimitri A. 1993; MD, 1993, University of Pennsylvania; MPH, 1998, University of Washington; general pediatrics.

Cunningham, Michael L. \* 1988; MD, 1988, University of Vermont; PhD, 1996, University of Washington; congenital defects.

Darmstadt, Gary L. 1995; MD, 1989, University of California (San Diego); infectious diseases, dermatology.

Dovey, Mark 1999; MD, 1989, Duke University; pulmonary.

Friedman, Debra L. 1998; MD, 1991, University of Medicine and Dentistry of New Jersey; hematology/oncology.

Graf, William D. 1988; MD, 1983, Freie University of Berlin (Germany); congenital defects.

Gray, Darryl 1997, (Adjunct); MPH, 1981, University of Washington; MD, 1984, Case Western Reserve University; ScD, 1992, Harvard University; clinical and cost effectiveness analysis of diagnostic/surgical procedures, clinical epidemiology.

Gunther, Daniel F. 1998; MD, 1992, University of California (Davis); pediatric endocrinology.

Hawkins, Douglas S. 1990; MD, 1990, Harvard University; hematology/oncology.

Hornung, Robin L. 1999; MD, 1990, Yale University; MPH, 1996, University of North Carolina; dermatology.

Kapur, Raj P. \* 1988, (Adjunct); MD, 1988, University of Southern California; human embryology, birth defects.

Klein, Eileen J. 1988; MD, 1988, Johns Hopkins University; pediatric emergency medicine.

Kuratani, John D. 1999, (Adjunct); MD, 1990, Tulane University; pediatric epilepsy, EEG.

Leppig, Kathleen 1989; MD, 1986, Case Western Reserve University; medical genetics.

Lozano, Paula 1989; MD, 1989, Harvard University; MPH, 1994, University of Washington; general pediatrics.

McDonald, Ruth A. 1987; MD, 1987, University of Minnesota; nephrology.

Melvin, Ann Jorns 1987; MD, 1986, Tulane University; infectious diseases.

Melzer, Sanford M. 1990; MD, 1982, Mt Sinai School of Medicine; general pediatrics.

Metinko, Andrew P. 1999; MD, 1985, University of Michigan; pediatric critical care.

Milner, Laurie A. 1986; MD, 1986, University of Texas (Austin); pediatric hematology/oncology.

Murray, Karen F. 1990; MD, 1990, Johns Hopkins University; gastroenterology.

Paris, Carolyn A. 1995; MD, 1991, Cornell University; MPH, 1999, University of Washington.

Park, Julie R. 1988; MD, 1988, University of Vermont; hematology, oncology.

Pinter, Joseph D. 1990, (Adjunct); MD, 1990, University of California (Los Angeles); pediatric neurology.

Rho, Jong M. 1994; MD, 1987, University of Cincinnati; pediatric neurology.

Schenkman, Kenneth A. 1990; MD, 1986, Indiana University; pediatric anesthesia.

Sievers, Eric L. 1988; MD, 1988, Brown University; hematology, oncology.

Smith, Sheryllyn 1994; MD, 1989, Baylor University; infectious diseases.

Sotero de Menezes, Marcio 1996; MD, 1984, Rio de Janeiro State University (Brazil); pediatric neurology.

Stout, James W. \* 1986; MAT, 1981, Duke University; MD, 1986, Wake Forest University; childhood asthma, health services and epidemiology.

Strandjord, Thomas P. 1983; MD, 1983, Johns Hopkins University; neonatal biology and respiratory diseases.

Symons, Jordan 1999; MD, 1992, Columbia University; nephrology.

Tarczy-Hornoch, Peter 1992; MD, 1989, Stanford University; neonatology and informatics.

### Lecturers

Polifka, Janine E. 1988; PhD, 1985, University of Louisville; teratology.

Rees, Jane \* 1973; MS, 1972, University of Washington; nutritional support of adolescent health, especially during pregnancy; eating disorders.

Trahms, Cristine M. \* 1973; MS, 1972, University of Washington; growth and development of young children: metabolic disorders, special health care needs.

Vavilala, Monica S. 1997; MD, 1991, University of Texas (Houston); anesthesiology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**PEDS 498 Undergraduate Thesis (\*)** *Bennett* For medical students. Offered: AWSpS.

**PEDS 499 Undergraduate Research (\*)** *Bennett* Participation in various clinical or basic research programs in progress, specifically: child development, developmental biology, human embryology and teratology, medical genetics, infectious diseases, neonatology, neuroembryology, cardiology, endocrinology and metabolism, immunology, respiratory disease. Offered: AWSpS.

**PEDS 505 P-Preceptorship in Pediatrics (1)** *Bennett* To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations for pediatricians by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Enrollment limited. Coordinator: Department of Pediatrics. Offered: AWSpS.

**PEDS 506 Interdisciplinary Seminars in Adolescent Health (1)** Focus on interviewing adolescents, health problems, public health issues, and health care policy. Prerequisite: graduate or professional student status.

**PEDS 512 P-Seminars in Human Embryology and Teratology (3)** *Chance, Mirkes* Presents in depth discussions of human embryonic-fetal development and malformations that arise, correlations with experimental studies and molecular embryology are included. A laboratory experience is optional. Prerequisite: permission of instructor. Offered: AWSpS.

**PEDS 530 P- Adolescent Seminar (1)** *Deisher, Smith* Clinic-based setting for seminar and interview practice with Pioneer Square adolescents; students learn how to deal with special health problems and other related problems of "street kids" through interviews and observations. Credit/no credit only. Offered: W.

**PEDS 551 P-Pediatric Electrocardiography (2)** *Guntheroth* Brief review of the physiology and physics pertinent to clinical electrocardiography is followed by a presentation of terminology and methods in clinical use. Normal electrocardiograms are studied, followed by abnormal tracings, with emphasis on pediatric material, but including adult material such as myocardial infarction. Prerequisite: HUBIO 540. Offered: W.

**PEDS 611 P-Free Teen Night Clinic (\* max. 24)** *Deisher, Smith* One night per week at free clinic in Pioneer Square area. Adolescent and young adult patients, generally poorly educated with low incomes and histories of inadequate health care. Seminars and interviews in conjunction with clinic focus on impact of nontraditional lifestyles and values on health status of individuals. (Limit: four students.) Offered: AWPSP.

**PEDS 630 P-WRITE Pediatrics Clinical Clerkship (\* max. 24)** Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

**PEDS 661 P-Pediatric General Clerkship, Anchorage (\*, max. 24)** *Lyon* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 662 P-Pediatric General Clerkship (\* max. 24)** *Newman* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 663 P-Pediatric General Clerkship (\* max. 24)** *Schweich* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 664 P-Pediatric General Clerkship (\* max. 24)** *Bradford* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 665 P-Pediatric General Clerkship (\* max. 24)** *Bennett* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department or clinic. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 666 P-Pediatric General Clerkship (\* max. 24)** *Marron* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 667 P-Pediatric General Clerkship (\* max. 24)** *Newman* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 668 P-Pediatric General Clerkship (\* max. 24)** *Stucky* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPSP.

**PEDS 669 P-Neonatal Pediatrics-Clerkship (\* max. 24)** *Gleason* Participation in the activities in the newborn and premature divisions; ward rounds, seminars, conferences, and familiarization with cer-

tain laboratory techniques, particularly those relating to acid-base balance. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWPSP.

**PEDS 670 P-Pediatric Infectious Diseases (\* max. 24)** *Rubens* Students see and work up clinic consultations and present in detail to attending physician. Daily rounds include problem-solving discussions and didactic presentations in broad category of infectious diseases. Opportunity for experience in clinical research and laboratory techniques. Prerequisite: PEDS 665 or permission; third- or fourth-year medical student standing. (Limit: one student.) Offered: AWPSP.

**PEDS 673 P-Office Practice (\* max. 12)** *Bennett* Opportunity to observe and function in the private office settings of a number of clinical pediatric faculty and to accompany pediatricians as they pursue their daily activities in the community. Prerequisite: PEDS 665. Offered: AWPSP.

**PEDS 676 P-Pediatric Clerkship With the Mentally Handicapped (\* max. 12)** *Dahl (Fircrest School), Ruvalcaba (Rainier School)* Total care involvement with mentally handicapped patients, incorporating general pediatric knowledge of mental retardation and neurology, plus other specialties related to mental deficiencies. Prerequisite: PEDS 665. (Four or six weeks, full-time.) Offered: AWPSP.

**CONJ 677 P-Clinical Allergy and Immunology (\* max. 12)** See Conjoint Courses.

**PEDS 679 P-Clinical Problems in Developmental Disabilities (\* max. 12)** *Bennett* Experience in multidisciplinary evaluation and management of the handicapped child. Student performs pediatric evaluations, obtains appropriate consultations, observes additional professional assessments (e.g., psychological testing), and plans rehabilitation program. Opportunity to provide parent counseling. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWPSP.

**PEDS 680 P-Pediatric Clinics (\* max. 24)** *Bennett* One to ten half-day sessions may be elected each week for four weeks in the following areas: general pediatrics, endocrinology, neurology, immunology, arthritis, cardiology, congenital defects and retardation, well-child, teratology, adolescent medicine, allergy, cystic fibrosis, hematology, prematurity, neonatology, and poison control. Enrollment limited. Prerequisite: PEDS 665.

**PEDS 681 P-Pediatric Genetics (\* max. 24)** *Pagon* Clinical focus on evaluation and management of children with genetic disorders. Exposure to genetic counseling, the evaluation of children with hereditary structural defects, and diagnosis and management of children with inborn errors of metabolism. Emphasis on genetic mechanisms that cause human disease. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks. Limit: one student.) Offered: AWPSP.

**PEDS 682 P-Congenital Defects-Clinical Experience (\* max. 24)** *Chance, Davis* Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite: permission of instructor. (Limit: one student.) Offered: AWPSP.

**PEDS 683 P-Pediatric Nephrology (8)** *Eddy* Four-week elective clerkship at Children's Hospital and Medical Center. Students participate in nephrology and transplant rounds, consult with renal fellows and attendings, and work up patients in renal clinics. Participation in seminars; special course in fluid balance. Prerequisite: third- or fourth-year medical student, PEDS 665, and MED 665 or equivalent. (Limit: two students.) Offered: AWPSP.

**PEDS 684 P-Pediatric Pulmonary Medicine (8)** *Redding* Respiratory disorders, diagnostic techniques and treatments unique to children in the inpatient, intensive care, and outpatient settings. Ap-

plication of principles of pulmonary physiology to clinical problems. Students conduct consultations under the supervision of the attending and present a topic of choice. Inpatient rounds and clinics. Prerequisite: PEDS 665, fourth-year medical student standing. (Limit: one student.) Offered: AWPSP.

**PEDS 685 P-Pediatric Hematology and Oncology (\* max. 24)** *Bernstein* One-on-one teaching plus four weekly didactic sessions. Specific training in techniques and interpretation of bone marrow aspirations, intravenous chemotherapy, transfusions, and laboratory techniques of hematologic evaluation. Self-learning programs available. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks, full-time.) (Limit: one student.) Offered: AWPSP.

**PEDS 686 P-Pediatric Cardiology (\* max. 24)** *Guntheroth, Kawabori* Emphasis on physical diagnosis and electrocardiography and on clinical knowledge of diagnostic techniques and surgical possibilities for inpatients and outpatients with cardiovascular problems. Opportunity to observe catheterizations and cardiovascular operations. Weekly clinics and twice-daily inpatient rounds. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWPSP.

**PEDS 691 P-Advanced Pediatric Clerkship (\* max. 24)** *Bennett* Inpatient and/or outpatient experience with responsibilities comparable to intern for patient workup, diagnosis, and care. Available at any one, or combination, of affiliated hospitals, including WWAMI units in Alaska, Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWPSP.

**PEDS 697 P-Pediatric Special Electives (\* max. 24)** *Bennett* By specific arrangement, for qualified students, special clerkship externship or research opportunities at institutions other than University of Washington. The faculty can advise of possible opportunities. Obtain special assignment form from Dean's office at least one month before preregistration. Prerequisite: permission of instructor at away site. Offered: AWPSP.

**PEDS 699 P-WWAMI Pediatrics Special Electives (\* max. 24)** *Bennett* By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department at away site.

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## Pharmacology

E401 Health Sciences

 *General Catalog Web page:*  
[www.washington.edu/students/genecat/academic/Pharmacology.html](http://www.washington.edu/students/genecat/academic/Pharmacology.html)

 *Department Web page:*  
[depts.washington.edu/phcol/](http://depts.washington.edu/phcol/)

Pharmacology is the science that deals with the nature of interactions between drugs and biological systems, and with the applications of such interactions to the treatment of disease. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

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## Graduate Program

Graduate Program Coordinator  
E401A Health Sciences, Box 357280  
(206) 543-8930

The Department of Pharmacology offers programs leading to the Master of Science and Doctor of Philosophy degrees. The Master of Science degree may be elected by the student or requested by the department.

## Master of Science and Doctor of Philosophy

*Admission Requirement:* A baccalaureate degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology.

### Master of Science

*Graduation Requirements:* Completion of Graduate School requirements to include PHCOL 511, 512, 513, and three additional 500-level pharmacology courses. Demonstration of competence in pharmacology and a related discipline, such as biochemistry or physiology, and a thesis. A foreign language is not required.

### Doctor of Philosophy

*Graduation Requirements:* Completion of Graduate School requirements to include PHCOL 511, 512, 513, 519, and five additional 500-level pharmacology courses plus 9 credits selected from the conjoint module series (CONJ 531, 532, 533, 536, 537, 539, 541, 542, 543, and 544), 3 non-seminar credits of physiology, and 3 non-seminar credits chosen from biochemistry, molecular biology, physiology, immunology, or cell biology for a total of 15 credits. All 15 credits must be at the approved 400 or 500 level. Students must pass a comprehensive General Examination covering general pharmacology and allied disciplines. A dissertation and Final Examination complete the program.

In the first year, students generally are expected to enroll in biochemistry, pharmacology, and physiology courses. For each of the academic quarters of the first year, a student may work with a different faculty member. The purpose of rotating among the faculty is to acquaint the student with various areas of pharmacology and research under investigation within the department. With this insight, the student should be better able to decide on a thesis or dissertation topic.

In the second year, while becoming more involved with research, the student continues attending courses in pharmacology and supporting disciplines. Immediately after spring quarter of the second year, the student will be given the written portion of the General Examination. Within three months after having taken the written portion, the student will be given the oral portion of the General Examination. The student's supervisory committee will then recommend that the student (1) continue to pursue the doctoral degree, (2) work for a master's degree, (3) undergo re-examination at a later date, or (4) terminate the program.

Continued work in the department for a Ph.D. or M.S. degree usually involves taking advanced biochemistry, pharmacology, and physiology courses, and research.

### Financial Aid

A limited number of teaching assistantships, research assistantships, and traineeships are available.

## Faculty

### Chair

William A. Catterall

### Professors

Beavo, Joseph A. \* 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Bomsztyk, Karol 1983, (Adjunct); MD, 1977, University of Rochester; nephrology.

Catterall, William A. \* 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Chavkin, Charles \* 1984; PhD, 1982, Stanford University; molecular mechanisms of opiate tolerance, the physiological role of neuropeptides in brain function.

Dorsa, Daniel M. \* 1981; PhD, 1977, University of California (Davis); neuropharmacology, neurochemistry.

Hol, Wilhelmus G. J. \* 1992, (Adjunct); PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Horita, Akira \* 1950, (Emeritus); PhD, 1954, University of Washington; neuropsychopharmacology.

Juchau, Mont Rawlings \* 1969; PhD, 1966, University of Iowa; developmental pharmacology, drug metabolism.

Krebs, Edwin G. \* 1977, (Emeritus); MD, 1943, Washington University; intracellular signaling mechanisms involving protein phosphorylation.

McKnight, G. Stanley \* 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.

Moon, Randall T. \* 1985; PhD, 1982, University of Washington; Wnt signal transduction in development and disease.

Nathanson, Neil M. \* 1979; PhD, 1975, Brandeis University; molecular analysis of neural signal transduction by muscarinic and neurokine receptors.

Omiecinski, Curtis J. \* 1983, (Adjunct); PhD, 1980, University of Washington; molecular toxicology, genetic regulation/expression of drug/chemical metabolizing enzymes.

Palczewski, Krzysztof \* 1992, (Adjunct); MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Schellenberg, Gerard D. 1981, (Adjunct Research); PhD, 1978, University of California (Riverside); mapping of familial Alzheimer disease genes and cloning of Werner's syndrome gene.

Storm, Daniel R. \* 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca<sup>2+</sup> signal transduction systems in the CNS.

Vincenzi, Frank F. \* 1967; PhD, 1965, University of Washington; ion transport and intracellular calcium, free radicals and disease, computers in education/research.

Watson, Eileen L. \* 1972, (Adjunct); PhD, 1970, University of Utah; salivary gland pharmacology and regulation.

### Associate Professors

Halpern, Lawrence M. \* 1965; PhD, 1961, Albert Einstein College of Medicine; neuropharmacology.

Hamblin, Mark W. 1990, (Adjunct); MD, 1982, PhD, 1982, University of California (San Diego); molecular and cell biology of serotonin receptors, geriatric psychiatry.

Idzerda, Rejean L. \* 1990; PhD, 1986, University of Washington; cyclic AMP signaling pathway in mammalian testis development and function.

Tempel, Bruce L. \* 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

### Assistant Professors

Bajjalieh, Sandra M. \* 1995; MS, 1983, University of Illinois; PhD, 1989, University of Wisconsin; molecular neurobiology.

Cook, David G. \* 1998, (Adjunct Research); PhD, 1991, Yale University; molecular mechanisms of Alzheimer's disease.

Stella, Nephí \* 1999; PhD, 1995, Ecole Polytechnique Federale De Lausanne; activation of immune cells in the CNS.

Wang, Edith H. \* 1996; PhD, 1991, Columbia University; regulation of genes that control cellular proliferation.

### Lecturers

Hamilton, Susan E. 1983; PhD, 1992, University of Washington; M, muscarinic receptor knockout mice.

Westenbroek, Ruth E. 1984; PhD, 1987, University of Washington; expression of calcium channels in developing and adult nervous systems.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsca/](http://www.washington.edu/students/crsca/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**PHCOL 401 General Pharmacology I (2-4, max. 4)**  
*Juchau, Wang* Principles governing drug-receptor interactions, dose-effect relationships, drug absorption, distribution, metabolism, and excretion. Drug toxicity, tolerance, allergy, and drug-induced mutagenesis and carcinogenesis. Drugs utilized as antimicrobial agents and cancer chemotherapeutic agents. Offered: A.

**PHCOL 402 General Pharmacology II (3/4)**  
*Bajjalieh, Storm* General pharmacology of drugs affecting the autonomic and central nervous systems. Prerequisite: PHCOL 401. Offered: W.

**PHCOL 403 General Pharmacology III (3/4)**  
*Idzerda, McKnight* General pharmacology of drugs affecting the endocrine and cardiovascular systems. For pharmacy students and other undergraduates. Prerequisite: PHCOL 402. Offered: Sp.

**PHCOL 434 General Pharmacology (2)** *Halpern, Watson* Lectures concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students. Offered: A.

**PHCOL 435 General Pharmacology (2)** *Halpern, Watson* Lectures concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students. Offered: W.

**PHCOL 498 Undergraduate Thesis (\*)** Offered: A.

**PHCOL 499 Undergraduate Research (\*)** Participation in departmental research projects. Offered: AWSpS.

**PHCOL 507 Pharmacology Seminar (1)** Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of completed research. Prerequisite: permission of instructor. Offered: AWSp.

**PHCOL 511 General Pharmacology I (1-5, max. 5)**  
*Juchau, Wang* Consideration of principles governing drug-receptor interactions, dose-effect relationships, drug absorption, distribution, metabolism, and excretion. Introduction to drug toxicity, tolerance, allergy, and drug-induced mutagenesis and carcinogenesis. Drugs utilized as antimicrobial agents and cancer chemotherapeutic agents. For graduate students. Prerequisite: organic chemistry, biochemistry, and introductory anatomy and physiology. Offered: A.

**PHCOL 512 General Pharmacology II (1-5, max. 5)** *Bajjalieh, Storm* General pharmacology of drugs affecting the autonomic and central nervous systems. Emphasis on current research approaches to understanding the basic mechanisms of drug action. For graduate students. Prerequisite: PHCOL 511 or permission of instructor. Offered: W.

**PHCOL 513 General Pharmacology III (1-5, max. 5)** *Idzerda, McKnight* General pharmacology of drugs affecting the endocrine and cardiovascular systems. For graduate students. Prerequisite: PHCOL 511, PHCOL 512, or permission of instructor. Offered: Sp.

**PHCOL 514 Current Topics in Pharmacology (1)** *McKnight* Current research related to the mechanisms of drug action presented in a seminar format. Presentations include relevant background material as well as detailed experimental results taken from current research articles. Open to medical and graduate students. Prerequisite: permission of instructor. Offered: AWSp.

**PHCOL 515 General Pharmacology Laboratory (\* max. 9)** Laboratory course for professional and graduate students who wish to do independent laboratory research under the direction of a specific faculty member. Prerequisite: permission of instructor. Offered: AWSp.

**PHCOL 519 Introduction to Laboratory Research in Pharmacology (4)** *Storm* On a rotation basis students carry out individual research projects in the laboratories of different faculty members. At the end of each quarter students make formal presentations of their work. For first year graduate students in pharmacology. Offered: AWSpS.

**PHCOL 527 Drug Metabolism (3)** *Juchau, Rettie* Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Open to medical and graduate students. Prerequisite: one year graduate, medical, or dental biochemistry, or permission of instructor. Offered: jointly with MEDCH 527; odd years; W.

**PHCOL 528 Neuropsychopharmacology (2)** *Halpern* Advanced review and discussion of biochemical and pharmacodynamic mechanisms underlying the central nervous system actions of psychotropic, analgesic, sedative, and antiepileptic drugs. Prerequisite: CONJ 531 and CONJ 532 or permission of instructor. Offered: even years; A.

**PHCOL 529 Ion Channel Pharmacology (2)** *Catterall, Tempel* Current topics in ion channel structure, function, genetics, and pharmacology, including consideration of role in electrical signaling in cell membranes and information transfer and processing in nervous system and of sites and mechanisms of action of drugs and toxins. Prerequisite: CONJ 532 and CONJ 536 or permission of instructor. Offered: odd years; A.

**PHCOL 530 Pathways of Receptor Action (2)** *Beavo, Storm* Advanced consideration of the molecular events between drug or hormone binding to receptors and the resulting responses. Roles played by cyclic nucleotides and other second messengers. Adenylate cyclase, phosphoinositide-mediated regulation, phosphodiesterases and protein kinases. Prerequisite: PHCOL 511, PHCOL 512, PHCOL 513, or permission of instructor. Offered: even years; W.

**PHCOL 531 Genetic Analysis of Signaling Systems (2)** *McKnight, Moon* Current topics involving signal transduction are discussed with an emphasis on genetic analysis of multicellular systems and creative experimental design. Prerequisite: 9 credits of graduate-level courses in molecular and cellular biology, biochemistry, or genetics, or permission of instructor. Offered: odd years; Sp.

**PHCOL 533 Molecular Toxicology (2)** *Kavanagh, Omiecinski* Advanced discussion of molecular mechanisms whereby chemical, physical, and biological agents produce their harmful effects on biological tissues. Prerequisite: permission of instructor. Offered: jointly with ENV H 533; even years; Sp.

**PHCOL 534 Regulation of Neurotransmission (2)** *Chavkin, Dorsa* Advanced consideration of the effects of drugs on neurotransmission and higher order neural systems including current topics in receptor pharmacology, hormonal modulation of neuro signaling, effects of disease on neural circuits, regulation of synaptic plasticity, and mechanisms underlying neurodegeneration. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; A.

**PHCOL 535 Transcriptional Control in Human Disease (2)** *Bomsztyk, Wang* Advanced consideration and discussion of the mechanisms regulating transcription/gene expression and of aberrant transcription factors which disrupt this process found in cancer and other human diseases. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; Sp.

**PHCOL 537 Molecular Neurobiology of the Cell Membrane (2)** *Bajjalieh, Nathanson* Advanced consideration of the structure and function of cell membranes, membrane trafficking, exocytosis, endocytosis, membrane proteins, and lipid-mediated signal transduction. Processes important to nervous system functioning emphasized. Prerequisite: CONJ 531 and CONJ 532, or permission of instructor. Offered: W.

**PHCOL 549 Concepts in Pharmacology (2)** *Vincenzi* Reading and participatory discussions of publications on fundamental concepts in pharmacology and development of concepts to present. Includes receptors, theories of receptor activation, chemical transmission, membrane potential, membrane responsiveness, transmembrane signaling, membrane ion pumps, voltage-operated channels, and drug absorption, distribution, metabolism, and elimination. Prerequisite: PHCOL 511, PHCOL 512, and PHCOL 513 or permission.

**PHCOL 550 An Overview of Faculty Research (1)** *Juchau* Reviews research topics currently being studied in pharmacology. Student reads articles published on each topic. Credit/no credit only. Prerequisite: first-year student standing in pharmacology. Offered: A.

**PHCOL 560 Regulation of Cell Function by Cyclic Nucleotide Phosphodiesterases (1)** *Beavo* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on practical problem solving, data analysis, and presentation of methods important to understanding published data and designing new experiments in this area of research. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 561 Molecular Properties of Ion Channels (1)** *Catterall* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of sodium and calcium channels and the mechanism of action of drugs on them. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 562 Regulation of Synaptic Physiology (1)** *Chavkin* Discussion of research strategies and methodologies involved in the regulation of signal transduction and synaptic physiology. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 563 Developmental Toxicology (1)** *Juchau* Presentation of theory and techniques with highest priority given to current literature and research advances. Emphasis on mechanisms whereby drugs and other foreign organic chemicals affect dysmorphogenesis, functional abnormalities, and other types of permanent and semi-permanent embryotoxic effects. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 564 Cellular Regulation by Protein Kinases (1)** *McKnight* Analysis of research problems, techniques, and emerging concepts in the study of the function of protein kinases. Emphasis on critical evaluation of research and development of presentation skills. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 565 Intercellular Signaling in Development (1)** *Moon* Molecular genetic approaches to dissecting the roles and mechanisms of intracellular signaling during development. Emphasis on vertebrate genes related to *Drosophila* segment polarity genes. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 566 Molecular Pharmacology of Neurotransmitter and Neurokinin Receptors (1)** *Nathanson* Discussion of research strategies and methodologies in the areas of molecular neurobiology and signal transduction of muscarinic receptors, G-proteins, and neurokinin receptors. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 567 Signal Transduction Mechanisms in Neuroplasticity and Neuron Growth (1)** *Storm* Discussion of research strategies, methodologies, and literature relating to signal transduction mechanisms important for neuroplasticity and regulation of neuron growth in the central nervous system. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 568 Pharmacology of Free Radicals (1)** *Vincenzi* Advanced considerations of current literature and experimental design, implementation and interpretation of research dealing with the effects of reactive oxygen species and free radicals on cell membranes and cells. Discussion of the relationships of such phenomena to human disease and the effects of drugs thereon. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 569 Molecular Genetics of Potassium Channel Function (1)** *Tempel* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of potassium channel genes and their role in behavior as studied in mutant mice. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 570 Molecular Pharmacology of Neurotransmission (1)** *Dorsa* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of neurotransmitter genes and the mechanism of action of drugs and hormones on their expression. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**PHCOL 571 Molecular Mechanisms of Neurosecretion (1)** *Bajjalieh* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

**PHCOL 572 Transcriptional Regulation of Growth Control Genes (1)**

*Wang* Discussion of research strategies, methodologies, and literature relating to proliferative growth control and gene expression. Emphasis on practical problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

**PHCOL 600 Independent Study or Research (\*)**

Pharmacology graduate students only. Offered: AWPSP.

**PHCOL 700 Master's Thesis (\*)**

Pharmacology graduate students only. Offered: AWPSP.

**PHCOL 800 Doctoral Dissertation (\*)**

Pharmacology graduate students only. Offered: AWPSP.

## Physiology and Biophysics

G424 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Physiology\\_Biophys.html](http://www.washington.edu/students/genocat/academic/Physiology_Biophys.html)



Department Web page:  
[depts.washington.edu/pbiopage/](http://depts.washington.edu/pbiopage/)

Physiology deals with the processes, activities, and phenomena incidental to, and characteristic of, life and living organisms. Based upon physics, chemistry, and mathematics, physiology interlocks closely with the other basic medical sciences—*anatomy, molecular biology, immunology, biochemistry, pharmacology, and pathology*—and with psychology. Research in physiology is accomplished by analyzing the molecular, cellular, and integrative properties of the system under study. For this reason, physiology appeals to students with diverse backgrounds and goals. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

## Graduate Program

Graduate Program Coordinator  
G424 Health Sciences, Box 357290  
(206) 685-0519  
[pbiop@u.washington.edu](mailto:pbiop@u.washington.edu)

The Department of Physiology and Biophysics offers advanced instruction and training leading to both the Master of Science and Doctor of Philosophy degrees. Students aspiring only to the M.S. degree are rarely accepted. Students pursuing a Ph.D. degree in physiology and biophysics may emphasize molecular and cellular physiology, biophysics, neurobiology, respiratory physiology, or endocrinology. Studies leading to the doctoral degree require five to six years to complete. The first year is spent acquiring a broad knowledge of physiology via a sequence of courses and laboratory rotations. After selection of a special area of study, the second year is spent taking advanced seminars in the area of specialization and developing a thesis proposal. After admission to candidacy, the latter years are spent pursuing the area in depth and completing an original-research project.

Individuals with graduate degrees in physiology and biophysics often pursue careers in teaching and research in colleges and universities and in biotech industries. With additional training, graduates have been successful in medicine, law, creative writing, and high-level computer programming.

The department participates in interdisciplinary Ph.D. degree programs in Neurobiology and Behavior, and in Molecular and Cellular Biology.

## Special Requirements

Admission to the physiology program normally requires a baccalaureate degree in biochemistry, biology, chemistry, engineering, genetics, mathematics, molecular biology, neuroscience, physics, or psychology.

Graduate Record Examination scores are required as part of the application. No subject tests are required.

Students are normally admitted to the graduate program in the autumn quarter. Applications and all relevant material should be submitted by February 1.

## Research Facilities

The department is well equipped to provide instruction and research training in cellular and molecular physiology, neurobiology, membrane biophysics, respiratory physiology, muscle biophysics, endocrinology, reproduction, and physiological psychology. The facilities of the Regional Primate Research Center, adjacent to the department, are available to qualified trainees who need to use primates in their research.

## Faculty

### Acting Chair

Albert J. Berger

### Professors

Anderson, Marjorie E. \* 1971; PhD, 1969, University of Washington; physiology of basal ganglia and cerebellum.

Berger, Albert J. \* 1978; MA, 1965, PhD, 1967, Princeton University; PhD, 1976, University of California (San Francisco); neural and chemical control of respiration.

Binder, Marc D. \* 1978; PhD, 1974, University of Southern California; organization of spinal reflexes.

Blinks, John R. \* 1990; MD, 1955, Harvard University; muscle calcium.

Bothwell, Mark A. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of nerve growth factors.

Brengelmann, George L. \* 1966; PhD, 1967, University of Washington; temperature regulation, cutaneous blood flow.

Carlson, Steven S. \* 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Crill, Wayne E. \* 1967; MD, 1962, University of Washington; properties of cortical neurons.

Detwiler, Peter B. \* 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.

Feigl, Eric O. \* 1969; MD, 1958, University of Minnesota; cardiovascular physiology, coronary and cerebral circulation.

Fetz, Eberhard \* 1975; PhD, 1966, Massachusetts Institute of Technology; cortical regulation of movement.

Freund, Peter 1980, (Adjunct); MA, 1971, Brown University; MD, 1975, Columbia University; temperature regulation, vasomotor control, physiology/biophysics.

Fuchs, Albert F. \* 1969; PhD, 1966, Johns Hopkins University; oculomotor physiology.

Gordon, Albert M. \* 1964; PhD, 1961, Cornell University; skeletal muscle physiology.

Hilbrandt, Jacob \* 1966; PhD, 1966, University of Washington; respiratory physiology.

Hille, Bertil \* 1968; PhD, 1967, Rockefeller University; ion channels of excitable membranes.

Hlastala, Michael P. \* 1972; PhD, 1969, State University of New York (Buffalo); respiratory physiology, inert gas analysis of respiratory function.

Hornbein, Thomas F. \* 1963; MD, 1956, Washington University; physiology, biophysics.

Howard, Jonathon \* 1989; PhD, 1983, Australian National University; biophysics of molecular motors.

Kennedy, Thelma T. \* 1958, (Emeritus); PhD, 1955, University of Chicago.

Koerker, Donna J. \* 1982; PhD, 1970, University of Michigan; endocrinology, intermediate metabolism of carbohydrates.

Kushmerick, Martin J. \* 1988; MD, 1963, PhD, 1966, University of Pennsylvania; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy.

Patton, Harry D. 1947, (Emeritus); PhD, 1943, MD, 1946, Yale University.

Ransom, Bruce Robert \* 1995, (Adjunct); MD, 1972, PhD, 1972, Washington University; neurology, movement disorders, neuroscience research

Robertson, H. Thomas 1975; MD, 1968, Harvard University; respiratory diseases.

Rowell, Loring B. \* 1963, (Emeritus); PhD, 1962, University of Minnesota.

Rubel, Edwin W. \* 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Scher, Allen M. \* 1950, (Emeritus); PhD, 1951, Yale University.

Schwartzkroin, Philip A. \* 1978; PhD, 1972, Stanford University; mechanisms of cortical excitability.

Schwindt, Peter C. \* 1974, (Emeritus); PhD, 1972, University of Washington; properties of spinal and cortical neurons, mechanisms of repetitive firing and convulsive activity.

Smith, Orville A. \* 1958, (Emeritus); PhD, 1953, Michigan State University.

Stahl, William L. \* 1975; PhD, 1963, University of Pittsburgh; neurochemistry of brain ATPase systems.

Steiner, Robert A. \* 1977; PhD, 1975, University of Oregon; neuroendocrinology.

Stirling, Charles E. \* 1968, (Emeritus); PhD, 1966, State University of New York (Upstate Medical Center).

Teller, Davida Y. \* 1965; PhD, 1965, University of California (Berkeley); vision, color vision, development of vision in infants.

Towe, Arnold L. \* 1953, (Emeritus); PhD, 1953, University of Washington.

Van Citters, Robert L. \* 1962, (Emeritus); MD, 1953, University of Kansas; cardiovascular physiology.

Winn, H. Richard \* 1983, (Adjunct); MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

## Associate Professors

Babcock, Donner 1986, (Research); PhD, 1971, Oregon State University; ion channels of sperm cells.

Conley, Kevin E. \* 1988; PhD, 1983, University of Wisconsin; muscle physiology.

Cunningham, Susanna L. \* 1978, (Adjunct); MN, 1969, PhD, 1978, University of Washington; risk factors for atherosclerotic cardiovascular disease.

Giniger, Edward Scott \* 1994, (Research); PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.

Glenny, Robb \* 1987; MD, 1984, University of Virginia; determinants of regional pulmonary blood flow and ventilation distribution.

Gorman, Mark 1997, (Research); PhD, 1979, University of Michigan; control of coronary blood flow.

Landau, Barbara R. 1962, (Emeritus); MS, 1949, PhD, 1956, University of Wisconsin.

Mackie, Kenneth P. \* 1987, (Adjunct); MD, 1984, Yale University; molecular and cell biological studies of cannabinoid receptor signaling.

Powers, Randall K. 1988, (Research); PhD, 1982, University of Washington; spinal cord neurophysiology.

Skahen, Julia G. 1941, (Emeritus); MS, 1928, University of Washington; PhD, 1941, University of Chicago.

Spain, William \* 1981; MD, 1977, Columbia University; neurology, neurobiology.

Wordeman, Linda \* 1994; PhD, 1988, University of California (Berkeley); mitosis and myofibril formation.

Zagotta, William N. \* 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.

### Assistant Professors

Gordon, Sharona E. \* 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Jagadeesh, Bharathi \* 1999; PhD, 1993, Northwestern University; neural basis of visual learning and memory.

Koh, Duk-Su 1995, (Research); PhD, 1992, Justus-Liebig University (Germany); regulation of exocytosis.

Perlmutter, Steve I. 1995, (Research); PhD, 1991, Northwestern University; neural control of movement.

Rieke, Frederick Martin \* 1997; PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Shadlen, Michael N. \* 1995; PhD, 1985, University of California (Berkeley); MD, 1988, Brown University; visual perception.

### Senior Lecturer

Linder, Thomas M. 1982; PhD, 1971, University of Washington.

### Lecturer

Melby, Anna 1996; PhD, 1995, University of Oregon.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4)** Linder, Melby See Conjoint Courses.

**P BIO 405- Human Physiology (4-)** Intensive coverage of physiology through lectures, conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids; neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: A.

**P BIO -406 Human Physiology (-4)** Intensive coverage of physiology through lectures, conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids;

neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: W.

**P BIO 424 Vision and Its Physiological Basis (5) NW Teller** Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: either PSYCH 101, PSYCH 102, BIOL 202, or ZOOL 301. Offered: jointly with PSYCH 424; W.

**P BIO 498 Undergraduate Thesis (\*)** Offered: AWSpS.

**P BIO 499 Undergraduate Research (\*)** Offered: AWSpS.

**P BIO 505 Topics in Physiology (0.5) Gordon** Topics include excitation-contraction coupling, muscle structure, and molecular basis of contraction, regulation of contraction, muscle mechanisms, energetics, and adaptation. Emphasis on skeletal muscle with some discussion of cardiac and smooth muscle. Series of six lecture discussions. Prerequisite: first year P BIO graduate student. Offered: A.

**P BIO 507 Cardiovascular, Renal, Respiratory Physiology (3) Berger** Cardiovascular physiology: the heart, microcirculation, hemodynamics, regional circulation, and reflex integration. Renal physiology: osmolarity, volume, and ion transport. Respiratory physiology: the lung, pulmonary circulation, alveolar ventilation, gas exchange, control of breathing, acid-base regulation, exercise. Offered: W.

**P BIO 508 Introduction to Laboratory Research in Physiology (2-5)** Students participate in the performance of ongoing projects in designated research laboratories. Emphasis is on experimental design, methodology and techniques. For first- and second-year graduate students in physiology and biophysics to provide a basis for future independent research. Offered: AWSpS.

**P BIO 509 Neuroendocrinology (3) Steiner** Emphasizes the cellular and molecular aspects of several topics in neuroendocrinology, including neuropeptide genes, reproduction, steroid hormone regulation of gene expression, mechanisms of hormone action, endocrine rhythms, and neural oscillations. Prerequisite: BIOL 200, BIOL 201, BIOL 202; BIOC 440, BIOC 441, BIOC 442 or permission of instructor. Offered: Sp.

**P BIO 510 Physiology Survey (2)** Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: A.

**P BIO 511 Physiology Survey (2)** Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: W.

**P BIO 512 Physiology Survey (2)** Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: Sp.

**P BIO 513 Practicum in Teaching Physiology and Biophysics (4)** Students undertake instructional material development, presentation of materials and develop problem-solving techniques. Credit/No credit only. Offered: AW.

**P BIO 516 Physiological Proseminar (7) Hlastala** Guided survey of the experimental literature in cardiovascular and respiratory physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite: permission of instructor. Offered: A.

**P BIO 518 Research Topics in Cardiovascular Physiology (1) Feigl** Graduate students and faculty members present and discuss current literature and research. Prerequisite: permission of instructor.

**P BIO 519 Membrane and Muscle Biophysics Seminar (1) Hille** Lectures on current research topics in cell membrane function and muscle contraction. Credit/no credit only. Prerequisite: permission of instructor. Offered: Sp.

**P BIO 520 Physiology Seminar (\*)** Selected topics in physiology. Prerequisite: permission of instructor.

**P BIO 521 Biophysics Seminar (\*)** Selected topics in biophysics. Prerequisite: permission of instructor.

**P BIO 522 Selected Topics in Respiratory Physiology (1-3, max. 3) Hildebrandt** Advanced seminar on selected topics, including pulmonary mechanics, gas exchange, lung fluid balance, regulation of breathing, pulmonary circulation, respiration in the neonate, liquid breathing, airway dynamics, lung structure and development, cardiopulmonary interactions, exercise physiology. Prerequisite: permission of instructor. Offered: AWSpS.

**P BIO 525 Readings in Advanced Physiology and Biophysics (\*)** Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: A.

**P BIO 526 Readings in Advanced Physiology and Biophysics (\*)** Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: W.

**P BIO 527 Readings in Advanced Physiology and Biophysics (\*)** Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: SpS.

**CONJ 531 Signaling Mechanisms in Excitable Cells (1.5)** See Conjoint Courses.

**P BIO 541 Motor Systems I: Peripheral, Spinal, and Cortical Mechanisms (3) Binder, Fetz** Discussion of research papers on the physiology of the motor unit and the spinal and cortical neurons that control motor unit activity. Prerequisite: NEUBEH 501-503 or permission of instructor.

**P BIO 542 Motor Systems II: Brainstem Mechanisms (3) Anderson, Fuchs** Critical discussion of research papers and resulting concepts regarding the roles of various brainstem systems in controlling somatic and ocular movements. Each student is responsible for leading the discussion of one topic. Prerequisite: NEUBEH 502 and NEUBEH 503 or equivalent and permission of instructor.

**P BIO 544 Properties of Neurons (3) Schwandt** Critical reading and discussion of papers on passive, active, and integrative properties of single invertebrate and mammalian neurons. Provides understanding of how a variety of cellular mechanisms contribute to neuronal discharge patterns. Prerequisite: CONJ

501, CONJ 502, CONJ 503 and NEUBEH 501, NEUBEH 502, NEUBEH 503 or equivalent and permission of instructor. Offered: even years; A.

**P BIO 547 Readings in Cell Physiology (2/3, max. 15)** *Hille* Reading and discussion of research literature on excitable cells. Emphasis on membrane excitability, transport, contractility, growth factors, and extracellular matrix. Topics vary. Prerequisite: CONJ 501 or equivalent. Offered: W.

**P BIO 549 Plasticity in the Vertebrate Nervous System (2)** *Schwartzkroin* Emphasis on mammalian CNS. Examples of anatomical, pharmacological plasticity chosen from literature. Structure changes during development and in adult (hippocampus, spinal cord, nerve-muscle) studied and as correlates of learning. Students responsible for leading class discussion of one topic. Credit/no credit only. Prerequisite: graduate-level courses in neurophysiology and neuroanatomy; understanding of basic neuronal mechanisms. Offered: even years; Sp.

**P BIO 560 Muscle and Cell Motility (\*)** *Gordon* Selected topics in muscle contraction and cell motility. Reading of original papers. Presentations by students and faculty. Topics vary. Prerequisite: permission of instructor.

**P BIO 594 Neurological Study Unit (0.5)** Faculty and student discussion of neurological topics illustrated with clinical cases or demonstrations include the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. Credit/no credit only. Prerequisite for medical students: HUBIO 532. Offered: AW.

**P BIO 600 Independent Study or Research (\*)** Offered: AWP.

**P BIO 700 Master's Thesis (\*)** Offered: AWP.

**P BIO 800 Doctoral Dissertation (\*)** Offered: AWP.

## Psychiatry and Behavioral Sciences

BB1644 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Psychiatry.html](http://www.washington.edu/students/genocat/academic/Psychiatry.html)



Department Web page:  
[depts.washington.edu/psychweb/](http://depts.washington.edu/psychweb/)

pbsci@u.washington.edu

The department offers course work, clinical training, and research opportunities for undergraduate students, medical students, graduate physicians, and graduate students in allied health programs such as psychology, social work, and psychiatric nursing.

A biobehavioral approach is emphasized, which incorporates intrapersonal, interpersonal, and sociocultural factors. Intrapersonal factors include emotion, perception, cognition, psychodynamics, neurochemistry, neuroanatomy, neurophysiology, and the developmental and aging processes. Interpersonal factors focus upon dyadic, familial, and group interactions. Sociocultural factors include the cultural, social, institutional, and community systems as well as the environment and epidemiology of health and disease.

### Graduate Program

The medical school curriculum is divided into a core (basic) curriculum and an elective curriculum. Within its core curriculum the Department of Psychiatry and Behavioral Sciences offers material covering learning theory, cognition, memory, perception, neuropharmacology, social growth and development, epidemiology

of health and disease, psychopathology, psychotherapy, and neuropsychiatry and behavioral medicine, as well as training in interviewing skills and assessment techniques. Its elective program includes a variety of clinical experiences and advanced didactics and seminars designed to further the knowledge and skills developed within the basic curriculum. In addition, the department encourages research and other scholarly pursuits by students in areas of interest to them. Stipends are available for research studies.

### Residency Training in Psychiatry

Contact: Deborah Cowley

A four-year residency for medical school graduates and a three-year post-internship residency prepares physicians for Specialty Board Certification in Psychiatry. Clinical rotations on various inpatient, outpatient, and consultation/liason services are augmented by individual supervision and didactic lectures. With the program's integrative orientation, residents become proficient in psychotherapy, psychopharmacology, and community liaison with patients of all ages. Fellowships in child, geriatric, community, forensic, and consultation-liason psychiatry are available, as well as in substance abuse and various other specialty areas.

### Clinical Psychology Internship Program

Contact: Karen Schmaling

A one-year internship in clinical psychology approved by the American Psychological Association is offered as an interdepartmental program. This internship is open to candidates for the doctorate in clinical psychology from graduate programs approved by the American Psychological Association.

### Postdoctoral Fellowship Training

Contact: Richard Veith

Postdoctoral fellowships for advanced clinical and research training in behavioral medicine, broadly construed, are also offered.

## Faculty

### Chair

Richard Veith

### Professors

Avery, David H. 1980; MD, 1972, Washington University; treatment of depression, seasonal affective disorder, transcranial magnetic stimulation.

Becker, Joseph \* 1965, (Emeritus); PhD, 1958, Duke University; psychosocial aspects of depression.

Bird, Thomas D. 1976, (Adjunct); MD, 1968, Cornell University; neurology, neurogenetics.

Borson, Soo 1972; MD, 1969, Stanford University; geriatric psychiatry.

Bowden, Douglas M. 1969; MD, 1965, Stanford University; neural substrates of learning and memory.

Calsyn, Donald 1981; PhD, 1979, University of Washington; drug abuse treatment, AIDS prevention.

Carr, John E. \* 1963; PhD, 1963, Syracuse University; clinical health psychology, behavioral medicine.

Chapman, C. Richard \* 1971; PhD, 1969, University of Denver; human pain measurement, psychophysiology, sensation and perception, chronic pain.

Cowley, Deborah S. 1982; MD, 1980, University of Pennsylvania; anxiety disorders, psychiatric disorders during pregnancy and postpartum.

Dager, Stephen R. \* 1979; MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Dikmen, Sureyya S. \* 1974, (Adjunct); PhD, 1973, University of Washington; clinical neuropsychology, neuropsychological and psychosocial outcomes in traumatic head injury.

Doerr, Hans O. \* 1967, (Emeritus); PhD, 1965, Florida State University; psychophysiology of central and autonomic nervous systems, neuropsychology.

Donovan, Dennis 1981; MA, 1972, Western Washington University; PhD, 1980, University of Washington; cognitive-behavioral factors in substance abuse and addictive behaviors.

Dorsa, Daniel M. \* 1981; PhD, 1977, University of California (Davis); neuropharmacology, neurochemistry.

Dunner, David L. 1978; MD, 1965, Washington University; diagnosis and treatment of depression.

Dworkin, Samuel F. \* 1974; DDS, 1958, PhD, 1969, New York University; dentistry and clinical psychology, pain, psychosomatic and illness-related behavior.

Heiman, Julia R. \* 1980; PhD, 1975, State Univ of New York (Stony Brook); sexuality and sexual relationships, prevention and treatment of family abuse.

Horita, Akira \* 1950, (Emeritus); PhD, 1954, University of Washington; neuropsychopharmacology.

Hunt, D. Daniel 1977; MD, 1973, Cornell University; MBA, 1977, University of Pennsylvania; medical education, career choice.

Johnson, Merlin 1982, (Emeritus); MD, 1947, University of Iowa.

Katon, Wayne J. \* 1976; MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.

Linehan, Marsha M. \* 1977, (Adjunct); PhD, 1971, Loyola University (Chicago); personality disorders, including borderline; suicidal behaviors, cognitive and behavior therapies.

McCauley, Elizabeth 1979; PhD, 1973, State University of New York (Buffalo); clinical and developmental psychology.

Meltzoff, Andrew N. \* 1977, (Adjunct); PhD, 1976, Oxford University (UK); cognitive and social development of human infants.

Raskind, Murray 1970; MD, 1968, Columbia University; aging and Alzheimer's disease.

Ries, Richard K. 1975; MD, 1975, Northwestern University; severe mental illness treatment, addictions, health services outcomes.

Robinson, Nancy M. \* 1969; PhD, 1958, Stanford University; developmental psychology, giftedness.

Roy-Byrne, Peter 1986; MD, 1978, Tufts University; diagnosis and psychopharmacology of anxiety, depression, and ADHD in adults.

Speltz, Matthew L. 1981; MA, 1975, Western Washington University; PhD, 1980, University of Missouri; developmental psychotherapy, family therapy, pediatric behavioral medicine.

Streissguth, Ann P. 1972; MA, 1959, University of California (Berkeley); PhD, 1964, University of Washington; psychology and behavioral teratology.

Teri, Linda \* 1984, (Adjunct); PhD, 1980, University of Vermont; clinical psychology.

Townes, Brenda D. \* 1961; PhD, 1970, University of Washington; psychology.

Trupin, Eric W. 1973; MA, 1973, PhD, 1974, University of Wyoming; psychology.

Tucker, Gary J. 1985, (Emeritus); MD, 1960, Case Western Reserve University; neuropsychiatry.

Turner, Judith A. 1980; MA, 1975, PhD, 1979, University of California (Los Angeles); psychology.

Veith, Richard 1977; MD, 1973, University of Washington; gerontology.

Vitaliano, Peter P. \* 1978; PhD, 1975, Syracuse University; stress and coping.

Vitiello, Michael V. \* 1982; PhD, 1980, University of Washington; sleep, sleep disorders and circadian rhythms in aging, age-related neuroendocrine/cognitive change.

Ward, Nicholas G. 1975; MD, 1973, Cornell University; treatment resistant mood disorders, psychopharmacology.

### Associate Professors

Armstrong, Hubert E. 1966, (Emeritus); PhD, 1963, Syracuse University; clinical psychology.

Aylward, Elizabeth H. 1997, (Adjunct); MA, 1976, University of Connecticut; PhD, 1982, Cornell University; structural and functional neuroimaging in neuropsychiatric disorders.

Barnes, Robert 1977; MD, 1973, University of Utah.

Buchwald, Dedra S. 1987, (Adjunct); MD, 1981, University of California (San Diego); internal medicine.

Carlin, Albert S. 1964, (Emeritus); MA, 1961, PhD, 1964, Syracuse University; clinical psychology.

Chaney, Edmund 1977; PhD, 1976, University of Washington; clinical psychology.

Craft, Suzanne \* 1994; PhD, 1985, University of Texas (Austin); neuropsychology of attention and memory in aging and Alzheimer's disease.

Dubach, Mark F. 1978; PhD, 1983, University of Washington; anthropology.

Egan, Kelly J. 1980; MA, 1968, Texas Technological University; PhD, 1980, University of Washington; clinical psychology.

Erickson, Richard C. 1991; PhD, 1969, University of Washington; clinical psychology.

Hamblin, Mark W. 1990; MD, 1982, PhD, 1982, University of California (San Diego); molecular and cell biology of serotonin receptors, geriatric psychiatry.

Kivlahan, Daniel R. \* 1983; PhD, 1983, University of Missouri; evaluating assessment, prevention, and treatment approaches for addictive behaviors.

Lampe, Thomas H. 1982; MD, 1977, Indiana University; Alzheimer's disease, post-traumatic stress disorder, neuroendocrinology.

Logsdon, Rebecca G. \* 1986, (Adjunct Research); PhD, 1986, Oklahoma State University; geriatric psychology, Alzheimer's disease, caregiving.

Maiuro, Roland D. 1978; PhD, 1978, Washington University; clinical psychology.

Maxim, Peter E. 1976; MD, 1966, PhD, 1971, Stanford University; in-patient care.

McCann, Barbara S. \* 1986; MS, 1982, PhD, 1984, Rutgers University; behavior change, adult ADHD, psychological stress, cardiovascular disease, diabetes, obesity.

McClellan, Jon M. 1984; MD, 1984, University of Michigan; child psychiatry.

McFall, Miles E. 1982; MA, 1979, PhD, 1981, University of Montana; clinical psychology.

Murburg, Michele 1982; MD, 1978, Albert Einstein College of Medicine; neurobiology of PTSD, PTSD in special populations, psychiatric consequences of workplace harassment.

Peskind, Elaine R. 1986; MD, 1986, University of Washington; neuroendocrinology of aging, Alzheimer's and PTSD, neurobiology of noncognitive behavioral problems.

Raskind, Wendy H. 1982, (Adjunct); PhD, 1977, MD, 1978, University of Washington; medical genetics.

Romano, Joan 1982; MS, 1974, PhD, 1982, University of Pittsburgh; clinical psychology.

Saxon, Andrew J. 1982; MD, 1977, Tufts University; addiction psychiatry.

Scher, Maryonda 1961, (Emeritus); MD, 1954, University of Washington; dissociative disorders/PTSD.

Schmaling, Karen B. 1992; MS, 1985, PhD, 1988, University of Washington; behavioral medicine (asthma, chronic fatigue syndrome), depression, treatment outcome research.

Scott, David T. 1993; PhD, 1978, Yale University; natural history of premature infants, efficacy of early intervention for premature infants.

Sullivan, Mark D. 1985; PhD, 1982, MD, 1984, Vanderbilt University; depression and chronic medical illness, chronic pain, ethics, quality of life.

Sulzbacher, Stephen 1976; MA, 1964, Hollins College (Virginia); PhD, 1971, University of Washington; psychiatry and behavioral sciences.

Syrjala, Karen L. 1985; PhD, 1983, MA, 1983, Boston University; oncology, pain.

Unis, Alan S. \* 1987; MD, 1976, University of Pittsburgh; early-onset psychopathology resulting from disrupted brain development.

Varley, Christopher K. 1974; MD, 1973, University of Washington; attention deficit hyperactivity disorder, pediatric psychopharmacology.

Verhulst, Johan 1977; MD, 1964, Catholic University of Louvain (Belgium); clinical psychiatry, marital therapy.

Villacres, Enrique C. 1981; MD, 1981, Medical College of Wisconsin; signal transduction and role of cAMP cascade proteolytic and learning, mo.

Walker, Edward A. 1983; MD, 1983, University of Washington; consultation-liaison psychiatry, medically unexplained physical symptoms.

Wells, Elizabeth A. 1982, (Adjunct Research); PhD, 1984, University of Washington; clinical psychology, alcohol and drug use among adolescents.

Wilson, Lawrence G. 1978; MD, 1966, University of Kansas; cultural influences on manifestation of symptoms of psychiatric illness and psychological distress.

Womack, William M. 1969; MD, 1961, University of Virginia; behavioral medicine, pediatric headache, stress/anxiety disorders, juvenile offenders.

### Assistant Professors

Calderon, Rosemary 1987; PhD, 1988, University of Washington; mental health and deafness, childhood psychopathology, early intervention.

Comtois, Katherine Ann 1991; PhD, 1992, University of Maryland; services research, borderline personality disorder, women, dual diagnosis.

Dobie, Dorcas J. 1984; MD, 1984, University of Michigan; geriatric psychiatry.

Fann, Jesse R. 1990; MD, 1989, Northwestern University; MPH, 1995, University of Washington; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium.

Leverenz, James B. 1992; MD, 1985, University of Washington; neurology, psychiatry and behavioral sciences, Alzheimer's.

McCurry, Susan Melancon \* 1991; MS, 1977, MS, 1984, PhD, 1991, University of Nevada; dementia, aging, older adults, depression, sleep, psychotherapy, intervention research.

Neumaier, John F. 1983; PhD, 1989, MD, 1990, University of Washington; serotonin receptors.

Pascualy, O. Marcella 1984; MD, 1982, Universidad Javeriana (Colombia); geriatric psychiatry.

Petrie, Eric C. 1990; MS, 1981, University of Wisconsin; MD, 1985, University of Washington; psychopharmacology, schizophrenia, post-traumatic stress disorder.

Pham, Tony A. 2000; MD, 1993, PhD, 1993, Baylor University; mental health and psychology.

Radant, Allen D. 1985; MD, 1985, University of California (Davis).

Reoux, Joseph P. 1995; MD, 1985, University of Texas (Houston); addiction psychiatry, substance withdrawal syndromes, pharmacotherapy, clinical guidelines.

Richards, Henry J. 1999, (Research); PhD, 1987, Loyola University.

Shores, Molly M. 1989; MD, 1987, University of Washington; geriatric psychiatry.

Sloan, Kevin L. 1992; MD, 1986, University of Chicago; dual disorders/addictions.

Stella, Nephi \* 1999; PhD, 1995, Ecole Polytechnique Federale de Lausanne; activation of immune cells in the CNS.

Szot, Patricia 1987, (Research); PhD, 1987, Oregon State University.

Tsuang, Debby W. 1992; MD, 1988, University of Iowa.

Uldall, Karina K. 1987; MD, 1987, University of Missouri; HIV/AIDS, health services.

Wingerson, Dane K. 1987; MD, 1987, University of Washington; antipsychotic medications and pharmacoeconomic issues.

### Senior Lecturer

Dagadakis, Christos S. 1976; MD, 1974, MPH, 1975, University of Washington; emergency psychiatry, mental health managed care, psychiatric disability, stress management.

### Lecturer

Kohen, Ruth 1988; MD, 1986, University of Aachen (Germany).

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsclat/](http://www.washington.edu/students/crsclat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**CONJ 475 Alcoholism: A Course for Medical Students in the Allied Health Sciences (2)** See Conjoint Courses.

**PBSCI 498 Undergraduate Thesis (\*)** Opportunity to complete work on psychiatric research projects or to pursue a specific psychiatric topic in depth, for instance, through library research.

**PBSCI 499 Undergraduate Research (\* max. 15)** Opportunities are available for participation in a wide variety of ongoing research in the behavioral sciences and clinical psychiatry, or for the development of an individual investigative project under the supervision of a faculty sponsor.

**PBSCI 525 P-Psychiatry and the Law (3)** *Goldenberg* Concentration on major issues in psychiatry and law. Outside speakers from legal, judicial, and psychiatric communities. Lectures on assessment in forensic settings, competence to stand trial, and criminal responsibility. Discussions on personality disorders and correctional environments. For psychiatric residents and graduate psychology, psychosocial nursing, social work, and law students.

**PBSCI 530 P-Developmental Psychoanalytic Psychotherapy (2)** *Schimmelbusch* Examines how failures of psychological development lead to disorders of regulation of affects and cognition, and how psychoanalytic treatment reinstates normal development. Treatment process viewed from a psychoanalytic and psychobiological perspective. Clinical case discussion integrates theoretical concepts.

**PBSCI 535 Modern Concepts of Psychoanalysis (2)** *Schimmelbusch* Examines childhood developmental stages in light of inborn and environmental determinants. Correlates developmental phases with adult personality functioning. Views emotional development from a psychoanalytic and psychobiological point of view. Clinical case discussion integrates theoretical concepts.

**PBSCI 548 P-Aging and Adult Development (1-3, max. 3)** Aging in Western technologically advanced societies frequently involves losses in status, stamina, and economic and social supports. Consideration given to losses among the aged. Students select projects in the area of aging and work at their own levels of expertise and sophistication. Seminar format with guided reading.

**PBSCI 591 P-Seminars and Conferences in Psychiatry: Seminar in Clinical Neuropsychology (\*)** Introduction to neuropsychological studies of brain-behavior relationships. Exposure to neuropsychological assessment procedures and manifestation of neurocognitive deficits in selected mental and medical disorders, e.g., epilepsy, AIDS, sleep disorders, trauma, toxin exposure, vascular disorders, psychiatric disorders. Develop knowledge of neuropsychological assessment procedures and applications to diverse medical conditions. Prerequisite: psychological assessment experience.

**PBSCI 665 P-Basic Clinical Clerkship (12)** *Dagadakis, Mehta, Shockley* Inpatient clerkship in psychiatry. Students have primary responsibility under the direction of attending psychiatrists and residents for diagnosis and care of patients at University of Washington Medical Center, Harborview Medical Center, or Veterans Administration Hospital. Emergency room, crisis intervention, consultation to patients with psychiatric dysfunction. Familiarity with psychopharmacology and short-term hospitalization emphasized. (Six weeks, full-time.)

**PBSCI 666 P-WWAMI Psychiatry and Behavioral Sciences Clerkship (12)** *Geeseman* Rotation aims to increase student's skills in basic psychiatry, social psychiatry, transcultural psychiatry, and community psychiatry. Orientation is around the diagnosis, treatment, and clinical management of White, Aleut, Indian, and Eskimo children and adults in outpatient, inpatient, and community settings. Third-, fourth-year medical students. Prerequisite: HUBIO 563. (Limit: three students.)

**PBSCI 667 P-Basic Psychiatry Clerkship, Boise (12)** *Leone* Basic psychiatry clerkship at Veterans Administration Medical Center in Boise, Idaho. Fulfills graduation requirement for clerkship in Psychiatry.

**PBSCI 668 P-Psychiatry Clerkship, Spokane (12)** *Bakker* Students work on adult, geriatric, and adolescent inpatient psychiatric units of Sacred Heart Medical Center, following patients after transfer to partial hospitalization or outpatient clinic. Didactics include basic psychiatric diagnosis, treatment, and pharmacotherapy. Prerequisite: completion of HUBIO series; third and fourth-year medical students.

**PBSCI 670 P-Clerkship in Consultation/Liaison Psychiatry UWMC (\* max. 24)** *Walker* Assessment of patients with major psychosocial problems associated with physical disease, including: problems stemming from the way the illness is perceived and experienced, liaison with other clinical disciplines on complex diagnosis and treatment of problems. (Limit:

one student; four weeks.) Prerequisite: HUBIO 563, PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

**PBSCI 671 P-Clerkship in Consultation/Liaison Psychiatry HMC (\* max. 24)** *Wilson* Prerequisite: PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Limit: two students.)

**PBSCI 672 P-Elective Clerkship in Primary Care Psychiatry at Boise VAMC (8/12)** *Blackburn, Leone, Marsh* Assessment and treatment of patients with acute psychiatric problems in a primary care/rural setting. Consultation work on general medicine and surgery; assessment and dealing with outpatient psychiatric problems as they initially present. Evaluations, crisis intervention strategies, and brief therapies stressed. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks; UW students only.)

**PBSCI 673 P-Outpatient Psychiatry Elective (\* max. 24)** *Ries* Offered at Harborview Outpatient Center. Students function as subinterns, conducting diagnostic interviews, initiating and managing pharmacotherapeutic treatment regimens, and providing crisis intervention, under the supervision of the full-time attending at Psychopharmacology Clinic. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

**PBSCI 676 P-Inpatient Clerkship in Psychiatry at American Lake VA (8/12)** *Chandran* For medical students with a defined interest in psychiatry who wish to develop their knowledge and skills in the evaluation, management, and treatment of a wide range of acute and chronic psychiatric conditions requiring inpatient hospital treatment. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

**PBSCI 677 P-Alcohol and Drug Treatment Clerkship at American Lake VA (8/12)** *Lim* Student assists in every phase of the substance-abuse treatment, including admission interviews, patient evaluation, problem identification, group and individual psychotherapy, assertiveness training, anger control, human sexuality, medical evaluation and treatment, couples therapy, discharge and aftercare planning. Experience primarily clinical. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

**PBSCI 678 P-Clerkship in Psychiatric Long-Term Care and Rehabilitation (\* max. 12)** *Chandran* Two- to six-week clerkship provides learning experiences in rehabilitation of long-term psychiatric patients with medical illness. Multidisciplinary team approach, working with homeless mentally ill. Diagnostic skills emphasized. Spectrum of diseases (cardiovascular, Huntington's, organic brain syndrome) is such that physical rehabilitation is not an emphasis. Prerequisite: HUBIO 563, PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

**PBSCI 680 P-Clerkship in Emergency Psychiatry (\* max. 24)** *Wingerson* Emphasis on clinical evaluation, acute management, and treatment planning for individual patients. Experience in coordinating these activities with other emergency room personnel, and various hospital and community resources. Emphasis on skills useful to physicians in any specialty. Third- and fourth-year medical students only. Prerequisite: either PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time.)

**PBSCI 685 P-Geriatric Psychiatry Clerkship (\* max. 12)** *Pascualy* Two- to six-week elective (four weeks highly recommended). Participation in the evaluation and care of older persons with psychopathology, such as intellectual impairment and depression, in a variety of settings. Emphasis on improving clinical skills regarding diagnosis and treatment of common behavioral problems in the elderly. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

**PBSCI 688 P-Subinternship in General Psychiatry (\* max. 16)** Students function as interns under the supervision of house staff and attending psychiatrists. Further development of their diagnostic and therapeutic skills emphasized. Special areas of interest, such as family intervention, substance abuse, psychoses, neuropsychiatry, community psychiatry, administration, research pursued. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668; permission of instructor. (Four or six weeks, full-time.)

**PBSCI 696 P-Advanced Clerkship in Child Psychiatry (\* max. 24)** *Varley* Provides students an opportunity to participate in evaluation and treatment. Experiences in specialized clinics are also available. It is suggested that the student contact the instructor prior to enrollment. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time. Limit: two students.)

**PBSCI 697 P-Psychiatry Special Electives (\* max. 24)** By special arrangement, clerkships, externships, and research opportunities can be made available at the University and other institutions. Students obtain permission from Dr. Hunt before obtaining a special assignment form from the Dean's office one month before advance registration. Students contact affiliating institutions. Does not fulfill the requirement for a basic clerkship in psychiatry.

## Radiation Oncology

NN106 University of Washington Medical Center

 *General Catalog Web page:*  
[www.washington.edu/students/gencat/academic/Radiation\\_Oncology.html](http://www.washington.edu/students/gencat/academic/Radiation_Oncology.html)

 *Department Web page:*  
[www.radonc.washington.edu](http://www.radonc.washington.edu)

Radiation oncology is the branch of clinical medicine that utilizes high-energy radiation to treat disease, usually cancer. The department consists of three divisions: clinical radiation oncology, medical radiation physics, and experimental cancer biology. Training programs are offered in all three divisions. Research programs in the Department of Radiation Oncology are aimed at the physical and biological mechanisms of interactions between ionizing radiations, and normal and malignant tissues, with particular emphasis on high linear energy transfer (LET) radiation effects. Other programs involve the application of positron emission tomography (PET) to elucidate differences between cancers and normal tissues, and the development of specialized radiopharmaceuticals.

## Faculty

### Chair

George E. Laramore

### Professors

Groudine, Mark \* 1982; MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity in development and transformation.

Krohn, Kenneth A. \* 1981; PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Laramore, George E. 1976; MS, 1966, PhD, 1969, University of Illinois; MD, 1976, University of Miami (Florida); therapeutic radiology.

Wootton, Peter 1959, (Emeritus); BSc (Hon), 1944, University of Birmingham (UK); medical radiation physics.

**Associate Professors**

Austin-Seymour, Mary M. 1988; MD, 1978, University of Chicago; therapeutic radiology.

Cho, Paul S. 1990; PhD, 1989, University of California (Los Angeles); medical radiation physics.

Horvitz, Eric J. 1995, (Affiliate); PhD, 1991, MD, 1994, Stanford University; medical information sciences.

Kalet, Ira J. \* 1980; PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Koh, Wui-Jin 1984; MD, 1984, Loma Linda University; therapeutic radiology.

Lindsley, Karen L. 1993; MD, 1985, Vanderbilt University; therapeutic radiology.

Phillips, Mark H. 1991; PhD, 1982, University of Wisconsin; medical radiation physics.

Russell, Kenneth J. 1985; MD, 1979, Harvard University; therapeutic radiology.

Schwartz, Jeffrey L. 1995; PhD, 1979, University of Texas (Dallas); radiation biology.

Stelzer, Keith J. 1990; PhD, 1985, University of Kansas; MD, 1989, University of California (Los Angeles); therapeutic radiology.

Wallner, Kent E. 1997; MD, 1981, Ohio State University; therapeutic radiology.

Wilbur, D. Scott 1986; PhD, 1978, University of California (Irvine); radiochemistry.

**Assistant Professor**

Yao, Michelle S. 2000; MD, 1993, University of Michigan; radiation oncology.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

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Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**R ONC 499 Undergraduate Research (\* max. 24)**

*Austin-Seymour, Cho, Douglas, Einck, Kalet, Koh, Laramore, Lindsley, Ling, Phillips, Rasey, Russell, Schwartz, Stelzer, Wilbur, Yas* Opportunities in clinical or laboratory investigation in radiation oncology, radiation physics, or computer-related research. Student participation in ongoing or new projects. Open to students in the biological or physical sciences.

**R ONC 695 P-Clinical Cancer Management (\* max. 8)**

*Koh* Participation in the clinical management of patients with cancer, emphasizing a multi-modality approach. Includes clinical assessment, planning of radiation treatment, and follow-up evaluation of patients. Special procedures include three-dimensional treatment planning, implant brachytherapy and intra-operative radiation. Daily teaching conferences with faculty and residents. Prerequisite: MED 665 or permission of instructor.

**R ONC 697 P-Radiation Oncology Special Elective (\* max. 24)**

*Koh* By specific arrangement for qualified students, special clerkship, externship or research opportunities can be made at institutions other than the University of Washington. Students should obtain a "Special Assignment" form from the Dean's Office at least one month before advance registration. Prerequisite: permission of instructor.

**Radiology**

RR215 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Radiology.html](http://www.washington.edu/students/genecat/academic/Radiology.html)



Department Web page:  
[www.rad.washington.edu](http://www.rad.washington.edu)

Diagnostic radiology is that branch of clinical medicine that specializes in the interpretation of various imaging modalities in order to detect, to characterize, and (with increasing frequency) to treat a wide variety of diseases. Historically, x-rays were the first energy source utilized for these purposes, and they continue to be a mainstay of this discipline. More recently, the armamentarium has grown to include ultrasound, computed tomography, magnetic resonance, and positron-emission tomography. In nuclear medicine, one of radiology's major subspecialties, radionuclides are employed for both diagnostic and therapeutic purposes. Another subspecialty is interventional radiology, wherein aspirations and biopsies, as well as therapeutic procedures such as abscess drainage, tumor embolization, and vascular shunts are performed percutaneously.

The Department of Radiology consists of two clinical divisions: diagnostic radiology and nuclear medicine. Both divisions are ably supported by technologists and faculty members in the field of radiation physics. Instruction in radiology is provided for medical students, residents, and fellows as well as for other physicians. The faculty and its teaching and research activities are represented in each of the hospitals affiliated with the University.

**Faculty****Chair**

Albert A. Moss

**Professors**

Bassingthwaite, James \* 1975, (Adjunct); MD, 1955, University of Toronto (Canada); PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Bush, William H. 1979; MD, 1967, Oregon Health Sciences University; genitourinary radiology.

Caldwell, James H. 1983, (Adjunct); MD, 1970, University of Missouri; cardiology.

Chesnut, Charles \* 1974; MD, 1966, University of Florida; osteoporosis.

Cohen, Wendy A. 1987; MD, 1975, Harvard University; neuroradiology.

Dager, Stephen R. \* 1979, (Adjunct); MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Eary, Janet F. 1980; MD, 1980, Michigan State University; nuclear medicine.

Effmann, Eric L. 1991; MD, 1967, Indiana University; pediatric radiology.

Estridge, Joseph M. 1987; MD, 1981, University of Louisville; neuroradiology.

Figley, Melvin M. 1958, (Emeritus); MD, 1944, Harvard University; thoracic and pulmonary radiology.

Freeny, Patrick C. 1991; MD, 1968, University of Oklahoma; abdominal radiology, computed tomography.

Godwin, J. David 1986; MD, 1971, Stanford University; pulmonary radiology.

Graham, C. Benjamin 1956; MD, 1958, University of Washington; pediatric, neonatal radiology.

Harley, John D. 1975; MD, 1966, Washington University; general radiology and angiography.

Hayes, Cecil E. 1991; PhD, 1973, Harvard University; physics, MRI.

Kim, Yongmin \* 1982, (Adjunct); MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, media processors, imaging and video systems, medical imaging modeling.

Krohn, Kenneth A. \* 1981; PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Kushmerick, Martin J. \* 1988; MD, 1963, PhD, 1966, University of Pennsylvania; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy.

Lewellen, Thomas \* 1967; PhD, 1972, University of Washington; bioengineering, electrical engineering.

Lichtenstein, Joel E. 2000; MD, 1972, Ohio State University; gastrointestinal radiology, computed tomography.

Mann, Frederick A. 1993; MD, 1975, Indiana University; emergency and trauma radiology.

Maravilla, Kenneth R. 1986; MD, 1970, State University of New York (Brooklyn); neuroradiology and neurosurgery.

Moss, Albert A. 1984; MD, 1967, State University of New York (Upstate Medical Center); gastrointestinal radiology, computed tomography.

Nelp, Wil B. 1962, (Emeritus); MD, 1955, Johns Hopkins University; nuclear medicine.

Nelson, James A. \* 1986; MD, 1965, Harvard University; diagnostic radiology with basic research in related sciences.

O'Sullivan, S. Finbarr \* 1987, (Affiliate); PhD, 1983, University of Wisconsin; nonparametric curve estimation, inverse problems, radiology.

Richards, Todd L. \* 1985; PhD, 1984, University of California (Berkeley); nuclear magnetic resonance imaging, spectroscopy of the brain in demyelinating diseases.

Richardson, Michael L. 1984; MD, 1975, Baylor University; bone and joint radiology and musculoskeletal radiology.

Rohrman, Charles A. 1975; MD, 1966, University of Washington; gastrointestinal radiology.

Schmiedl, Udo P. 1989; PhD, 1979, MD, 1982, University of Heidelberg (Germany); abdominal imaging, ultrasound, computed tomography.

Stewart, Brent K. \* 1993; PhD, 1988, University of California (Los Angeles); medical physics, informatics.

Talner, Lee B. 1993; MD, 1963, Yale University; genitourinary radiology.

Weinberger, Edward 1979; MD, 1979, Harvard University; pediatric radiology.

Wilson, Anthony J. 1994; MBBCh, 1972, Otago University (New Zealand); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT.

**Associate Professors**

Aylward, Elizabeth H. 1997; MA, 1976, University of Connecticut; PhD, 1982, Cornell University; developmental psychology, structural and functional neuroimaging in neuropsychiatric disorders.

Brewer, David K. 1978; MD, 1972, Harvard University; pediatric radiology, angiography, computed tomography.

Conley, Kevin E. \* 1988; PhD, 1983, University of Wisconsin; muscle physiology.

Dalley, Robert W. 1987; MD, 1982, University of Utah; neuroradiology.

Fontaine, Arthur B. 1997; MD, 1981, Albany Medical College; angio interventional radiology.

Gillespy, Thurman 1990; MD, 1980, Thomas Jefferson University; musculoskeletal radiology, orthopaedics.

Glickerman, David J. 1990; MD, 1983, Albany Medical College; angiography, interventional radiology.

Goodacre, Brian W. 1999, (Acting); MD, 1985, University of British Columbia (Canada); body imaging and interventional radiology.

Griep, Robert J. 1982; MD, 1958, University of Texas (Galveston); internal medicine/radiology.

Haynor, David R. \* 1979; PhD, 1971, University of California (Berkeley); MD, 1979, Harvard University; medical image processing and segmentation, image deformation, functional MRI, expression arrays.

Hunter, John C. 1992; MD, 1970, University of Illinois; musculoskeletal, radiology, MRI.

Jacobson, Arnold F. 1987; MD, 1980, University of Illinois; PhD, 1980, University of Wisconsin; nuclear medicine.

Kimmey, Michael 1979, (Adjunct); MD, 1979, Washington University; gastroenterology/endoscopy.

Lewis, David H. 1985; MD, 1985, Virginia Commonwealth University; nuclear medicine.

Marglin, Stephen I. 1980; MD, 1968, Yale University; chest and oncologic radiology.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Phillips, Leon A. 1959, (Emeritus); MD, 1952, Yale University; general radiology, urology.

Rosenbaum, David M. 1983; MD, 1977, Albert Einstein College of Medicine; pediatric radiology.

Schulte, Scott J. 1988; MD, 1979, University of Washington; gastrointestinal radiology.

Shaw, Dennis 1985; MD, 1983, University of Washington; neuroradiology, pediatric radiology.

Stern, Eric J. 1992; MD, 1985, University of Medicine and Dentistry of New Jersey; chest radiology.

Taira, Ricky K. 1997; MD, 1982, PhD, 1988, University of California (Los Angeles); biomedical physics.

Takasugi, Julie E. 1988; MD, 1982, University of California (Los Angeles); pulmonary radiology.

Tewson, Timothy J. 1994; PhD, 1972, University of London (UK); synthesis of PET radiopharmaceuticals and their behavior in vivo.

Wiseman, Robert W. \* 1989; PhD, 1988, Florida State University; cellular energetics, NMR spectroscopy, mitochondria, kinetics, gene expression, metabolism.

Yuan, Chun 1991; PhD, 1988, University of Utah; medical biophysics, MRI.

### Assistant Professors

Baxter, Alexander B. 1994; MD, 1985, University of Michigan; neuroradiology.

Blackmore, Christopher C. 1995; MD, 1990, University of Rochester; MPH, 1997, University of Washington; body imaging, teleradiology, digital radiology, MRI/CT.

Bloch, Robert D. 1998; MD, 1991, PhD, 1991, University of Health Sciences (Chicago); angiography, interventional radiology.

Borsa, John J. 1996; MD, 1991, University of Manitoba (Canada); angiography and interventional radiology.

Dubinsky, Theodore J. 1997; MD, 1983, University of Maryland; ultrasound, computed tomography, body imaging.

Escobedo, Eva M. 1992; MD, 1985, Stanford University; musculoskeletal trauma radiology.

Eubank, William B. 1996; MD, 1986, MPH, 1986, Tulane University; body MR and GU imaging.

Gardner, Jill C. 1992, (Research); PhD, 1981, Dalhousie University (Canada); computed image processing and analysis.

Georgian-Smith, Dianne 1996; MD, 1983, Case Western Reserve University; breast cancer, breast imaging.

Hoffer, Eric K. 1997; MD, 1984, University of California (Los Angeles); minimally invasive therapy, stent grafts for aneurysms, uterine artery embolization, dialysis access.

Jarvik, Jeffrey G. 1993; MD, 1987, University of California (San Diego); neuroradiology, outcomes research.

Kim, Thomas A. 1997; MD, 1988, Washington University; neuroradiology.

Langer, Steve G. 1996; PhD, 1994, Oakland University; medical physics.

Lehman, Constance D. 1990; MD, 1990, PhD, 1990, Yale University; mammography, women's breast imaging.

Link, Jeanne 1982; MS, 1982, PhD, 1998, University of Washington; radioanalytical chemistry.

Maki, Jeffrey H. 1998; MD, 1991, Duke University; MRI.

Mankoff, David A. 1990; MD, 1988, PhD, 1988, University of Pennsylvania; high count rate PET imaging.

Vesselle, Hubert J. 1997; PhD, 1990, MD, 1991, Case Western Reserve University; nuclear medicine.

Waitches, Gayle M. 1997; DO, 1990, Chicago College of Osteopathic Medicine; trauma and emergency radiology.

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**RADGY 498 Undergraduate Thesis (\*)** Supervised clinical and/or laboratory research in the broad field of medical imaging, culminating in a thesis. The thesis will be submitted to Dr. James Nelson for suitable recognition. Offered: AWSpS.

**RADGY 499 Undergraduate Research (\*)** Opportunity to gain research experience and direct participation in either clinical or basic sciences investigation in diagnostic radiology and/or nuclear medicine. Written exposition of the results of this experience will be submitted to Dr. James Nelson. Offered: AWSpS.

**RADGY 505- P-Preceptorship in Nuclear Medicine (1, max. 24)** *Eary (University of Washington Medical Center)* Opportunity for first- and second-year medical students to gain experience with faculty in clinical and academic environments. Students observe general aspects of the Nuclear Medicine Division, including clinical problems, the different relationships in the clinic between physician and patient, and several research aspects of the division. Prerequisite: permission of instructor. Offered: AWSpS.

**RADGY 508 Physical Aspects of Medical Imaging (4)** *Stewart* Quantitative physical principles of medical imaging are presented for electromagnetic and sonic radiation. Methods of image formation and analysis are discussed for conventional film radiography, CT, DSA, PET, B-mode ultrasound and Doppler ultrasound. Offered: jointly with BIOEN 508/ ENV H 528.

**RADGY 550 Nuclear Magnetic Resonance in Biomedicine (2)** *Hayes, Kushmerick, Richards, Yuan* Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research

applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with BIOEN 565; odd years; Sp.

**RADGY 580 P-Nuclear Medicine Technique, Physics, and Instrumentation (2.5)** *Lewellen* Provides familiarization with basic nuclear phenomena and with the instrumentation used in the practice of nuclear medicine. There are discussions and laboratory exercises. Practical experience in instrument operation and sample counting are provided. Prerequisite: permission of instructor. Offered: S.

**RADGY 600 Independent Study or Research (\*)** Prerequisite: permission of Dr. Nelson and faculty sponsor. Offered: AWSpS.

**RADGY 693 P-Introduction to Diagnostic Radiology (4)** *Schulte* Half-time clerkship in the field of medical imaging. Lectures, case discussions, film reading, and independent study provide an overview of the subspecialty areas of diagnostic radiology and nuclear medicine. Emphasis on utilization and selection of imaging tests, radiologic anatomy, and interpretation of commonly encountered studies. Offered: AWSpS.

**RADGY 694 P-Advanced Clinical Clerkship (8)** *Schulte* Full-time clerkship provides a more in depth experience in diagnostic radiology and nuclear medicine. Required rotations in the subspecialty areas of radiology augment the basic lecture series and case discussions of Radiology 693. For those with a special interest in diagnostic radiology. Prerequisite: permission of instructor. Offered: AWSpS.

**RADGY 696 P-Nuclear Medicine Clerkship (\* max. 12)** *Eary* Daily participation at University of Washington Medical Center nuclear medicine clinic emphasizing technical performance, diagnostic interpretation, and clinical relevance of nuclear imaging. Daily clinical teaching conferences of the division. Four- and six-week clerkships can be preplanned in areas such as pulmonary, cardiovascular, renal, bone, computer analysis. Prerequisite: permission of instructor. Offered: AWSpS.

**RADGY 697 P-Radiology Special Electives (\* max. 24)** *Schulte* Radiologic training in a nonaffiliated institution. Permission and arrangements must be made at the time of registration through direct communication between the student and the education coordinator in Radiology. A written outline from a preceptor at the intended site required. Prerequisite: permission of radiology education coordinator. Offered: AWSpS.

## Rehabilitation Medicine

BB919 Health Sciences

 *General Catalog Web page:*  
[www.washington.edu/students/genocat/academic/Rehab\\_Medicine.html](http://www.washington.edu/students/genocat/academic/Rehab_Medicine.html)

 *Department Web page:*  
[depts.washington.edu/rehab/](http://depts.washington.edu/rehab/)

The Department of Rehabilitation Medicine provides education for medical students, interns, residents, and allied health students in occupational therapy, physical therapy, and prosthetics and orthotics in a comprehensive approach to rehabilitation problems. This includes special diagnostic and evaluative procedures; methods and rationale in the application of principles of occupational therapy, physical therapy, prosthetics and orthotics, and other health professions; and advanced investigation of special problems encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers graduate curricula leading to the following degrees: Master of Occupational Therapy, Master of Physical Therapy, and a Bachelor of Science in the field of prosthetics and orthotics. The department also offers a Master of Science degree in rehabilitation medicine with options for occupational therapists, physical therapists, and residents in physical medicine and rehabilitation who wish to pursue academic or research careers.

## Occupational Therapy

### Head

Elizabeth M. Kanny

Occupational therapists provide services related to *occupational performance* in everyday life in the areas of self-care, work and productive activities, and play/leisure. Occupational therapists work with people who have physical illness or injury, social or emotional difficulties, congenital or developmental problems, or who are in need of preventative strategies that promote well being. They work with people in all age groups and from diverse cultural and ethnic groups and socioeconomic levels.

Occupational therapists help people with impairments or limitations to live as productive a life as possible. They work with people to increase independent function in life activities, enhance development, and to minimize or prevent disability. They use a variety of therapeutic methods including training in self-care activities; design, fabrication, and application of splints; sensorimotor activities; therapeutic group activities; selection and use of adaptive equipment; adaptation of physical environments in the home, school, work, or community; activities to enhance functional performance in everyday life; and work evaluation, work hardening, and workplace adaptations.

Today's occupational therapists work in clinical and community practice, administration, education, and research. Work settings include rehabilitation centers and hospitals; public and private schools; home health agencies; mental health centers and psychiatric hospitals; private practice; vocational rehabilitation centers and industrial clinics; private industry, wellness and prevention programs; and hospices.

The curriculum is designed to link theoretical and technical knowledge in occupational therapy with professional values, attitudes, and skills. The education of each student is based on the philosophy that "occupational performance" (including self-care, work, and leisure/play) is central and provides a purpose and meaning to one's life. Professional standards of practice, ethics, and continued professional growth are emphasized throughout the program. Program requirements include seven quarters of professional course work and six months of full-time fieldwork training. Fieldwork training must be completed within 24 months after completion of professional course work. Completion of all program requirements leads to a Master of Occupational Therapy degree awarded by the School of Medicine, Department of Rehabilitation Medicine.

The Occupational Therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220, phone (301) 652-2682. Graduates of the program are eligible to sit for the national certification examination for the occupational therapist. The National Board for Certification in Occupational Therapy (NBCOT) is the certifying agency responsible for the development and implementation of this exam. Most states, including Washington, require state licensure in order to practice.

**Admission Requirements:** Applicants must have completed a bachelor's degree in any major and taken the Graduate Record Exam (GRE) within the past five years. In addition, there are eight prerequisite courses that must be completed prior to being admitted to the program. The admission process occurs once a year for entry to the program in autumn quarter of each year; the application deadline is February 15.

Specific prerequisite courses include the following. For students who have attended schools outside of the UW, comparable courses must be taken:

**Natural Sciences:** Survey of Physiology (ZOOL 118), 5 credits; General Anatomy (B STR 301), 4 credits; Introduction to General Chemistry, (CHEM 120), 5 credits; General Physics (PHYS 114), 4 credits; General Physics Laboratory (PHYS 117), 1 credit.

**Social Sciences:** Abnormal Psychology (PSYCH 305), 5 credits; Developmental Psychology (PSYCH 306), 5 credits; Survey of Sociology (SOC 110), 5 credits or Principles of Sociocultural Anthropology (ANTH 202), 5 credits.

**Statistics:** Basic Educational Statistics (EDPSY 490), 3 credits.

To apply, students must have completed five of the prerequisite courses, with three courses in the natural sciences or statistics. They must have earned a minimum GPA of 3.0 in the prerequisite courses with no single course graded less than 2.0; and have a GPA of 3.0 on the most recent 60 semester or 90 quarter credits. Admission is competitive, based on demonstrated academic ability, communication skills, and understanding and experience in occupational therapy. Detailed program requirements and selection process information may be obtained by calling (206) 685-7411 or via the program's Web page ([depts.washington.edu/rehab/education/ot.shtml](http://depts.washington.edu/rehab/education/ot.shtml)).

**Graduation Requirements:** The following courses must be completed satisfactorily in the schedule sequence, beginning autumn quarter only, at the UW: REHAB 320, 321, 322, 332, 414, 442, 444, 445, 448, 451, 452, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 584, 585, 587, 591, 594, B STR 431, and HUBIO 563.

**Student Evaluation:** The University grade-point system is used in student evaluation. A student must maintain a cumulative GPA of 3.0 in all required professional course work to maintain satisfactory standing and to graduate. Detailed scholastic requirements are available on the program's Web page ([depts.washington.edu/rehab/education/ot.shtml](http://depts.washington.edu/rehab/education/ot.shtml)).

If at any point the OT curriculum cumulative GPA falls below 3.0, the student is placed on academic probation and the student must raise it to 3.0 by the end of two subsequent quarters. If a student is unable to remove his/her probation status, he/she is subject to dismissal from the program.

The student must satisfactorily complete all academic course work before taking the two required Level II Fieldwork placements (REHAB 594). If a student does not pass a Level II Fieldwork placement, the student will be placed on probation and continuation in the program will be subject to review by the Occupational Therapy Advisory and Evaluation Committee (OTAEC). The student must petition the OTAEC for approval to repeat a Level II Fieldwork placement. If repetition is allowed, it can be repeated only once. Both of the two required Level II Fieldwork placements must be satisfactorily completed in order to graduate from the program and they must be completed within two years after the completion of the academic portion of the program.

At any point in the program, a student's entire record may be reviewed relative to continuance in the program by the OTAEC. This review may include academic coursework, clinical or laboratory performance, and/or professional behaviors.

## Physical Therapy

### Head

Mark Guthrie

Physical therapy is a direct form of professional patient care that can be applied in most disciplines of medicine. The principal objective in physical therapy is to restore or improve motor function in individuals with musculoskeletal or neuromuscular problems.

Management of problems related to motor function is only part of the work of physical therapy. Equally important is a rebuilding of self-confidence and the creation of a desire to return to a normal, active life. Other primary objectives of physical therapy are prevention of disability and pain, and training in mobility skills for those who must adapt to permanent disability.

As a consequence of the scope of the profession, physical therapists function in a variety of settings, the most familiar being the hospital. Physical therapists also plan, provide, and supervise evaluation and direct patient care in outpatient clinics, rehabilitation centers, health maintenance organizations, developmental centers, home-health agencies, schools, extended-care facilities, voluntary health programs, industry, and private practices. The physical therapist may be found anywhere that quality health care is needed. Increasingly, physical therapists are becoming involved in basic and clinical research; in the academic community, either as full-time faculty members or as supervisors of clinical education; and as consultants in local, state, and federal health-planning activities.

Physical therapists function in compliance with the licensing laws and ethical principles that govern the practice of physical therapy. The steps to licensure as a physical therapist vary slightly from state to state, but all physical therapists graduate from an accredited curriculum of physical therapy that includes a specific period of clinical training. As physical therapy relates to the majority of medical specialties, the education program is broad in scope, including an emphasis on physical and social sciences. The physical therapist evaluates the patient's problem by testing such factors as range of joint motion, muscle strength, posture and gait, pulmonary function, sensation and sensory perception, orthotic and prosthetic fit, reflexes and muscle tone, and functional skills. Some of the procedures used may include ultrasound, superficial heat and cold, electrical stimulation, massage, traction, joint mobilization, biofeedback, therapeutic exercise, and training in the use of orthotic, prosthetic, and other assistive devices, such as crutches, canes, and wheelchairs.

As with all professionals in health fields, physical therapists are responsible for subscribing to a program of continuing education. Some therapists also develop the knowledge and skills of a specialist via continuing education and concentrated practice in one area, such as sports or pediatric therapy. A formalized mechanism for certifying specialists is implemented by the national professional association, the American Physical Therapy Association.

The University of Washington program in physical therapy is accredited by the American Physical Therapy Association Commission on Accreditation in Physical Therapy Education.

### Master of Physical Therapy

**Admission Requirements:** Applicants are required to complete a bachelor's degree in another field prior to enrollment in the physical therapy curriculum. For current admission requirements, applicants should request detailed program information (which is updated annually and available after October 1 each year) from the Physical Therapy Curriculum Office, Box 356490, University of Washington, Seattle, Washington 98195-6490; (206) 685-7408; or view the information online at

depts.washington.edu/rehab/education/. Students are urged to request or check these materials early, since the deadline for receipt of applications is February 15. At the time of entrance to the program (autumn quarter), applicants must be legal residents of Washington, Idaho, Alaska, Montana, Oregon, Hawaii, Wyoming, or Nevada. Preference is given to Washington residents.

## Prosthetics and Orthotics

### Head

John Ferguson

Upon successful completion of the prosthetics and orthotics program, the student will have learned the skills necessary to function as an entry level resident in prosthetics-orthotics. The degree in prosthetics-orthotics gives the student eligibility to enter a one-year clinical residency for each discipline at a National Commission on Orthotics and Prosthetics Education (NCOPE) approved site. This residency requirement must be completed for eligibility to apply for the National Certification Boards administered by the American Board for Certification in Orthotics and Prosthetics, Inc.

The prosthetist-orthotist is a member of the rehabilitation health care team working together with disabled or physically challenged individuals to enhance their daily life and increase their functional abilities. The three groups of prosthetic-orthotic devices which can potentially enter into the rehabilitation of an individual are: (1) prosthetic devices, which replace or substitute for a missing limb or part of a limb; (2) orthotic devices, which help with the control of motion and the support of a weakened body segment; and (3) adaptive devices, which enable the person to perform specific activities. Practitioners design and fabricate the appropriate device and evaluate the fit and functional use for each patient. To evaluate function, the prosthetist-orthotist must have a detailed knowledge of anatomy and kinesiology, joint range of motion, muscle strength, and human locomotion.

Upon successful completion of the program, the student is awarded a Bachelor of Science degree by the University of Washington School of Medicine. The practitioner program is accredited through the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

For more information on the Prosthetics and Orthotics undergraduate program, see the undergraduate volume of the *General Catalog* or visit the *General Catalog* online at [www.washington.edu/students/genocat/](http://www.washington.edu/students/genocat/).

## Post-Professional Programs

The Master of Science in Rehabilitation Medicine has three primary pathways: occupational therapy, physical therapy, and rehabilitation medicine. This program is designed for rehabilitation practitioners who want to pursue a program of coursework and research to enhance their professional growth. Additional information may be found at the program's Web site ([depts.washington.edu/rehab/education/](http://depts.washington.edu/rehab/education/)).

### Master of Science, Rehabilitation Medicine (Occupational Therapy Pathway)

This degree program is designed to prepare occupational therapists to discuss rehabilitation science, models of disability, and/or theory and frames of reference relating to occupational therapy; to design and conduct research; to provide instruction, and to administer occupational therapy services or provide a higher level of clinical service. Independent-study options and electives offer flexibility, allowing the student to meet individual objectives. Completion of a data-based thesis is required. Full-time students generally complete

the course work in four quarters. The additional time to complete the thesis requirement varies.

**Admission Requirements:** An applicant for admission must be a graduate of an approved occupational therapy program and must be certified to practice by the American Occupational Therapy Certification Board. A minimum of one year of professional experience is desirable. Detailed information about the program is available from the Division of Occupational Therapy Curriculum Office at (206) 685-7411 or from the Web site ([depts.washington.edu/rehab/education/ot.shtml](http://depts.washington.edu/rehab/education/ot.shtml)).

**Graduation Requirements:** All students must satisfactorily complete: (1) a minimum of 36 credits, including specific core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in occupational therapy.

### Master of Science, Rehabilitation Medicine (Physical Therapy Pathway)

This degree program is designed to prepare physical therapists to assume a career in teaching and administration within the field. The curriculum emphasizes preparation for research and contribution to the professional literature; therefore, a thesis is a requirement of this plan. Opportunities are provided to enhance specialized knowledge and skill in selected content areas of physical-therapy practice. Depending upon the student's educational goals and prior accomplishments, the program should require one to two calendar years for completion.

**Admission Requirements:** Selection for admission to the Master of Science degree program (physical-therapy pathway) is based on an assessment of intellectual capacity, basic professional competence, promise for future contributions to the field, and availability of the program (due to funding limitations, the program is not offered every year). Students must have completed a baccalaureate degree and an accredited physical-therapy program with a minimum cumulative GPA of 3.00, based on a four-point scale, in all college work. Detailed information on program and admission requirements is available from the Division of Physical Therapy Curriculum Office, (206) 685-7408; or email [gleep@u.washington.edu](mailto:gleep@u.washington.edu).

**Graduation Requirements:** All students must satisfactorily complete (1) a minimum of 36 credits, including specified core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in physical therapy.

### Master of Science, Rehabilitation Medicine (Rehabilitation Medicine Pathway)

This degree program is designed to prepare physicians, specifically physiatrists, as academicians in the field of physical medicine and rehabilitation. In addition to core course work in relevant medical sciences, an emphasis is placed on developing skills toward the goal of conducting independent or collaborative research projects.

**Admission Requirements:** An applicant for admission must be a physician from an approved medical school and must be concurrently enrolled, or have completed, an approved residency program in physical medicine and rehabilitation.

**Graduation Requirements:** All students must complete (1) a minimum of 36 credits, including specific core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in physical medicine and rehabilitation.

## Faculty

### Acting Chair

Marjorie E. Anderson

### Professors

Anderson, Marjorie E. \* 1971; PhD, 1969, University of Washington; physiology of basal ganglia and cerebellum.

Cardenas, Diana D. \* 1981; MD, 1973, University of Texas (Dallas); physiologic mechanisms following spinal cord injury, rehabilitation in renal disease.

Deitz, Jean L. \* 1979; PhD, 1976, University of Florida; occupational therapy.

Dikmen, Sureyya S. \* 1974; PhD, 1973, University of Washington; clinical neuropsychology, neuropsychological and psychosocial outcomes in traumatic head injury.

Fordyce, Wilbert E. \* 1956, (Emeritus); PhD, 1953, University of Washington; psychology.

Fraser, Robert T. \* 1976; PhD, 1976, University of Wisconsin; psychology.

Halar, Eugen M. \* 1968, (Emeritus); MD, 1959, University of Zagreb (Yugoslavia); psychiatry, cardiovascular rehabilitation.

Jaffe, Kenneth M. \* 1981; MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects, electromyography.

Jensen, Mark \* 1987; PhD, 1989, Arizona State University; assessment and treatment of chronic pain, coping with medical illness, treatment outcome.

Kraft, George Howard \* 1969; MD, 1963, Ohio State University; electromyography, rehabilitation of central nervous system diseases, multiple sclerosis.

Lehmann, Justus F. \* 1957, (Emeritus); DrMed, 1945, Johann Wolfgang Goethe University (Germany); psychiatry.

Patterson, David R. \* 1984; PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.

Robinson, Lawrence R. \* 1989; MD, 1982, Baylor University; clinical neurophysiology and pain after amputation.

Stolov, Walter C. \* 1960, (Emeritus); MD, 1956, University of Minnesota; physical medicine and rehabilitation and electrodiagnostic medicine.

Turner, Judith A. 1980; MA, 1975, PhD, 1979, University of California (Los Angeles); psychology.

Yorkston, Kathryn \* 1975; PhD, 1975, University of Oregon; neurogenic communication disorders in adults.

### Associate Professors

Bell, Kathleen \* 1981; MD, 1981, Temple University; brain injury - prognosis, pharmacologic intervention, imaging, medical education.

Benditt, Joshua O. 1994, (Adjunct); MD, 1982, University of Washington; pulmonary and critical care medicine.

Berni, Rosemarian \* 1962, (Emeritus); MN, 1973, University of Washington; rehabilitation nursing.

Bombardier, Charles H. \* 1989; PhD, 1987, Washington State University; spinal cord injury adjustment, decubitus ulcers, brain injury, alcohol abuse after injury.

Chang, Michael Wei \* 1992; MD, 1988, University of Texas (Galveston); physical medicine and rehabilitation, electrophysiology biomechanics.

Czerniecki, Joseph M. \* 1982; MD, 1981, University of British Columbia (Canada); MS, 1985, University of Washington; amputation rehabilitation, biomechanics and gait analysis.

Egan, Kelly J. 1980, (Adjunct); MA, 1968, Texas Technological University; PhD, 1980, University of Washington; clinical psychology.

Engel Knowles, Joyce M. \* 1993; PhD, 1988, University of Kansas; use of occupational therapy in pain management, especially with children.

Esselman, Peter C. \* 1986; MD, 1986, University of Washington; exercise in the elderly; treatment of traumatic brain injury and burn rehabilitation.

Gardner, Gregory C. 1989, (Adjunct); MD, 1984, Baylor University; rheumatology.

Goldstein, Barry \* 1987; PhD, 1981, MD, 1986, University of California (Los Angeles); skin adaptation to mechanical stress, pressure ulcers, overuse injuries of the upper extremity.

Guthrie, Mark R. \* 1983; PhD, 1990, University of Washington; functional assessment, physical therapy efficacy.

Hammond, Margaret C. \* 1979; MD, 1979, Medical College of Wisconsin; medical consequences of longstanding spinal cord injury.

Haselkorn, Jodie K. \* 1985; MD, 1985, Louisiana State University; health services for the disabled; diagnostic accuracy of tests, effectiveness of interventions.

Hays, Ross M. \* 1983; MD, 1978, University of Washington; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects, electromyography.

Hicks, Ramona R. \* 1999; PhD, 1993, University of Connecticut; cellular and molecular mechanisms of traumatic brain injury and repair.

Hillel, Allen D. \* 1983, (Adjunct); MD, 1976, Stanford University; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease.

Johnson, Kurt Lewis \* 1990; PhD, 1984, University of Wisconsin; counseling psychology; psychological, social vocational aspects of disability and chronic illness.

Kanny, Elizabeth M. \* 1978; MA, 1977, Seattle University; PhD, 1996, University of Washington; education of allied health practitioners, ethical reasoning and ethics education.

Little, James Wendell \* 1984; PhD, 1976, MD, 1977, University of Chicago; psychiatry, rehabilitation medicine, clinical neurophysiology.

Massagli, Teresa L. \* 1985; MD, 1982, Yale University; medical and rehabilitation outcome after spinal cord injury in children.

McMillan, Jo Ann \* 1958, (Emeritus); MSED, 1968, University of Southern California; physical therapy.

Odderson, Ib R. \* 1985; PhD, 1978, Indiana University; MD, 1985, Vanderbilt University; stroke rehabilitation.

Pepping, Mary \* 1999; PhD, 1981, Washington State University; long-term psychosocial follow-up of brain injury patients.

Rodriguez, Arthur A. \* 1999; MD, 1972, University of Wisconsin; neurology and biomedical engineering.

Sanders, Joan Elizabeth \* 1985, (Adjunct); PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.

Shumway-Cook, Anne \* 1999; MS, 1973, PhD, 1983, University of Oregon; physiologic basis for balance problems following neurological injury; clinical applications.

Slimp, Jefferson C. \* 1979; PhD, 1976, University of Wisconsin; neurophysiology, cerebral cortex, spinal cord, clinical somatosensory evoked potentials.

Stiens, Steve A. 1993; MD, 1986, University of Cincinnati; MS, 1991, University of Washington; spinal cord

injury, disability, architecture, spasticity, neurogenic bowel function, wheelchairs.

### Assistant Professors

Bowen, James D. 1982, (Adjunct); MD, 1982, Johns Hopkins University; multiple sclerosis.

Chan, Leighton \* 1994; MD, 1990, University of California (Los Angeles); rehabilitation and public policy.

Doctor, Jason N. \* 1995; PhD, 1995, University of California (San Diego); cost and outcomes with rehabilitation treatment, medical decision making.

Ehde, Dawn \* 1991; PhD, 1992, University of North Dakota; traumatic brain injury, treatment adherence.

Kartin, Deborah \* 1998; MS, 1988, PhD, 1996, University of Washington; pediatric developmental disabilities, prenatal drug exposure, high-risk infancy.

Reilly, Dominic F. 1991, (Adjunct); MD, 1988, University of Washington; general internal medicine.

Washington, Kathleen A. \* 1982, (Clinical); MS, 1980, University of Wisconsin.

### Senior Lecturers

Greenberg, Sharon L. 1979; MOT, 1978, University of Washington; occupational therapy.

Hertling, Darlene 1964; BS, 1956, University of California (Berkeley); physical therapy and manual therapy techniques.

### Lecturers

Dudgeon, Brian J. 1989; MS, 1983, University of Washington; occupational therapy.

Ferguson, John R. 1996; BA, 1985, California State University, Fresno; post-operative amputation care.

Okumura, Ramona M. 1990; BS, 1981, University of Washington; prosthetics and orthotics.

Yamane, Ann 1982; BS, 1976, University of Washington; prosthetics and orthotics.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**REHAB 400 Medical Science (4)** Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

**REHAB 401 Medical Science (4)** Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

**REHAB 402 Medical Science Laboratory (1, max. 2)** To introduce students to the role of allied health professionals in the treatment of pathologies presented in 320, 321 lectures. Credit/no credit only.

**REHAB 403 Pathologic Physiology for Rehabilitation Professionals (5)** *Anderson, Slimp* Emphasis on normal and pathologic physiology of the circulatory, respiratory, central nervous, and musculoskeletal systems as basis for treatment in occupational

therapy, physical therapy, and prosthetics-orthotics. Required for students in these fields. Others by permission.

**REHAB 413 Special Studies in Physical Therapy (1-15, max. 24)** Theory and practice in specialized areas of physical therapy. Credit/no credit only.

**REHAB 414 Psychological Aspects of Rehabilitation (2)** *Patterson* Psychological processes underlying adjustment to disability; application of behavioral/analysis systems in patient therapy management; effects of cognitive or personality deficits on patient performance and treatment strategies. Credit/no credit only.

**REHAB 416 Principles of Physical Therapy Administration (2, max. 4)** *McMillan* The nature of administration, economic trends, operational policy, aspects of supervision, ethical and legal influences applicable to a physical therapy department. Required for physical therapy students. Credit/no credit only.

**REHAB 420 Lower Extremity Prosthetics I (8)** *Ferguson* Instruction in patient evaluation, casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation for below-knee amputation. Required for prosthetics and orthotics majors; others by permission of instructor.

**REHAB 421 Lower Extremity Prosthetics II (11)** *Ferguson* Instruction in above-knee patient evaluation, casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation. Methods of fitting through knee and hip disarticulation levels demonstrated. Required for prosthetics and orthotics majors; others by permission of instructor.

**REHAB 423 Lower Extremity Orthotics I (6)** *Yamane* Patient evaluation and prescription considerations for orthotic management of the lower extremity. Lectures provide instruction in the biomechanics of the lower extremity during ambulation, clinical indications and fitting criteria for a variety of orthotic devices. Laboratory sessions provide experience in fabrication principles, and impression and measurement techniques. Required for prosthetics and orthotics majors.

**REHAB 424 Lower Extremity Orthotics II (8)** *Yamane* Orthotic treatment of pathological conditions that affect the knee and hip addressed. Focus is placed on development of prescription recommendation, fabrication, fitting, and follow-up of orthoses that support, assist, or stabilize the knee and hip. Required for prosthetics and orthotics majors; others by permission of instructor. Offered: Sp.

**REHAB 427- Applied Prosthetics and Orthotics I (1-, max. 4)** Presentation and discussion of current clinical practice using research and journal articles and case presentations. Required for prosthetics and orthotics majors; others by permission of instructor.

**REHAB 428 Applied Prosthetics and Orthotics II (1-4, max. 13)** Experience in patient management under the preceptorship of certified practitioners at clinical affiliation sites. Required for prosthetics and orthotics majors.

**REHAB 429 Immediate Post-Operative and Early Fitting (2)** *Ferguson* Lecture and laboratory designed to introduce the student to the principles of immediate postsurgical prosthetic fitting, including patient management. Required for prosthetic and orthotic majors; others by permission of instructor.

**REHAB 430 Engineering Concepts (2)** Principles of mechanics and strength of materials, force analysis, and hydraulic control in relationship to orthotics and prosthetics design. Required for prosthetics and orthotics majors. Offered: S.

**REHAB 442 Kinesiology (4)** *Guthrie, Shumway-Cook* Study of joint motion and muscle function in relation to both the normal and abnormal state. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for Department of Rehabilitation Medicine students; others by permission.

**REHAB 444- Function of the Locomotor System (4-)** *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

**REHAB -445 Function of the Locomotor System (4-)** *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

**REHAB 448 Applied Kinesiology Laboratory (1)** *Greenberg, Guthrie, Shumway-Cook* Instruction and laboratory focus on practical experience and clinical problem solving in kinesiology. Potential topics include muscle and joint motion testing, sensory/perceptual assessment, prosthetic and orthotic devices, wheelchair use, gait training.

**REHAB 451 Functional Anatomy Laboratory (1)** Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

**REHAB 452 Functional Anatomy Laboratory (1)** Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

**REHAB 458 Augmentative and Alternative Communication: Implementation Strategies (3)** NW Communication needs of nonspeaking individuals. Interdisciplinary approaches to the evaluation, selection, and implementation of aided and unaided communication augmentation systems. Recommended: basic course work in either SPHSC, OT, PT, or ENGR. Offered: jointly with SPHSC 453; irregularly.

**REHAB 459 Augmentative and Alternative Communication: Access for Technology (3)** NW Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with SPHSC 454.

**REHAB 476 Prosthetic and Orthotic Evaluation and Use (2)** *Okumura* Instruction in mechanical component substitution for functional losses. Emphasis is on biomechanical principles, prosthetic-orthotic components, and alignment and fitting techniques. Credit/no credit only. Required for physical therapy students.

**REHAB 496 Special Topics in Rehabilitation (1-9, max. 14)** Guided opportunity for in-depth study in specific areas of rehabilitation. Topics vary.

**REHAB 498 Undergraduate Thesis (\*)**

**REHAB 499 Undergraduate Research (\*)** Opportunity to design, perform, and analyze research investigation in problem areas in rehabilitation medicine. These include clinical and basic research problems in, for example, head and spinal injury, chronic disease, pain neurophysiology, electrodiagnosis, communication, and bioengineering.

**REHAB 500 Clinical Clerkships in Physical Therapy (2, max. 8)** *Robinson* Observation, instruction, and supervised practice in treatment of patients in diverse clinical settings. Emphasis is given to the application of previously learned material and skills to specific clinical problems. Required for physical therapy students. Credit/no credit only.

**REHAB 501 Lifespan I: General Lifespan Development (2)** *Hicks* Provides professional physical therapy students an overview of typical human development across the lifespan, with particular emphasis on motor development. Serves as framework for understanding atypical development and the effects of disease and disability across the lifespan. Offered: Sp.

**REHAB 502 Lifespan II: Pediatrics (3)** *Kartin* Provides an overview of pediatric physical therapy practices for children with atypical development. Assessment, development of physical therapy plans of care for children with various disabilities will be presented within the frameworks of family-centered-care and disablement models. Prerequisite: REHAB 501, REHAB 502. Offered: Sp.

**REHAB 503 Lifespan III: Geriatric Physical Therapy (3)** Theory and principles of exercise procedures used when treating the geriatric patient. Includes a discussion of age related changes in the systems essential to movement control; factors contributing to physical disability and frailty with aging; adaptation of assessment and treatment procedures to the geriatric patient. Lectures and laboratories.

**REHAB 504 Physical Therapy Procedures I: Assessment (2)** Development of clinical competence in patient assessment techniques from a neuromusculoskeletal perspective. Discussion of normal and pathological findings. Special emphasis on upper quadrant anatomy and patient handling skills. Lecture and laboratory format.

**REHAB 506 Physical Therapy Procedures II: Assessment (2)** Development of clinical competence in patient assessment techniques from a neuromusculoskeletal perspective. Discussion of normal and pathological findings. Special emphasis on lower quadrant anatomy, posture evaluation, and medical record documentation skills. Lecture and laboratory format.

**REHAB 507 Physical Therapy Procedures III: Modalities (3-4)** *McGough* Principles and practice of physical therapy clinical treatment procedures utilizing therapeutic modalities. Lecture and laboratory format.

**REHAB 508 Physical Therapy Procedures IV: Therapeutic Exercise (5)** *Hicks* Theory, principles and practice of exercise procedures used for treatment purposes in physical therapy, including motor learning, variables of motor performance, and exercise prescription. Lectures and laboratories. Simulated patient problems.

**REHAB 509 Physical Therapy Procedures V: Physical Restoration (5)** Development of physical therapy treatment skills used in rehabilitation of severe neuromusculoskeletal dysfunction. Lecture and laboratory format.

**REHAB 510 Rehabilitation Psychology (2)** *Jensen* Processes and management methods for assimilation of disability, enhancing patient participation in rehabilitation process, and for helping in maintenance of performance; behavioral management and case conference strategies; rehearsal of contingency management techniques. Required for residents; others by permission of instructor.

**REHAB 511 Musculoskeletal IV: Clinical Management (5)** Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on upper quadrant anatomy. Lecture and laboratory format.

**REHAB 512 Musculoskeletal V: Clinical Management (5)** Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on lower quadrant anatomy. Lecture and laboratory format.

**REHAB 513 Special Studies in Physical Therapy (1-5, max. 15)** Theory and practice in specialized areas of physical therapy. Includes organization and administration of specialized programs, advanced evaluation and treatment techniques, role of the consultant. Credit/no credit only.

**REHAB 514 Effective Service Delivery in Educational Settings (2)** Development of knowledge, skills, and attitudes necessary for optimizing service delivery in educational settings to children with disabilities. Public laws, service delivery models, best practice issues, ethical decision making, cross-cultural competence, and interagency relationships addressed. For occupational and physical therapists, speech and hearing pathologists, and other related services personnel.

**REHAB 515 Assessments and Interventions for Children with Emotional and Behavioral Disorders (2)** Presentation of current knowledge regarding emotional and behavioral disorders in children for occupational and physical therapists and other personnel working in educational settings. Areas covered include contributing factors, frames of reference, intervention models, assessment and intervention strategies, individual educational plans, and medications.

**REHAB 516 Medical Information for Rehabilitation Counselors (3)** *Johnson* Lectures in medical science field regarding the etiology, prognosis, and physical restoration of common disabling conditions. Case studies are used extensively, and major emphasis is placed on vocational implications of physical disability. Prerequisite: permission of instructor.

**REHAB 517 Physical Therapy Seminar (2-3, max. 21)** *Kartin* Group seminar format focused on physical therapy topics pertaining to transcurricular and professional practice issues. Credit/no credit only.

**REHAB 518 Infants and Young Children: Current Research (3)** *Deitz, Swanson* Introduces students to recent research relating to assessment and intervention with infants and young children who are "at risk" or who are disabled. Critical evaluation of the current research emphasized. Prerequisite: clinical experience or coursework related to infants and young children with disabilities and permission of instructors.

**REHAB 520 Seminar (1-5, max. 5)** Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for graduate students, residents and postdoctoral fellows in rehabilitation medicine. Lectures, discussion, and laboratory work in selected aspects appropriate to elected area of study for applicants for master-level degree.

**REHAB 522 Neurophysiological Topics in Rehabilitation Medicine (2)** *Anderson* Review of traditional neurophysiological concepts and an exposition of recent advances in neurophysiological research related to the practice of rehabilitation medicine. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

**REHAB 523 Neuroscience III: Applied Neurology (4)** *Hicks, Shumway-Cook* Theory and principles of advanced exercise procedures used when treating patients with neurologic pathology. Includes the application of principles of motor learning and control; facilitation and inhibition of variables affecting functional motor performance; adaptation of assessment and treatment procedures to patients with different types of neurologic impairments. Lectures and laboratories.

**REHAB 527 Neuroscience IV: Physical Rehabilitation of Adult Neurological Disorders (2)** *Hicks* Critical analysis and application of physical therapy assessment and treatment techniques to problems related to specific adult neurological disorders. Neurological disorders to be covered include stroke, spinal cord injury, traumatic brain injury, and multiple sclerosis. Offered: W.

**REHAB 530 Medical Aspects of Vocational Counseling (2/3)** *Johnson* Introduction to vocational implications of physical and emotional disabilities. Methods, counseling techniques, therapeutic modalities, community resources used in producing vocational assistance for persons with disabilities. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

**REHAB 532 Clinical Affiliation for Rehabilitation Counselors (5-6)** *Johnson* Under preceptorship of rehabilitation counseling staff, students counsel and evaluate patients with severe physical, emotional, or social problems; administer vocational testing; obtain placement on job stations; work with community resources for vocational/educational placement; and develop activity-oriented schedules. Prerequisite: permission of instructor.

**REHAB 539 Communication Disorders in Rehabilitation Medicine (1)** *Yorkston* Overview of communication disorders secondary to central and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation. Prerequisite: graduate student status (postdoctoral fellow).

**REHAB 544- Functional Anatomy for Physiatrists (2-)** *Goldstein* Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro-musculo-skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB -545 Functional Anatomy for Physiatrists (-2)** *Goldstein* Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro-musculo-skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB 546 Teaching Practicum in Occupational and Physical Therapy (1-3, max. 3)** Integration of knowledge and skills in teaching through teaching in the classroom or presentation of a minicourse, workshop, or in-service training series. Prerequisite: MEDED 520 and permission of instructor.

**REHAB 550 Neuropsychology in Rehabilitation (2)** *Dikmen* Examination and management of patients with brain lesions, as well as an understanding of the consequences of such conditions. Prerequisite: graduate standing in rehabilitation medicine.

**REHAB 555 P-Neuromuscular Electrodiagnosis (2.5)** *Kraft* Demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by participation in clinical electrodiagnosis examinations. Develops awareness of the usefulness of knowing when such procedures are indicated for patients and interpret results rather than develop proficiency in performing these examinations. Prerequisite: HUBIO 560 and permission of instructor.

**REHAB 566 Special Topics in Rehabilitation (1-9, max. 14)** Philosophy and concepts in the interdisciplinary rehabilitation of persons with major disabilities, including advanced content in the rehabilitation theory and process of selected categories.

**REHAB 567 Practicum in Rehabilitation (1-12, max. 24)** Specialized practicum experience in environment providing rehabilitation services. Practicum arrangements and permission by instructor.

**REHAB 568 Biophysics as Applied to Physical Medicine (2)** *Esselman* Propagation and absorption characteristics of physical forms of energy used for treatment in physical medicine. Physiologic effects basic to prescription of the physical therapy modalities. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB 570 Foundations of Occupational Therapy (4)** An overview of the practice of occupational therapy, emphasizing the role of occupational performance in context, frames of reference, clinical reasoning, and purposeful activity. Introduces the diversity of occupational therapy practice environments through didactic and clinical experiences. Offered: A.

**REHAB 571 Occupational Performance through the Life Span (3)** Overview of human development as it relates to occupational performance and functional adaptation in the ages and stages of life from infancy through old-old age. Emphasis will be placed on environmental influences, activity, and occupational roles, tasks, and component behaviors as they relate to individuals in different ages and stages. Offered: W.

**REHAB 572 Occupational Therapy Theory and Practice in Psychosocial Dysfunction I (5)** *Engel-Knowles* An overview of bodies of knowledge in psychosocial practice as related to occupational performance. Learning topics include major frames of reference, effects of psychosocial disorders on occupational performance (life activities), and occupational therapy evaluation and intervention skills. Lectures, reading, class discussions, role-playing, problem-based learning, and fieldwork comprise the learning experiences. Offered: S.

**REHAB 573 Occupational Therapy in Community Practice (4)** *Engel-Knowles* Bodies of knowledge in occupational performance as they relate to the emerging area of community-based practice. Includes traditional and evidence based practice in the realms of health promotion, prevention, evaluation, and intervention. Lectures, assigned readings, class discussions, role playing, site visits, films, laboratory exercises, and problem-based learning tutorials. Offered: A.

**REHAB 574 Occupational Therapy Theory and Practice in Physical Disabilities I (5)** *Dudgeon* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: A.

**REHAB 575 Occupational Therapy Theory and Practice in Physical Disabilities II (4)** *Greenberg* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: W.

**REHAB 576 Occupational Therapy Theory and Practice in Pediatrics (5)** *Dietz* Occupational therapy evaluation, intervention, and transition services focused on occupational performance (life activities) for children and teens with disabilities and their families. Offered: W.

**REHAB 577 Occupational Therapy Theory and Practice in Geriatrics (4)** *Dudgeon, Engel-Knowles* Occupational therapy evaluation and intervention

with older adults. Covers psychology, physiology, and socio-demographics of aging. Emphasis on interaction skills with the elderly and occupational performance (life activities). Fieldwork in the practice setting enhances didactic coursework. New course, effective Spring 2001. Offered: Sp.

**REHAB 578 Occupational Performance Analysis (3)** *Dudgeon* Skills in the analysis, adaptation, and sequencing of therapeutic and functional activities as they apply to occupational performance. Analysis focuses on performance components (sensorimotor, cognitive, psychosocial, psychosocial, psychological), temporal aspects (chronological, developmental), and environmental aspects (physical, social, cultural). Offered: S.

**REHAB 579 Therapeutic Communication (3)** *Engel-Knowles* Introduces basic principles and skills of effective interpersonal communication in dyadic interactions and in groups. Emphasis on effective listening, interviewing, and principles and concepts of occupational therapy groups. Lectures, readings, class discussions, role playing, and in-class exercises comprise the learning experiences. Offered: Sp.

**REHAB 580 Introduction to Research in Rehabilitation (3)** *Deitz* Evaluation of rehabilitation research literature and design of research studies relevant to rehabilitation. Offered: S.

**REHAB 581 Application of Measurement Systems (3)** *Deitz* Provides basis for critically evaluating and using tests and measurements in occupational therapy evaluation. Focus on reliability, validity, norms, test development process, statistics relevant to tests and measurement, and ethical implications of testing. Critical evaluation of selected standardized test used in occupational therapy. Offered: W.

**REHAB 582 Assistive Technology in Rehabilitation (3)** Overview of the field of assistive technology as it impacts occupational performance in health-care, work, and leisure activities. Covers interface devices, computer applications, environmental controls, augmentative communications, power mobility, seating and positioning systems, and sensory enhancements. Offered: W.

**REHAB 584 Health-Care Trends and Issues (3)** *Kanny* Overview of the health services system in the United States and current trends and issues facing occupational therapists within this system. Content includes: health service providers, reimbursement of health care services, regulation, personnel and role delineation, and health policy and advocacy. Offered: A.

**REHAB 585 Administration and Management (3)** *Kanny* Covers knowledge and skills needed for leadership positions in occupational therapy practice. Focus is on administrative and management functions including strategic planning, program planning, marketing, fiscal management, program evaluation, quality improvement, and personnel management. Offered: W.

**REHAB 586 Ethical Reasoning in Practice (2)** *Kanny* Critical analysis of issues related to current occupational therapy practice, education, administration and research. Provides a synthesis of the diverse learning experiences students have had within the occupational therapy program in the context of ethical reasoning and leadership roles within the profession. Offered: Sp.

**REHAB 587 Industrial Rehabilitation (3)** *Dudgeon* Provides knowledge and skills related to vocational assessment and industrial rehabilitation for individuals with medical or psychosocial problems. Emphasizes worker characteristics, job analysis, and accommodation in business and industrial settings. Clinical simulation components provide applications to specific diagnostic, impairment, or disability conditions.

**REHAB 591 Master's Project (1-4, max. 7)** Master's project focused on research, administration, education, practice, policy, or other scholarly or creative work. Offered: AWPSpS.

**REHAB 592 Principles of Orthotic Use in Rehabilitation (2)** *Chang* General principles and clinical applications of orthoses in patient management, with exposure to research issues in orthotic design.

**REHAB 593 Principles of Prosthetic Use in Rehabilitation (1)** *Czerniecki* General principles of prevention of amputation, prosthetic design, biomechanics, and clinical applications of upper and lower extremity prostheses.

**REHAB 594 Clinical Fieldwork in Occupational Therapy (10, max. 20)** *Rollinger* Six months of supervised fieldwork education. Experience in delivering occupational therapy services to clients focusing on application of purposeful and meaningful occupation. Exposure to a variety of clients across the lifespan and in a variety of settings reflective of current practice in the profession. Credit/no credit only. Offered: AWPSpS.

**REHAB 595 Clinical Affiliation in Physical Therapy (10, max. 30)** *Robinson* Clinical practice of physical therapy techniques under supervision in community-based clinics. Credit/no credit only.

**REHAB 596 Electromyography and Clinical Neurophysiology (4)** *Kraft* Didactic course covering electromyography and clinical neurophysiology. First part covers basic neurophysiology and second covers electromyography, nerve conduction studies, somatosensory-evoked potentials, residual- and auditory-evoked potentials, single fiber EMG, late response, quantitative analysis, and macro EMG. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB 597- Electromyography and Electrodiagnosis Laboratory (1-)** *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB -598- Electromyography and Electrodiagnosis Laboratory (-1-)** *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB -599 Electromyography and Electrodiagnosis Laboratory (-1)** *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

**REHAB 600 Independent Study or Research (\*)** Credit/no credit only.

**REHAB 685 P-Chronic Disease and Disability (4)** *Cox, Hays* Meets chronic-care requirement for medical students. Structured clinical experience on rehabilitation medicine services. Differences between acute and chronic medicine, identification of disability problems, and therapeutic techniques for removing disability. Hospitals are within University system, local area, and WWAMI area. Prerequisite: third-year medical student standing.

**REHAB 686 P-Rehabilitation Medicine Clerkship—Pediatrics (8/12)** *Hays, Jaffe, Massagli* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disabling pediatric disease. School planning, family counseling, community support services included. Four- or six-week package permits inpatient, outpatient, and consultation experience. Recommended for students contemplating pediatrics. Prerequisite: third-year medical student standing.

**REHAB 687 P-Rehabilitation Medicine Clerkship (8/12)** *Hays* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disability problems. Four- or six-week package permits inpatient, outpatient, and consultation experience. Recommended for careers in family medicine, internal medicine, rheumatology, cardiology, neurology, geriatrics, orthopedic surgery, neurosurgery, and cardiovascular surgery. Prerequisite: third-year medical student standing.

**REHAB 689 P-Spinal Cord Injury (8/12)** *Hammond* Introduction to diagnosis, management, rehabilitation of patients with spinal-cord injuries. Interaction with rehabilitation team, psychiatrists, and subspecialists in urology, neurosurgery, and plastic surgery. Performance at subintern level expected. Veterans Administration Medical Center only. Prerequisite: MED 665, SURG 665.

**REHAB 695 P-Rural Rehabilitation Medicine Clerkship (8)** *Hays* Structured clinical experience in identification and treatment of disability problems in rural (nonmajor urban) communities. Satisfies chronic care/rehabilitation medical graduation requirements. Prerequisite: completion of at least six months of clinical clerkships, permission of instructor.

**REHAB 697 P-Rehabilitation Medicine Special Elective (\* max. 24)** Equivalent to 686, 687, or 688. Satisfies requirements in rehabilitation medicine/chronic care. Student arranges with another university, using the "Special Assignment Form." Students can qualify after review, similar experience at another university. Prerequisite: permission of instructor.

**REHAB 699 P-WWAMI Rehabilitation Medicine Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

**REHAB 700 Master's Thesis (\*)** Credit/no credit only.

## Surgery

BB487 University of Washington Medical Center



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Surgery.html](http://www.washington.edu/students/genecat/academic/Surgery.html)



Department Web page:  
[depts.washington.edu/surgery/](http://depts.washington.edu/surgery/)

The Department of Surgery carries out instruction during all four years of School of Medicine attendance. The third-year six-week clerkship constitutes the core of student exposure to general surgery and is required of all students. The fourth-year emergency-room clerkship is also a required part of the curriculum. The department offers a variety of fourth-year elective clerkships in a number of the specialty aspects of the department's clinical activities, including but not limited to trauma, cardiothoracic surgery, plastic surgery, vascular surgery, transplantation, surgical critical care, pediatric surgery, and the management of burn patients.

## Faculty

### Chair

Carlos A. Pellegrini

### Professors

Allen, Margaret D. 1985; MD, 1974, University of California (San Diego); cardiothoracic surgery.

Ashbaugh, David G. 1982, (Emeritus); MD, 1957, Ohio State University; thoracic surgery.

Beach, Kirk Watson \* 1976, (Research); MSChE, 1968, PhD, 1971, University of California (Berkeley); MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Clowes, Alexander W. \* 1980; MD, 1972, Harvard University; general and vascular surgery.

Copass, Michael K. 1971, (Adjunct); MD, 1964, MA, 1964, Northwestern University; neurology/emergency services.

Dellinger, E. Patchen \* 1977; MD, 1970, Harvard University; general and gastrointestinal surgery.

Engrav, Loren H. 1977; MD, 1969, University of California (Los Angeles); plastic and reconstructive surgery.

Gruss, Joseph S. 1991; MBChB, 1969, University of Witwatersrand (S Africa); plastic surgery.

Heimbach, David M. 1974; MD, 1964, Cornell University; burn and general surgery.

Herman, Clifford M. 1977, (Emeritus); MD, 1959, University of Vermont; general surgery.

Johansen, Kaj H. 1978; MD, 1970, University of Washington; PhD, 1977, University of California (San Diego); general and vascular surgery.

Jurkovich, Gregory J. 1988; MD, 1978, University of Minnesota; general surgery.

Kohler, Ted R. 1983; MD, 1976, Harvard University; general and vascular surgery.

Maier, Ronald V. 1981; MD, 1973, Duke University; general surgery, trauma-critical care surgery.

Merendino, K. Alvin 1948, (Emeritus); MD, 1940, Yale University; PhD, 1946, University of Minnesota; general surgery.

Moe, Roger E. 1967, (Emeritus); MD, 1959, University of Washington; oncology and general surgery.

Patterson, David R. \* 1984, (Adjunct); PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.

Pellegrini, Carlos A. 1993; MD, 1971, University of Rosario Medical School (Argentina); general and laparoscopic surgery.

Perkins, James D. 1989; MD, 1979, University of Arkansas; transplant surgery.

Strandness, D. Eugene 1965, (Emeritus); MD, 1954, University of Washington; vascular surgery.

Tapper, David 1983; MD, 1970, University of Maryland; pediatric surgery.

Trumble, Thomas E. 1989, (Adjunct); MD, 1979, Yale University; orthopaedics, hand and microvascular surgery.

Verrier, Edward D. 1989; MD, 1974, Tufts University; cardiothoracic surgery.

Winterscheid, Loren C. 1957, (Emeritus); PhD, 1953, MD, 1954, University of Pennsylvania; general and thoracic surgery.

Zierler, R. Eugene 1984; MD, 1976, Johns Hopkins University; general and vascular surgery.

### Associate Professors

Aldea, Gabriel S. 1998; MD, 1981, Columbia University; cardiothoracic surgery.

Anderson, Benjamin O. 1994; MD, 1985, Albert Einstein College of Medicine; oncology, general surgery.

Byrd, David R. 1992; MD, 1982, Tulane University; general surgery and oncology.

Egbert, Mark A. 1982, (Adjunct); DDS, 1981, University of Washington; oral and maxillofacial surgery.

Fontaine, Arthur B. 1997, (Adjunct); MD, 1981, Albany Medical College; angio interventional radiology.

Foy, Hugh M. 1978; MD, 1978, University of Nebraska; general surgery.

Gentilello, Larry M. 1990; MD, 1982, Albert Einstein College of Medicine; general surgery.

Gibran, Nicole 1990; MD, 1985, Boston University; general, burn, and trauma surgery.

Hanel, Douglas Paul 1992, (Adjunct); MD, 1977, St Louis University; orthopaedics, hand/microvascular surgery.

Hatsukami, Thomas 1988; MD, 1982, University of California (Los Angeles); vascular surgery.

Isik, F. Frank 1990; MD, 1985, Mt Sinai School of Medicine; plastic surgery/control of angiogenesis.

Langdale, Lorrie A. 1985; MD, 1979, University of Washington; general surgery.

Lupinetti, Flavian M. 1993; MD, 1978, Johns Hopkins University; cardiothoracic surgery.

Marsh, Christopher L. 1989; MD, 1980, Loma Linda University; transplant surgery.

Meissner, Mark H. 1985; MD, 1985, University of Colorado (Denver); general, vascular, and critical care surgery.

Nicholls, Stephen C. 1986; MBChB, 1975, University of Auckland (New Zealand); vascular surgery.

Pohlman, Timothy H. 1984; MD, 1978, Rush Medical College; general surgery.

Rand, Richard P. 1990; MD, 1981, University of Michigan; plastic and reconstructive surgery.

Sawin, Robert 1989; MD, 1982, University of Pittsburgh; pediatric surgery.

Sinanan, Mika N. \* 1980; MD, 1980, Johns Hopkins University; PhD, 1986, University of British Columbia (Canada); general and laparoscopic surgery.

Vedder, Nicholas 1990; MD, 1981, Case Western Reserve University; case history, plastic and reconstructive surgery.

Waldhausen, John H. 1992; MD, 1986, Pennsylvania State University; pediatric surgery.

Wood, Douglas E. 1992; MD, 1983, Harvard University; thoracic surgery.

Yeung, Raymond S. 1997; MD, 1982, University of Toronto (Canada); general and surgical oncology.

### Assistant Professors

Allan, Christopher H. 1998, (Adjunct); MD, 1992, Northwestern University; hand and microvascular surgery.

Anderson, Richard V. 1997; MD, 1987, St Louis University; cardiac surgery.

Billingsley, Kevin G. 1998; MD, 1989, Johns Hopkins University; general surgery.

Cornejo, Carol J. 1991; MD, 1991, University of California (San Francisco); trauma/critical care.

Curtis, William E. 1997; MD, 1988, University of Colorado (Denver); cardiac surgery.

Daum, Guenter 1993, (Research); PhD, 1989, University of Konstanz (Germany); vascular smooth muscle cells.

Duncan, Brian W. 1997; MD, 1985, Indiana University; congenital heart and cardiovascular.

Eubanks, Thomas R. 1997; DO, 1991, Chicago College of Osteopathic Medicine; videoendoscopic surgery.

Healey, Patrick J. 1993; MD, 1987, Boston University; general and pediatric surgery.

Horvath, Karen D. 1998; MD, 1990, New York Medical College; surgical critical care, laparoscopic surgery.

Karmy-Jones, Riyad 1997; MD, 1983, University of Alberta (Canada); thoracic surgery.

Kuhr, Christian S. 1988; MD, 1988, University of Washington; multi-organ transplantation, urologic surgery.

Lynge, Dana C. 1993; MD, 1985, McGill University (Canada); general surgery.

Mock, Charles N. \* 1992; MD, 1980, Brown University; MPH, 1994, PhD, 1997, University of Washington; injury: epidemiology, prevention, treatment, especially in less developed countries.

Mulligan, Michael S. 1999; MD, 1989, University of Connecticut; thoracic surgery.

Stelzner, Matthias G. 1996; MD, 1983, University of Bonn (Germany); General surgery.

Stevens, Lucile E. 1997; MD, 1985, Pennsylvania State University; PhD, 1993, University of Minnesota; transplant.

Stevens, R. Brian 1998; MD, 1987, University of California (Davis); PhD, 1998, University of Minnesota; animal islet cell core program/human islet cell separation.

Vallieres, Eric 1996; MD, 1982, Laval University (Canada); thoracic, lung transplant.

Zierler, Brenda \* 1988, (Adjunct Research); PhD, 1996, University of Washington; clinical trials, vein graft, outcomes analysis.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**SURG 498 Undergraduate Thesis (\*)** *Langdale* Offered to those students who have engaged in undergraduate research in general surgery. (Full- or part-time.)

**SURG 499 Undergraduate Research (\*)** *Langdale* Provides an opportunity to participate in ongoing research projects or carry out an independent research project under supervision of Department of Surgery faculty. Practical experience in experimental design and execution is provided under direct supervision of selected faculty members. (Full- or part-time.)

**SURG 505 P-Preceptorship in Surgery (1)** *Langdale* Opportunity for first- and second-year medical students to gain personal experience with clinical faculty members in the community. Students observe general aspects of private practice, including clinical problems seen; practice limitation; doctor-doctor, doctor-patient, and doctor-nurse relationships in the office and hospital. Prerequisite: permission of department.

**SURG 600 Independent Study or Research (\*)** *Langdale*

**SURG 665 P-Clinical Clerkship (\* max. 12)** *Langdale* (Veterans Affairs Medical Center, Harborview Medical Center, Providence Medical Center, University of Washington Medical Center) Diagnosis and management of problems amenable to surgical therapy. Physiological basis of surgical care, differential diagnosis and decision making, and the basic principles of surgical management. Care of inpatients and outpatients, including participation in the operating rooms. Prerequisite: HUBIO 563. (Six weeks. Limit: twenty students.)

**SURG 681 P-Peripheral Vascular Disease (4/8, max. 8)** *Clowes* (Veterans Affairs Medical Center) Peripheral arterial and venous problems, including methods of clinical evaluation; new diagnostic procedures; and the available methods of treatment. Patient workup, perfor-

mance of diagnostic studies, and presentation of case material to the staff. Prerequisite: SURG 665, HUBIO 563. (Two or four weeks. Limit: one student.)

**SURG 682 P-Clinical Burn Care (\* max. 12)** *Heimbach* (Harborview Medical Center) Offered on the burn unit of Harborview Medical Center. Exposure to the care of patients with thermal injury, including management of severe metabolic and septic problems and opportunity to participate in surgical procedures. Exposure to plastic and reconstructive surgery. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.)

**SURG 683 P-Pediatric Surgery Externship (8/12)** *Tapper* (Children's Hospital and Medical Center) Surgical conditions peculiar to the particular age group with a preponderance of congenital and neoplastic conditions that are amenable to surgical treatment. A reasonable background of knowledge in human embryology and genetics is recommended. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.)

**SURG 684 P-Trauma and Emergency Care (\* max. 16)** *Copass, Eisenberg* (Harborview Medical Center, University of Washington Medical Center) Register for one or both segments of this course. Segment 1: emergency medicine and trauma at Harborview Medical Center with assignment to the emergency department. Emphasis on management of severely injured and critically ill patients. Segment 2: acute medicine at University of Washington Medical Center. Evaluate and treat ambulatory emergencies. Prerequisite: SURG 665, MED 665. (Four weeks, third-year and fourth-year students. Limit: twelve students at Harborview Medical Center; three students at University of Washington Medical Center.)

**SURG 685 P-Cardiothoracic Surgery Externship (\* max. 12)** *Verrier* (University of Washington Medical Center) Serve as subintern, participate in patient care while learning cardiopulmonary hemodynamics of cardiac and thoracic surgery. Observe a wide variety of both cardiac and thoracic disease entities. Participate in the open-heart procedures in the operating room. Opportunity to gain additional understanding of physiology of cardiopulmonary bypass. (Four or six weeks. Limit: two students.)

**SURG 686 P-Plastic Surgery Clerkship and Preceptorship (\* max. 12)** *Engrav* (University of Washington Medical Center) Introduces fundamental techniques and enhances knowledge of plastic surgery, wounds, trauma, burns, cancers, and pediatric and adult cosmetic and reconstructive surgery. Participate in all surgery-related activities. Prerequisite: SURG 665; MED 665. MS III only, two weeks, 4 credits, limit 2; MS III/MS IV four/six weeks (recommended), 8/12 credits, limit 4.

**SURG 687 P-Transplantation Surgery Clerkship (8)** *Perkins* (University of Washington Medical Center) Clerkship is in the University regional multi-organ transplantation center. Student participates fully in the care of all transplant patients, on twice daily multidisciplinary rounds, in pre-operative conference, and in the operating room and on the donor harvest team. Weekly didactic teaching sessions. Prerequisite: SURG 665 and MED 665. (Four weeks. Limit: two students.)

**SURG 688 P-Subinternship in General Surgery (\* max. 16)** *Langdale* (Veterans Affairs Medical Center, Harborview Medical Center, Providence Medical Center, University of Washington Medical Center) Offered on the general surgery wards of the University-affiliated hospitals. Diagnosis, preoperative care, and postoperative care; management of surgical emergencies, the ICU patient, and outpatient follow-up of discharged patients. Students function at the intern level under close supervision of the staff and house staff. Prerequisite: SURG 665. (Four or six weeks. Limit: seven students.)

**SURG 689 P-Community Surgery Clerkship (8)** *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a group prac-

tice in a smaller city. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four weeks. Longview. Limit: one student. Coeur d'Alene. Limit: one student.)

**SURG 690 P-Alaska Native Medical Center Surgery Sub-Internship (8/12)** *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a specialized population of patients. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four or six weeks. Alaska Native Medical Center, Anchorage. Limit: one student.)

**SURG 691 P-Surgical Intensive Care Unit Sub-Internship (8)** *Langdale* Designed to augment experience gained in 665. Excellent opportunity to participate in the management of critically ill patients under the close supervision of the staff/house staff. Recommended for students entering surgery or primary care. Prerequisite: SURG 665. (Harborview Medical Center. Limit: two students. Veterans' Affairs Medical Center. Limit: one student.)

**SURG 697 P-Surgery Special Electives (\* max. 24)** *Langdale* Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: SURG 665 and departmental permission. (Four, six, or twelve weeks.)

**SURG 698 P-Clinical Clerkship Away (\*, max. 24)** Clerkship equivalent to SURG 665, at sites outside the Seattle metropolitan area.

## Urology

BB1115 Health Sciences

 *General Catalog Web page:*  
[www.washington.edu/students/genocat/academic/Urology.html](http://www.washington.edu/students/genocat/academic/Urology.html)

 *Department Web page:*  
[depts.washington.edu/uroweb/](http://depts.washington.edu/uroweb/)

Urology is the surgical discipline concerned with diseases of the urinary tract in males and females, and the genital system in the male. The science is broadly based: major areas of practical and investigative concern include congenital defects, cancer, renal diseases, reproductive biology, neuropathology, renal stone formation, and transplantation.

Clinically, the field encompasses a large variety of technical skills including real-time imaging and manipulation, endoscopy, and open surgery. Medical diagnosis and treatment are a large part of the discipline.

The department is actively involved in patient care, instruction, and research concerning the problems of urology. Training for medical students starts in the second year and continues through the third and fourth years. Training is also provided for residents, fellows, nurses and applied specialists. The department is responsible for a fully approved urology residency program. Contact the Urology Clerkship Coordinator at (206) 731-3205 for further information.

## Faculty

### Chair

Paul Henry Lange

### Professors

Ansell, Julian S. 1959, (Emeritus); MD, 1951, Tufts University; PhD, 1959, University of Minnesota; congenital defects and pediatric urology.

Barnes, Glover W. \* 1969; MA, 1955, PhD, 1961, State University of New York (Buffalo); tissue, organ immunology.

Berger, Richard E. 1982; MD, 1973, University of Chicago; infertility, infectious diseases, impotence and prostate disease.

Chapman, Warren H. 1962, (Emeritus); MD, 1952, University of Chicago; oncology and microsurgery.

Krieger, John N. 1982; MD, 1974, Cornell University; infectious diseases.

Lange, Paul Henry 1988; MD, 1967, Washington University; oncology, endourology and adult reconstruction.

Mayo, Michael Edward 1975; MBBS, 1962, St Thomas' Hospital Medical School (UK); neuro-urology and reconstruction, urodynamics.

Mitchell, Michael E. 1989; MD, 1969, Harvard University; pediatric urology and reconstruction.

Vessella, Robert L. 1989; PhD, 1974, University of Mississippi; tumor markers and immunology.

### Associate Professors

Ellis, William J. 1991; MD, 1985, Johns Hopkins University; oncology, prostate disease.

Higano, Celestia S. 1982, (Adjunct); MD, 1979, University of Massachusetts; oncology.

Riley, Donald E. \* 1982, (Research); PhD, 1976, University of Washington; pathogenic research and diagnosis involving DNA sequences.

### Assistant Professors

Bassuk, James A. 1992, (Affiliate); PhD, 1983, Iowa State University.

Corman, John M. 1998; MD, 1992, Baylor University; general surgery.

Grady, Richard W. 1996; MD, 1990, University of Michigan; pediatric urology.

Kuhr, Christian S. 1988; MD, 1988, University of Washington; multi-organ transplantation, urologic surgery.

Miller, Jane L. 1985; MD, 1985, University of Oklahoma; female urology and urodynamics, urologic trauma.

Penson, David F. 1999; MD, 1991, Boston University; MPH, 1999, Yale University; urologic malignancies, erectile dysfunction, outcomes research.

Porter, James Roscoe 1992; MD, 1990, Medical College of Ohio; urologic trauma, laparoscopy, endourology.

Takayama, Thomas K. 1989; MD, 1985, Tufts University; biochemistry of prostate specific antigen.

Yang, Claire C. 1993; MD, 1988, Vanderbilt University; neurourology and electrophysiology testing.

### Lecturer

Muller, Charles 1980; PhD, 1976, University of California (Berkeley); male fertility and sperm physiology.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

Course numbers with a P suffix are not graduate courses and are restricted to medical student enrollment only.

**UROL 498 Undergraduate Thesis (\*)** Provides an opportunity for medical students to write in the area of urology.

**UROL 499 Undergraduate Research (\*)** The student participates in current urologic research projects under supervision of full-time staff. Certain specific problems may be elected by the student. Elective for medical students.

**UROL 501 P-Urology Preceptorship (1)** Individual experiences with one or more of the full-time department faculty members covering research, teaching, and patient care. Students observe activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- or second-year medical student standing; permission of instructor.

**UROL 525 P-Medical Disciplinary Board Procedures (2)** Students learn about physician-patient interactions which produce complaints or malpractice claims. Students assigned to the Washington State Medical Disciplinary Board for two monthly meetings, evaluate current cases, present them to board members. Outstanding presentations go to the whole board. Warning: Cases are discussed only with the Board. Offered: AWSpS.

**UROL 675 P-Urology Preceptorship (\* max. 8)** Student follows a private practice preceptor in all of his or her work. Becomes acquainted with the office management of urological problems. Prerequisite: UROL 680, HUBIO 562. (Two or four weeks.)

**UROL 680 P-Urology Clerkship (\* max. 8)** *Berger, Ellis, Krieger, Lange, Mayo, Porter* Full activities of clinical service. Basic principles of urology emphasized. Prerequisite: HUBIO 562. (Two or four weeks.)

**UROL 681 P-Female Urology (4)** *Miller* Observation of cases of lower urinary tract disorders specific to women, emphasizing behavioral management and multidisciplinary care. Ninety-five percent of cases observed are women. Not intended as the only exposure to urology for students considering urology as career choice. Prerequisite: third or fourth year standing and permission of instructor.

**UROL 685 P-Urology Subinternship (\* max. 12)** *Berger, Ellis, Krieger, Lange, Mayo, Porter* Subintern is responsible for patient workups and for preoperative and postoperative care and participates in the operating room. Prerequisite: MED 665 or pediatrics basic clerkship, or permission of instructor.

**UROL 690 P-Urology Specialties (\* max. 8)** For those who wish further exposure to a specific aspect of urology. Students can spend time with one attending at University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, or Veterans Administration Hospital studying oncology, infections, infertility, stone disease, impotence, or other aspects of urology. Prerequisite: UROL 680 and permission of instructor.

**UROL 697 P-Urology Special Electives (\* max. 24)** Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. (Six or twelve weeks.)

**UROL 699 P-WWAMI Urology Special Electives (\* max. 24)** By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

# School of Nursing

## Dean

Nancy F. Woods  
T318 Health Sciences

## Associate Deans

Susan L. Woods, Academic Programs  
Pamela H. Mitchell, Research and Practice

## Assistant Dean for Educational Outreach

Ruth F. Craven



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/School\\_Nursing.html](http://www.washington.edu/students/genocat/academic/School_Nursing.html)



School Web page:  
[www.son.washington.edu](http://www.son.washington.edu)

Nurse professionals are members of interdisciplinary teams in clinics, hospitals, and community settings, and work with people of all ages, cultural backgrounds, and lifestyles to help them achieve the highest level of wellness possible. Nurse practitioners fill critical health care needs in both urban and rural settings for portions of the population who have not received adequate health care. Nurse scientists conduct important research about a variety of health problems and how best to promote health, prevent disease, and care for people who are ill. Nurses also teach in schools of nursing, in colleges and universities through the world.

The School of Nursing offers programs leading to baccalaureate, master's, and doctoral degrees.

## Undergraduate Program

### Adviser

Dagmar Schmidt  
T310 Health Sciences, Box 357260  
(206) 221-2461  
sonapo@u.washington.edu

For information on the School of Nursing's undergraduate program, see the undergraduate volume of the *General Catalog* or visit the *General Catalog* online at [www.washington.edu/students/genocat/](http://www.washington.edu/students/genocat/).

## Graduate Program

Graduate Program Coordinator  
T310 Health Sciences, Box 357260  
(206) 543-8736  
sonapo@u.washington.edu

The School of Nursing offers graduate study leading to the degrees of Master of Nursing, Master of Science, and Doctor of Philosophy in nursing science. At the master's level, programs are designed to meet the many needs of a diverse student body by providing opportunities for advanced study practice and research in nursing. The Master of Nursing program develops increased competence in selected areas of advanced practice nursing. The following focus areas are available: adult acute-care nurse practitioner (cardiovascular/AIDS/oncology), adult/older adult nurse practitioner, advanced community-health nursing

(cross-cultural nursing/occupational health nursing/healthy aging/policy and program development), advanced practice in care systems management, advanced practice home care nurse practitioner, advanced practice genetics nursing, advanced practice options in bio-behavioral nursing, family-centered pediatric nursing, nurse midwifery, perinatal nursing/neonatal nurse practitioner, psychosocial nurse practitioner, family nurse practitioner, pediatric nurse practitioner, women's primary care nurse practitioner, and an independent M.N. Research is an integral part of all programs. A thesis is required in the Master of Science program. The Master of Nursing program provides the option of a thesis or non-thesis project. The School of Nursing offers three concurrent graduate degree programs with the School of Public Health and Community Medicine: The M.N./M.P.H., the M.S./M.H.A., and the M.N./M.H.A.

Part-time study is available in most focus areas of the M.N. program. Course work may be started prior to formal admission to a program as a graduate nonmatriculated student (GNM). GNM status allows the student to earn up to 12 graduate-level credits which may be applied to a graduate program if the student is later admitted. Time limits for acceptance of courses taken as a GNM student are six years for a master's degree and ten years for a doctoral degree from the first course to completion of the degree.

The Doctor of Philosophy in Nursing Science program prepares scientists capable of advancing nursing practice and education through research and scholarly activity. The program provides for rigorous research training designed for individuals interested in careers in academia or for other types of leadership positions in health-service agencies in which the ability to design, plan, and implement research in nursing is a significant expectation.

## Special Requirements

In addition to the basic requirements for graduate status in the University, admission to premaster's status in the School of Nursing requires baccalaureate preparation either in nursing or in another major, a basic course in statistics, Graduate Record Examination scores within the past five years, an admissions essay, and three references. Licensure as a registered nurse is required for application to the M.N. program. At least one year of practice is recommended for most clinical programs. Admission is usually for autumn quarter. The application deadline for most master's degree options is February 1. Early application is encouraged, although late applications may be accepted on a space-available basis. Additional information may be obtained from the School of Nursing Academic Programs Office

Admission requirements for the doctoral program, in addition to the above, include Graduate Record Examination scores within the past five years, three references, a statement of goals for doctoral study which includes a description of area-of-research interest, and an example of scholarly work. The deadline for application to the doctoral program is February 1.

## Financial Aid

A limited number of nurse traineeships are available for premaster's study. Other financial aid is available on a limited basis. Teaching assistantships and research assistantships are available to a limited number of students. Priority for these appointments is given to predoctoral students.

Contact the Academic Programs Office, School of Nursing, for current information.

## Faculty

### Professors

Allen, David G. \* 1988; PhD, 1975, University of Iowa; philosophy of science, critical and feminist theory, psychosocial nursing theory.

Barnard, Kathryn E. \* 1972; MSN, 1962, Boston University; PhD, 1972, University of Washington; ecological factors of child development.

Batey, Marjorie V. \* 1956, (Emeritus); MS, 1956, PhD, 1968, University of Colorado (Boulder); sociological factors in health-care systems.

Beaton, Randal D. \* 1976, (Research); PhD, 1972, University of Washington; stress and stress management in emergency workers, occupational health and safety.

Benoliel, Jeanne 1970, (Emeritus); MS, 1961, University of California (Los Angeles); DNS, 1969, University of California (San Francisco).

Berkowitz, Bobbie \* 1988; PhD, 1990, Case Western Reserve University; administration, leadership and policy development within public health and nursing.

Blackburn, Susan T. \* 1973; PhD, 1979, University of Washington; high-risk infants and their families, infant care-giving interactions and environments.

Booth, Cathryn L. \* 1980, (Research); PhD, 1974, Ohio State University; mother-infant interaction, observational methodology, child birth experiences and attachment.

Brandt, Patricia \* 1981; PhD, 1981, University of Washington; influence of family functioning on early child development.

Brown, Marie A. \* 1983; PhD, 1983, University of Washington; HIV infection, home care, women's health, death.

Budzynski, Helen Kogan \* 1968, (Emeritus); PhD, 1968, University of California (Los Angeles); stress response: cognitive/physiologic interface in chronic dysfunctions, self-management teaching.

Budzynski, Thomas H. \* 1996, (Affiliate); PhD, 1969, University of Colorado; enhancement of academic performance through physiologic stimuli to decrease anxiety, EEG monitoring.

Carwein, Vicky \* 1995, (Adjunct); MS, 1972, University of California (San Francisco); DNS, 1981, Indiana University; nursing and health sciences.

Chrisman, Noel J. \* 1973; PhD, 1966, MPH, 1967, University of California (Berkeley); community partnership research, clinical cultural competence, ethnic health beliefs and practices.

Cowan, Marie J. \* 1977, (Affiliate); MS, 1972, PhD, 1979, University of Washington; estimation of infarct size by electrocardiography, sudden cardiac death, physiological nursing.

Craven, Ruth F. \* 1968; MN, 1968, University of Washington; EdD, 1984, Seattle University; gerontological nursing.

Cunningham, Susanna L. \* 1978; MN, 1969, PhD, 1978, University of Washington; risk factors for atherosclerotic cardiovascular disease.

De Tornyay, Rheba \* 1975, (Emeritus); EdD, 1967, Stanford University; health services, nursing education.

Dimond, Margaret \* 1988; MN, 1971, University of Iowa; PhD, 1978, University of Wisconsin; aging, bereavement, family caregiving, Alzheimer's disease, chronic illness, long-term care.

Disbrow, Mildred A. \* 1982, (Emeritus); PhD, 1968, University of Washington; maternal-infant interaction, child abuse.

- Eggert, Leona \* 1978; MA, 1970, PhD, 1984, University of Washington; adolescent health promotion, drug use and youth, suicide prevention, social support processes.
- Eyres, Sandra J. \* 1974; PhD, 1972, University of North Carolina; environmental resources promoting adaptation and health.
- Gallucci, Betty J. \* 1973; MS, 1971, PhD, 1973, North Carolina State University; oncology, nutritional assessment, pathophysiology of stomatitis, and graft versus host disease.
- Giblin, Elizabeth C. \* 1959, (Emeritus); MN, 1954, University of Washington; EdD, 1959, University of Colorado (Boulder); nursing assessment and nursing therapies, pathophysiological bases.
- Graham, Katherine J. 1988; MN, 1967, PhD, 1978, University of Washington; quality of life across life, work; health systems.
- Haberman, Mel R. 1982, (Affiliate); PhD, 1987, University of Washington; oncology nursing, quality of life.
- Hegvary, Sue T. \* 1986; PhD, 1974, Vanderbilt University; administration and productivity of health care and nursing services.
- Heitkemper, Margaret M. \* 1981; MN, 1975, University of Washington; PhD, 1981, University of Illinois; gastroenterology, enteral nutrition, gerontology.
- Horn, Barbara J. \* 1977, (Emeritus); PhD, 1971, University of Michigan; effective organization of nursing resources.
- Killien, Marcia G. \* 1973; PhD, 1982, University of Washington; women's health, reproductive decision making, work and family.
- Kodadek, Sheila M. 1996, (Affiliate); PhD, 1985, University of Illinois; neonatal, family experience of chronic illness and disability during childhood and adolescence.
- Lewis, Frances M. \* 1978; PhD, 1977, Stanford University; complex organizational analysis, evaluation research, psychosocial factors in chronic illness.
- Little, Dolores E. 1951, (Emeritus); MN, 1957, University of Washington; physiological nursing.
- Loustau, Anne \* 1976, (Adjunct); PhD, 1975, University of Washington; clinical decision making, patient teaching, patient compliance with therapeutic regimens.
- Magyary, Diane L. \* 1981; PhD, 1981, University of Washington; family centered health care of children at risk, disabled or handicapped.
- Mansfield, Louise W. 1951, (Emeritus); MA, 1951, Columbia University; physiological nursing.
- Mitchell, Pamela H. \* 1971; MS, 1965, University of California (San Francisco); PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.
- Muecke, Marjorie A. \* 1979; PhD, 1976, University of Washington; medical anthropology, women's health, refugee health, Southeast Asia.
- Murphy, Shirley Ann \* 1985, (Emeritus); PhD, 1981, Portland State University; addictive processes in women, coping with violent death of a child, occupational trauma.
- Osborne, Oliver H. \* 1969, (Emeritus); PhD, 1968, Michigan State University; ideology, policy and health care systems, transcultural health.
- Patrick, Maxine L. \* 1973, (Emeritus); DPH, 1970, University of California (Los Angeles); gerontology, geriatrics.
- Price Spratlen, Lois \* 1976; PhD, 1976, University of Washington; sexual harassment and perceived workplace mistreatment in higher education.
- Prinz, Patricia \* 1976; PhD, 1969, Stanford University; sleep and circadian physiology.
- Siantz, Mary Lou \* 1998; MN, 1971, University of California (Los Angeles); PhD, 1984, University of Maryland; child/adolescent psychiatric nursing, risk and adaptation among migrant children and families.
- Spieker, Susan J. \* 1983, (Research); PhD, 1982, Cornell University; developmental psychology, infant security, mother-infant interaction.
- Teri, Linda \* 1984; PhD, 1980, University of Vermont; dementia, healthy aging and intervention research, depression and anxiety.
- Vitiello, Michael V. \* 1982, (Adjunct); PhD, 1980, University of Washington; sleep, sleep disorders and circadian rhythms in aging, age-related neuroendocrine/cognitive change.
- Webster-Stratton, Carolyn \* 1976; PhD, 1980, University of Washington; parent intervention programs for behaviorally disturbed children.
- Wilkie, Diana J. \* 1990; MN, 1984, PhD, 1990, University of California (San Francisco); cancer pain assessment and management, pain research.
- Wolf-Willets, Vivian \* 1969, (Emeritus); PhD, 1969, University of Chicago; curriculum development, instruction, stress management.
- Woods, Nancy \* 1978; PhD, 1978, University of North Carolina; women's health.
- Woods, Susan L. \* 1975; MA, 1975, University of Washington; PhD, 1991, Oregon Health Sciences University; cardiovascular clinical specialist, pulmonary artery catheter measurement.

#### Associate Professors

- Belza, Basia \* 1991; MN, 1982, University of Virginia; PhD, 1991, University of California (San Francisco); chronic illness, gerontology, fatigue prevention and management in rheumatic diseases.
- Betrus, Patricia \* 1978; PhD, 1985, University of Washington; stress, cognitive behavioral therapy, depression, research design.
- Bevens, Stella Hay \* 1955, (Emeritus); MA, 1951, University of Minnesota; physiological nursing.
- Blainey, Carol \* 1967; MN, 1967, University of Washington; clinical teaching and problems of patients with diabetes mellitus.
- Bond, Eleanor \* 1984; MN, 1976, PhD, 1985, University of Washington; critical care nursing, therapeutic effects of exercise.
- Boozer, Mary Kathryn \* 1960, (Emeritus); MN, 1955, University of Washington; physiological nursing, care of patients.
- Brandt, Edna M. 1952, (Emeritus); MN, 1953, University of Washington; physiological nursing.
- Burr, Robert L. \* 1976, (Research); PhD, 1986, University of Washington; cardiovascular/psychophysiology, autonomic nervous system.
- Bush, James P. 1984; MN, 1973, University of Washington; EdD, 1984, University of San Francisco; pain management, power and powerlessness as perceived by professional nurses.
- Carnevali, Doris 1982, (Emeritus); MN, 1961, University of Washington.
- Catanzaro, Marci-Lee \* 1982, (Research Emeritus); PhD, 1980, Union Graduate School; rehabilitation nursing.
- Elmore, Shawn K. \* 1983; PhD, 1990, University of Washington; psychobiological aspects of women with mood disorders.
- Estes, Nada \* 1972, (Emeritus); MS, 1958, University of Colorado (Boulder); counseling people with substance-use disorder, depression.
- Flagler, Susan B. \* 1979; DNS, 1981, University of California (San Francisco); maternal role adjustment and early parent-infant interaction.
- Fought, Sharon G. \* 1986, (Adjunct); PhD, 1983, University of Texas (Austin); emergency care/critical care nursing; simulation gaming educational strategies.
- Hammond, Mary A. \* 1972, (Research); PhD, 1971, University of Wisconsin; child development, longitudinal research methods.
- Herting, Jerald R. \* 1996, (Research); PhD, 1987, University of Washington; adolescent substance abuse and mental health, quantitative methods, social demography.
- Hoffman, Agnes \* 1979, (Emeritus); PhD, 1977, University of Kansas; substance use disorders, mental health care of the elderly.
- Horn, Beverly M. \* 1976; PhD, 1975, University of Washington; cross-cultural research in maternal-child nursing.
- Jarrett, Monica E. \* 1980, (Research); MN, 1981, PhD, 1988, University of Washington; psychobiology of women.
- Jordan, Pamela L. \* 1984; PhD, 1984, University of Michigan; expectant/new fatherhood, transition to parenthood.
- Kang, Rebecca R. \* 1981; PhD, 1985, University of Washington; environment of at-risk infants and families, community health, immigrants.
- Kelly, Jean F. \* 1986, (Research); PhD, 1979, University of Washington; family factors that affect at-risk children.
- Kieckhefer, Gail M. \* 1987; PhD, 1985, University of Washington; motivation for health promotional and illness management behavior in children.
- Lalonde, Bernadette \* 1986, (Research Adjunct); PhD, 1980, University of Toronto (Canada); public health program evaluations including process and outcomes, evaluation research.
- Landis, Carol A. \* 1991; MS, 1973, DNS, 1988, University of California (San Francisco); health consequences of sleep loss, neuroendocrinimmune interactions, methods of inquiry.
- Lentz, Martha J. \* 1983, (Research); MN, 1975, PhD, 1984, University of Washington; physiological adaptation: the influence of sleep and other biological rhythms.
- Leppa, Carol J. \* 1990, (Adjunct); PhD, 1990, University of Illinois; ethics and comparative health care systems, specifically women's health issues.
- Lewis, Linda L. \* 1989; MS, 1981, PhD, 1987, University of Illinois; reproductive neuroendocrinology mood changes related to the human menstrual cycle.
- Logsdon, Rebecca G. \* 1986, (Research); PhD, 1986, Oklahoma State University; geriatric psychology, Alzheimer's disease, caregiving.
- Martell, Louise K. \* 1992; PhD, 1990, Oregon State University; maternal adaptations to childbearing.
- Meyer, Kerry E. \* 1992; MN, 1981, Vanderbilt University; PhD, 1990, University of Maryland.
- Mitchell, Ellen S. \* 1977; MN, 1967, University of Florida; PhD, 1986, University of Washington; women's health; menstrual cycle symptom experience, food cravings and eating control.
- Molbo, Doris M. \* 1969, (Emeritus); MA, 1968, University of Washington; oncology: prevention and screening, care and rehabilitation.
- Munet-Vilaro, Frances \* 1997; PhD, 1984, University of Washington; stress and coping of Latina with families, community-based health promotion.
- O'Connor, Frederica W. \* 1986; PhD, 1986, Northwestern University; psychoeducation in schizophrenia, mental health services, program evaluation.
- Olshansky, Ellen F. \* 1985, (Affiliate); DNS, 1985, University of California (San Francisco); women's health, infertility, qualitative research (grounded theory), women's depression.

Patterson, Diana \* 1989; DNS, 1984, University of Alabama; childbearing family, pediatric primary health care.

Pesznecker, Betty L. 1970, (Emeritus); MN, 1957, University of Washington.

Pittman, Rosemary 1964, (Emeritus); MS, 1947, University of Chicago.

Richardson, Mary L. 1977; MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.

Salazar, Mary K. \* 1984; MN, 1986, University of Washington; EdD, 1991, Seattle University; behavioral theory applied to health education, cancer control, occupational health.

Schepp, Karen G. \* 1988; PhD, 1985, University of Arizona; stress and coping of physically and mentally ill youth and their families.

Schultz, Phyllis R. \* 1989; PhD, 1981, University of Denver; nursing systems research, impact of nursing services on population's health.

Simpson, Terri A. \* 1991; MN, 1975, University of California (San Francisco); PhD, 1988, University of Washington; critical care patients' physiological and psychological responses to environmental stressors.

Spitzer, Ada 1993, (Affiliate); PhD, 1990, University of Washington; migration, cross-cultural nursing, stress and coping of children with illness, nursing scholarship.

Swanson, Kristen M. \* 1985; PhD, 1983, University of Colorado (Boulder); caring therapeutics, responses to miscarriage.

Thomas, Karen A. \* 1981; PhD, 1986, University of Washington; preterm infant development, care unit environments, acute care pediatrics, thermoregulation.

Thomas, Mary Durand \* 1983; PhD, 1978, University of Hawaii; programs of care for the seriously mentally ill, psychosocial assessment and diagnostic reasoning.

Thompson, Frances Elaine A \* 1984, (Research); PhD, 1990, University of Washington; attribution theory, adolescent drug use, suicide, preventive interventions.

Ward, Deborah \* 1987; PhD, 1987, Boston University; health policy and politics, women's paid and unpaid caregiving work.

White-Traut, Rosemary 1994, (Affiliate); DSc, 1983, Rush University; preterm infant feeding responses, intervention for premature infants.

Whitney, Joanne D. \* 1991; MS, 1979, University of Michigan; PhD, 1991, University of California (San Francisco); wound healing.

Young, Heather M. \* 1986, (Research); MN, 1989, PhD, 1991, University of Washington; community-based health care service for older adults.

### Assistant Professors

Altman, Gaylene M. \* 1983, (Research); PhD, 1992, University of Washington; women's health.

Berry, Donna L. \* 1988, (Research); MN, 1981, University of Texas (Houston); PhD, 1992, University of Washington; health care of persons with, and at risk for, cancer.

Carr, Catherine A. \* 1998; PhD, 1993, University of Michigan; nurse-midwifery.

Cochrane, Barbara B. \* 1985, (Affiliate); PhD, 1992, University of Washington; women's health, breast cancer, health behavior change.

Davis, Shoni Kay \* 1993, (Affiliate); DNSc, 1992, University of California (Los Angeles).

Draye, Mary A. 1982; MPH, 1968, University of Michigan; FNP practice, infertility, health promotion.

Ensign, B. Josephine \* 1994; MS, 1986, Virginia College of Medicine; MPH, 1992, DPH, 1994, Johns Hopkins University; community-based health service for adolescents.

Gustavson, Norman A. 1996, (Affiliate); PhD, 1980, Washington State University; neural regulation training.

Heerwagen, Judith \* 1981, (Affiliate); PhD, 1982, University of Washington; behavioral ecology.

Huebner, Colleen Ellen \* 1982, (Adjunct); PhD, 1991, MPH, 1994, University of Washington; social bases of developmental problems in early childhood.

Johnson, Clark \* 1994, (Research); MEd, 1973, PhD, 1978, University of Washington; medical informatics.

Jones, Mary C. 1964, (Emeritus); MS, 1962, Boston University.

Kasprzyk, Danuta M. 1984, (Affiliate); PhD, 1984, University of Washington; factors affecting clinician provision of sexual risk assessment and HIV/STD prevention counseling.

Kennedy, Michael 1987, (Research); PhD, 1994, University of Washington; symptom self-management in schizophrenia, mental health of Asian immigrants and refugees.

Kovalesky, Andrea H. 1992, (Adjunct); MSN, 1977, University of California (San Francisco); MA, 1990, Fuller Theological Seminary; PhD, 1997, University of Washington; maternal/child nursing.

Larson, Margaret L. \* 1958, (Emeritus); MN, 1967, University of Washington; cross-cultural variables in mental illness, nursing interventions in disturbed behaviors.

Lovell, David Gilbert \* 1984, (Research); PhD, 1975, University of Wisconsin; MSW, 1993, University of Washington; policy and program issues in mental health treatment for prisoners.

MacLaren, Aileen \* 1994; MSN, 1982, University of Miami (Florida); PhD, 1998, Johns Hopkins University; midwifery.

McCurry, Susan Melancon \* 1991; MS, 1977, MS, 1984, PhD, 1991, University of Nevada (Reno); dementia, aging, older adults, depression, sleep, psychotherapy, intervention research.

McGrath, Barbara B. \* 1987, (Research); PhD, 1993, University of Washington; medical anthropology, illness knowledge/practice, U.S. Pacific Islanders, HIV/AIDS, genetic science.

Moniz, Donna M. 1986, (Affiliate); MN, 1975, JD, 1982, University of Washington.

Montano, Daniel E. \* 1979, (Affiliate); PhD, 1983, University of Washington; attitude-behavior research and behavior change, cancer control, HIV prevention.

Motzer, Sandra Adams \* 1976, (Research); MN, 1976, University of Washington; PhD, 1992, Oregon Health Sciences University; chronic health alterations.

Oshio, Sachiko 1985; MS, 1981, Boston University; PhD, 1992, University of Washington; relationship development, particularly between mothers and newborn infants.

Randell, Brooke P. \* 1993, (Research); MN, 1969, University of California (Los Angeles); DNSc, 1987, University of California (San Francisco); preventive community-based interventions with high-risk adolescents and their families.

Sales, Anne \* 1997, (Adjunct); MSN, 1989, University of North Carolina; PhD, 1998, University of Minnesota; health economics, health care, nursing labor markets.

Schroeder, Carole A. \* 1993; MSN, 1985, University of Nevada; PhD, 1993, University of Colorado (Denver); women's health, community health, models of care delivery, health care systems.

Shannon, Sarah E. 1984; MSN, 1992, PhD, 1992, University of Washington; health-care ethics, end-of-life decision making.

Sikma, Suzanne 1979, (Adjunct); MSN, 1979, Loyola University (Chicago); PhD, 1994, University of Washington; caring in organizations, development and evaluation of organizations, care delivery systems.

Strickland, Carolyn J. B. \* 1991; MS, 1976, PhD, 1983, University of Washington; health related behavior, complex organizations, American Indian populations.

Ulrich, Yvonne M. 1995, (Research); PhD, 1989, University of Texas (Austin); intervention approaches for abused women across the life span.

Venkatraman, Manorama M. 1995, (Research); MSW, 1984, PhD, 1990, University of Michigan; symptom experiences of midlife women, cross-cultural.

Wild, Lorie M. 1984, (Research); MN, 1983, PhD, 1996, University of Washington; clinical pain management.

Zierler, Brenda \* 1988, (Research); PhD, 1996, University of Washington; clinical trials, vein graft, outcomes analysis.

### Senior Lecturer

Cornman, Barbara Jane 1997; MN, 1976, University of Oregon; PhD, 1988, University of Washington; holistic nursing; female adolescent response to childhood sexual abuse.

### Lecturers

Albert, Marilynn L. 1989; MSN, 1974, Boston University; health promotion in elderly and standardized patients.

Anderheggen-Leif, Lise D. 1988; MN, 1990, University of Washington; complementary therapies for treating illness.

Flanagan, Carol A. 1995; MSN, 1980, Catholic University of America; public health.

Gochmour, Michelle Kom 1997; MN, 1997, University of Washington; occupation health, community health.

Gordon, Patricia E. 1993; MN, 1997, University of Washington; collaborative family health care.

Holye, Christine A. 1985; MN, 1979, University of Washington; women's health, peri and post menopausal years, primary care of pediatric patients, asthma, diabetes.

Jensen, Marilee M. 1990; MSN, 1988, University of Washington; women's primary care nurse practitioner.

Olson, Bevely J. 1994; MA, 1967, University of Washington; psychiatric-mental health nursing.

Sekijima, Margaret, 1999; MN, 1995, University of Washington; stress management and relaxation techniques, post-traumatic stress disorder, culture shock.

Zimmer, Phyllis Ann 1983; MN, 1982, University of Washington; family nursing practitioner role, practice characteristics, education, and political advocacy.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**NURS 401 Care in Illness I (5)** Selected psychopathologic and pathophysiologic health alterations and therapies across life span. Assesses human functioning, pathophysiology, pharmacology, psychosocial, cultural variation, health care resources, and person-environment relationships to select nursing strategies for acutely and chronically ill individuals of all ages.

**NURS 404 Interpersonal Therapeutics (3)** Nursing care within context of interpersonal relationships. Effective enactment of nursing role requires knowledge of relationship development, maintenance and termination, using skillful interpersonal communication in diverse health-care contexts. Emphasizes application of conceptual models in interpersonal processes and skills between professionals and clients, other professionals, and groups.

**NURS 405 Care in Illness II (5)** Continuation of 401, further examining selected psychopathologic and pathophysiologic alterations in health of individuals in context of families across life span. Emphasizes assessing functioning in psychosocial, cultural, person-environment relationships, and health care resources to plan nursing strategies for acutely/chronically ill individuals of all ages.

**NURS 407 Cultural Variation and Nursing Practice (3)** Introduces knowledge and skills for culturally competent health care for all. Compares health related values, beliefs, and customs among major cultural groups. Views family and social network as culturally variable health seeking behavior contexts. Examines Western biomedicine and alternative healing methods within broader environment, including government, other social institutions.

**NURS 408 Nursing Care with Families in the Community (3)** Application of biopsychosocial and social environmental theories and assessments to diagnose alterations in health/mental health of families, small groups in community settings. Emphasizes interpersonal and clinical therapies; coordination of community resources, evaluating effectiveness of changes; characteristics of nursing care in home visiting.

**NURS 410 Legal and Ethical Issues in Clinical Practice (3)** Identification of ethical and legal issues and the ensuing dilemmas relevant to the profession of nursing and nurses as health professionals and citizens. Selected problems and dilemmas affecting nurses, nursing, and the delivery of health care analyzed using specific moral-ethical perspectives.

**NURS 412 Nursing Care Systems (3)** Introduction to analyzing current health care systems and their effectiveness in achieving desired health outcomes for selected client populations from a system perspective. Emphasizes key features of interface between client and health care professionals, and environmental factors and organizational structures which influence the transaction.

**NURS 413 Nature of Health, Threats to Health, and Health Promotion (3)** Introduction to scientific principles of nursing care to promote health, wellness, prevent disease in clients. Emphasis on understanding multidimensional aspects of health; personal, environmental factors that support healthy functional patterns of individual clients, health promotion interventions. Assessment of health patterns in terms of risk, vulnerability, resilience, protective factors. Corequisite: NCLIN 414. Offered: A.

**NURS 445 Topics in Nursing (1-10, max. 10)** Guided survey and discussion of current literature on major topics in physiological nursing. Seminar/lecture with analysis and discussion of selected topics and readings. May have clinical component. Implications for nursing practice and health care emphasized.

**NURS 450 Connected Learning I (1, max. 6)** An opportunity and quarterly requirement for nursing students to participate in a learning community in small groups with a faculty member. Focus is on dialogue, understanding others perspectives, building community, and integration of concurrent learning in other courses.

**NURS 451 Connecting to Families in Transition (1-2, max. 6)** Focuses on working with families as partners in care for clients who are experiencing personal or family life and health transitions. Begins with family experiences with transitions and the way health issues were learned from the family and widens the lens through discussions with classmates and experiences with other families.

**NURS 488 Youth at High Risk for Drug Abuse, Suicide Behaviors, Aggression, and Depression (3)** Study of adolescent problem behaviors: causes, connections, and contexts. Two central themes are understanding vulnerability to drug abuse, suicide behaviors, and other related behaviors within social network contexts and exploring implications for prevention and early intervention programming.

**NURS 495 Child Rearing, Culture, and Health (3) I&S** Cross-cultural study of the child-rearing practices, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used. Offered: jointly with ANTH 440.

**NURS 500 Children and Adolescents with Special Health Needs, Their Families and Communities (2/4, max. 4)** Advanced practice with infants, children, and adolescents at risk for or with chronic physical, neurobiological, developmental, or psychosocial problems. Focus on assessment and referral with select management strategies relevant for primary and specialty health care. Includes care coordination, multidisciplinary, culturally competent, and family centered approaches. Prerequisite: permission of instructor.

**NURS 501 Advanced Mental Health Interventions with Children (3)** Developmentally based assessment and therapeutic approaches relevant for children with psychosocial health problems. Consideration to matching therapeutic approaches with specific nature of symptomatology and other child, family, cultural, and environmental characteristics, including social and educational systems. Individual and group evaluation research emphasized. Prerequisite: NURS 500.

**NURS 502 Human Responses in Health and Illness I (3)** Survey of selected human responses to environmental demands in health and illness as expressed at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as host defenses, ventilation, circulation, elimination, and nutrition are discussed. Prerequisite: graduate standing.

**NURS 503 Human Responses in Health and Illness II (3)** Survey of selected human responses to environmental demands in health and illness at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as immune response, stress response, circadian rhythms, pain, sleep, cognition, and consciousness. Prerequisite: graduate standing.

**NURS 504 Clinical Nursing Therapeutics (1-6, max. 6)** Critical analysis of therapeutic modalities to assist patients with a variety of responses to health problems. Includes selected therapies such as suction/drainage, positioning to address responses in critical, life threatening, and chronic/continuing health states. Varying credits assigned for modules covering particular therapies. Prerequisite: NURS 502, NURS 503, or permission of instructor.

**NURS 505 Selected Topics in Psychosocial Nursing (2-10, max. 10)** In-depth exploration of the major theoretical issues in psychosocial nursing. Seminar with analysis and discussion of selected topics and readings and implications for research and health care.

**NURS 506 Foundations in Psychosocial Nursing (3)** Introduces students to Psychosocial Nursing by study of classic published papers. Current status of the specialty analyzed by review of standards of

practice, certification criteria, and discussion of ethical, clinical, and educational issues. Examines visions and projected needs for the future.

**NURS 508 Seminar in Group Treatment (2)** Seminar on the theoretical basis for working with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

**NURS 509 Issues in Violence and Aggression for Health Professionals (3)** Focuses on research and theory of violent/aggressive behavior. Perspectives of victim, offender, family, community, society examined. Focus is recognition of violence against women. Course is designed to challenge students to clarify beliefs, values related to topics such as rape, homicide, domestic violence. Prerequisite: graduate nursing student or permission of instructor.

**NURS 510 Primary Care Foundations: Diagnosis and Management of Common Health Concerns (1-3 max. 9)** Focus on diagnosis and management of common primary care problems of adolescents and adults, including older adults, within advanced nursing practice. Emphasizes individual and family responses and nursing strategies including differential diagnosis, treatment, patient education, and follow-up. Content focus changes each quarter. Prerequisite: permission of instructor; recommended: concurrent field work.

**NURS 511 Seminar in Neonatal Nursing (3)** Neonatal neurobehavioral and physiologic adaptation within context of physical and social environment. Neonatal responses to alterations in growth and illness. Assessment modalities and therapeutic strategies used during the neonatal period. Prerequisite: NURS 514 or permission of instructor.

**NURS 512 Critical and Interdisciplinary Approaches to Women's Health (3)** Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with WOMEN 512.

**NURS 513 Women's Health: A Nursing Perspective (3)** Critical analysis of contemporary and historical works relevant to nursing care for women across the life span. Synthesis of a holistic view of women's health to guide nursing practice and research. Prerequisite: graduate and senior undergraduate students.

**NURS 514 Physiologic Adaptation in Women and Children (1-6, max. 6)** Analysis of developmental physiologic adaptations in four units: women/reproductive processes, pregnancy/postpartum, fetus/neonate, and infancy through adolescence. Emphasis on implications for nursing practice. Examination of research basis for selected intervention strategies.

**NURS 515 Common Adolescent Health Problems (2)** Focuses on assessment, clinical decision making, and management of common adolescent problems. Concepts and theories of health promotion, adolescent development, and intervention strategies are explored to provide a broad framework for caring for adolescents in primary settings.

**NURS 516 Pediatric Pulmonary Anatomy and Physiology: Clinical Applications (2)** Lung development, anatomy, and physiology; clinical application when caring for children with acute and chronic lung disease. Prerequisite: permission of instructor.

**NURS 517 Pediatric Pulmonary Pathophysiology: Clinical Applications (2)** Applies knowledge of pediatric anatomy and physiology to assessment and treatment of pulmonary pathophysiology in children. Nursing issues in caring for children and families with acute and chronic lung disease. Prerequisite: permission of instructor.

**NURS 518 Advanced Practice Pediatric Primary Care Management (3)** Focuses on use of clinical decision making framework to develop theoretically and empirically sound individualized comprehensive management plans for the young child who presents with common physical and behavioral symptoms in the primary care setting. Prerequisite: permission of instructor.

**NURS 519 Curriculum Development in Nursing Education (3)** Theoretical rationale for curriculum development, study of curricular problems in nursing in relation to the elements of the curriculum as described in a curricular design. Prerequisite: graduate standing.

**NURS 520 Evaluation of Clinical Performance in Nursing (3)** For graduate students preparing for faculty or staff development positions in nursing. Theory and principles of evaluation. Instruments to appraise clinical nursing performance developed as part of course requirements. Prerequisite: graduate standing or permission of instructor.

**NURS 523 Seminar in Care Systems Management (3)** Nursing science framework for analysis of the performance of care systems and of innovative change in care systems. Improving care through the use of leadership, quality improvement, and clinical and organizational effectiveness. For nonmajors in care systems management.

**NURS 524 Conceptual Foundations for Care Systems Management (3)** Critical analysis of nature and theoretical bases of care systems management practice. Concepts of nursing and organization science foundations to person-provider transaction management and leadership in context of economic, political, and social environments and health outcomes. Prerequisite: graduate standing.

**NURS 525 Managing Clinical Effectiveness Within Care Systems (3)** Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

**NURS 526 Managing Organizational Effectiveness Within Care Systems (3)** Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

**NURS 527 Managing Effective Access and Utilization Within Care Systems (3)** In depth inquiry into health care access and resource utilization patterns among diverse populations, with emphasis on management strategies for establishing effective population-system fit.

**NURS 528 Implications of Human Embryology and Genetics for Clinical Practice (3)** Normal development of the human embryo and fetus and principles of human genetics. Alterations in development leading to common anomalies and implications for clinical practice. Prerequisite: graduate standing or permission of instructor.

**NURS 529 Childhood Common Developmental and Behavior Issues (2)** Focus on common developmental and behavioral issues presented by children and their families in primary care setting. Emphasis on the developmental, family, and cultural aspects of assessment and management of the common issues.

**NURS 530 Conceptual Frameworks for Parent-Child Nursing (3)** Designed to assist graduate students in exploration, criticism, and analysis of selected concepts, frameworks, and models relevant to parent-child nursing practice. Group seminar work focuses on the discussion of issues influencing the

roles and practice of clinical nurse specialists in parent-child nursing. Skills necessary for developing a conceptual framework for practice.

**NURS 531 Selected Topics in Parent and Child Nursing (1-6, max. 12)** In-depth examination of the literature pertinent to major theoretical issues in parent and child nursing. Seminar with analysis and discussion of selected topics and readings. Implications for research, prevention, and health care stressed. Prerequisite: permission of instructor.

**NURS 532 Professional Issues in Advanced Parent and Child Nursing (2-5, max. 5)** History and current issues in advanced parent and child nursing practice and interface with health care systems. Advanced practice roles in provision, implementation, and evaluation of health care services for women, children, and families. Opportunity for application to specific advanced practice roles. Prerequisite: permission of instructor.

**NURS 533 Seminar in Cardiovascular Nursing (3)** Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions; group study of current therapies with emphasis on prevention and rehabilitation. Individual study of topic of interest.

**NURS 534 Seminar in Nursing in Gerontology (3)** Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged.

**NURS 535 Seminar in Neuroscience Nursing (3)** Guided survey of clinical and experimental literatures regarding selected concepts of human functioning mediated by the nervous system: consciousness, mentation, movement, sensation, integrated regulation, coping with disability. Clinical and research measurement, current research and implications for further research, clinical applications.

**NURS 536 Biological Aspects of Cancer: Implications for Care (3)** Survey of major concepts from tumor biology and implications for advanced oncology nursing practice. Areas covered include carcinogenesis, cancer epidemiology, pathology, metastasis, treatments (chemotherapy, radiation, surgery, immunotherapy), and cancer detection and prevention. Discussion of role of advance nurse clinician and complex patient responses are incorporated into discussion of basic biological concepts.

**NURS 537 Pain Management: Pharmacological and Nonpharmacological Therapeutics (3)** Course focuses on nursing management of pain as a multidimensional phenomenon. Pharmacological and nonpharmacological therapeutics are critically reviewed for appropriateness in treatment of acute, chronic, and cancer pain. Nursing actions to initiate and maintain optimal therapy, based on individual responses, are reviewed and evaluated. Research-based clinical decisions are practiced.

**NURS 539 Seminar in Critical-Care Nursing (3, max. 9)** Systematic inquiry into pathophysiology, initial nursing management, and systems of care for the critically ill adult or child.

**NURS 540 Special Topics in Physiological Nursing (3-6, max. 9)** Guided survey of the experimental literature of major topics in physiological nursing, including cardiopulmonary, biology of aging, neuromuscular, cancer, and endocrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

**NURS 541 Care of Well Women (4)** Examines components the components of advanced nursing/midwifery care of well women. Emphasis on assessment, diagnosis, and management of common health issues and problems of women across the life span. Prerequisite: permission of instructor.

**NURS 542 Care During Childbearing I (4)** Advanced nursing/midwifery care and management of the low-risk childbearing woman and fetus through preconception, prenatal, intrapartum, and postpartum periods. Prerequisite: NURS 514.

**NURS 543 Care During Childbearing II (4)** Advanced nursing/midwifery care and management of childbearing women and fetus at risk for health problems throughout the prenatal, intrapartum, and postpartum periods. Primary management, collaborative management, and referral of at-risk clients. Prerequisite: NURS 514 and NURS 542 or permission of instructor.

**NURS 544 Psychosocial Adaptations of Individuals and Families during the Perinatal Period (3)** Adaptation of individuals and families during the perinatal period, with emphasis on psychosocial adaptation, consumer education, transition to parenthood, parent-infant interaction and community based support. Prerequisite: permission of instructor.

**NURS 545 Care of the Neonate and Infant (2)** Adaptation of neonate to the extrauterine environment and continuum of care to promote the health of infants within the context of family, community, and other environments. Prerequisite: NURS 514, NURS 528, or permission of instructor.

**NURS 546 Interpersonal Aspects of Behavior (3)** Selected theories in relation to psychosocial development and adaptation across life span for individuals, families, and small groups and as explanatory models of major psychosocial disabilities. General and psychosocial nursing models evaluated for heuristic value for research and practice. Prerequisite: graduate standing or permission of instructor.

**NURS 547 Biologic Aspects of Psychosocial Disabilities (3)** Analysis of biological processes influencing psychosocial behavior in response to internal and external stimuli. Research and theory of neuroendocrine mechanisms in psychosocial disabilities. Analysis of nursing management and evaluation of biopsychosocial modalities used in modification of behavior. Prerequisite: graduate standing in nursing or permission of instructor.

**NURS 549 Assessment in Psychosocial Nursing (4)** Conceptual and clinical approaches to advanced-level data collection and diagnostic reasoning in psychiatric/psychosocial disorders. Synthesizes knowledge from psychosocial nursing and multiple allied fields to enhance learners' cognizance of principles for establishing accurate and comprehensive data bases and sound multifaceted diagnostic formulations. Emphasizes DSM diagnostic scheme.

**NURS 550 People of Color, Psychosocial Health, and the Culture of Oppression (3)** Explores relationships among the psychosocial health of people of color, American cultural patterns of intersecting forms of oppression (e.g., gender, race, and class) and the role of health professionals in defining, ameliorating and/or aggravating psychosocial distress.

**NURS 551 Theoretical Foundations of Primary Care (1-3, max. 3)** Presentation and interpretation of theoretical basis of advanced nursing practice in primary care. Provides students with conceptual foundation upon which to base their development as nurse practitioners. Prerequisite: graduate standing; permission of instructor.

**NURS 552 Health Promotion (2-3)** Emphasis on health promotion, screening, and disease prevention in primary care. Examination of individual and family wellness, models of risk assessment and behavior change, health promotion strategies, and barriers to achieving health. Opportunity to explore age-related health risks. Prerequisite: graduate standing and permission of instructor; recommended: nurse practitioner students take fieldwork concurrently.

**NURS 553 The Mentally Ill Offender in Correctional and Community Settings (3)** Survey of social, political, economic, legal, and moral problems posed by individuals with mental disorders who commit crimes. Covers historical antecedents and current responses of correctional and mental health systems to mentally ill offenders, prevalence and correlates of incarceration, and roles of professionals in correctional mental health field. Credit/no credit only. Offered: W.

**NURS 555 Memory Theory and Implications for Health Care (3)** Presents comparative analysis of research, theories of memory and their physiological basis. Means of measuring memory are critically evaluated. Current clinical problems and the therapeutic and care interventions using memory theory and rehabilitation are evaluated. Prerequisite: graduate or advanced undergraduate standing, or GNM or NM standing with permission of instructor.

**NURS 556 Biopsychosocial Perspectives on Addictions (3)** Psychosocial and pathophysiological aspects of substance use examined for their effects on individuals and families throughout life span. Theories and empirical findings serve as basis for evaluating preventive and therapeutic nursing approaches to substance use disorders, including those related to target populations. Prerequisite: basic course in biological sciences.

**NURS 558 Infancy: The Context of Relationships (4)** Comprehensive overview of infancy. Topics include caregiving-child interaction, attachment, mental health diagnostic classifications, ecological aspects of the caregiving environment. The NCAST Parent-Child Interactive Scales and the Zero to Three Diagnostic Classification are presented.

**NURS 559 Theories of Psychiatric Disabilities (3)** Theories from psychosocial nursing, psychiatry, and behavioral sciences explanatory of psychiatric disabilities provide basis for identifying psychosocial problems. Structure and functions of mental health organizations and social networks analyzed. Prerequisite: NURS 547 or permission of instructor.

**NURS 560 Dynamics of Community Health Practice (3/5)** Examination of and experience with principles of clinical practice in community settings. Included are family as community constituent, populations at risk, community assessment, and community development. Prerequisite: graduate standing or permission. Offered jointly with HSERV 508.

**NURS 561 Selected Topics in Comparative Nursing Care Systems (2-3, max. 10)** In-depth examination of the literature pertinent to major theoretical issues in cross-cultural nursing and health-care systems. Seminar with analysis and discussion of selected topics and readings. Implications for research and health care stressed.

**NURS 562 Clinically Applied Anthropology (3)** Anthropology as it relates to interdisciplinary delivery of culturally relevant health care. Cultural variation in illness beliefs and behavior, types of healing practices, illness prevention, social support networks. Prerequisite: graduate standing, permission of instructor. Offered: jointly with ANTH 562.

**NURS 563 Advanced Community Health Nursing (3)** Systematic inquiry into the nature and foundations of community health nursing. Analytic and theoretical perspectives on health risk assessment and nursing interventions in the community. Implications for community health nursing services. Prerequisite: permission of instructor and graduate standing.

**NURS 564 Biopharmacological Management in Psychosocial Nursing (3)** Biological and pharmacological interventions pertinent to practice of psychosocial nursing, including psychopharmacology, electroconvulsive therapy, and phototherapy. Emphasis on empirical neuroendocrine bases and then nursing management issues pertaining to these in-

terventions. Legal and ethical issues pertaining to advanced practice and putative neurological mechanisms are examined. Prerequisite: NURS 547 or permission of instructor.

**NURS 565 Self-Management Strategies and Techniques in Patient Care (3)** Theories underlying cognitive/behavioral self-management strategies and techniques in patient care. Evaluation of the clinical appropriateness and utility for nursing. Application to such clinical problems as abstinence in the recovering alcoholic, depression, and eating disorders. Prerequisite: graduate standing or permission of faculty.

**NURS 566 Occupational Stress and Stress Management (3)** Relationships between occupational stressors and worker's health, well-being, productivity. Analyzes models of occupational stress. Investigates similarities, differences between job-related stressors and stress responses in various occupations. Explores elements of worksite stress management programs. Prerequisite: graduate standing in nursing or allied health discipline; advanced undergraduates with permission of instructor.

**NURS 567 Theoretical Basis of Management of Stress Response (3)** Theories of physiologic responses linked to theories of cognitive/affective and behavioral responses to stressors. Conceptual basis of self-management techniques. Research findings relevant to these theories and techniques examined and analyzed. Prerequisite: course in human physiology or physiologic psychology, permission of instructor.

**NURS 568 Health Politics and Policy (3)** Analyzes the formal and informal political context of health care delivery, professionals, and institutions in the United States. Addresses media coverage and public persuasion, as well as policy analysis. Special attention is paid to women's political resources and participation. Credit/no credit only.

**NURS 570 Family Concepts: Health and Illness (3)** Emphasizes the family as unit of care across the life span. Predominant themes: factors influencing family health promotion, including resilience, vulnerability, risk reduction, and health policy; continuity, change and transition; and promotion of family health during acute and chronic illness episodes.

**NURS 571 Advanced Interpersonal Therapeutics with Families (3)** Models and research on therapeutic relationships and interpersonal processes evaluated and applied to group interactions among family members, among professionals, and between the family, professionals, and macrosystems. Partnership building emphasized. Individual and group characteristics examined across the life span in social, cultural, and health contexts. Prerequisite: permission of instructor.

**NURS 572 Family Nursing Therapeutics: Behavioral Models (3)** Behavioral models of health-related behavior analyzed to develop therapeutic programs and services for families experiencing health-related concerns or disruptions. Seminars introduce didactic material and laboratory assignments facilitate development of therapeutic and programmatic content. Prerequisite: permission of instructor.

**NURS 573 Professional Issues for Nurse Practitioners (2)** Presentation and analysis of current health care trends and key professional issues influencing nurse practitioner practice. The NP's leadership role, role in influencing health policy, accountability to the profession/public, marketability, and legal dimensions of practice are stressed. Prerequisite: NP student nearing program completion or permission.

**NURS 575 Loss, Grief, Death, and Dying in Clinical Practice (2-4, max. 4)** Analysis and study of social, cultural, and psychological conditions that influence human death in modern society. Research findings, selected readings, and direct experience provide

direction for examination of philosophic, theoretical, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission of instructor. (Limit: sixteen students.)

**NURS 576 Populations at Risk in the Community (3)** Health needs and risks of selected populations in the community and theoretical and analytical perspectives on assessment and intervention strategies in community health nursing practice with groups and populations whose health is at risk. Prerequisite: graduate standing and permission of instructor.

**NURS 577 Seminar in Nursing and the Social Order (3, max. 9)** Changing patterns of nursing service and education in contemporary society. Implications of personal value systems. Prerequisite: permission of instructor.

**NURS 578 Health, Care, and Community (3)** Analysis of health care in community from nursing and behavioral science perspectives. Sociocultural influences on health beliefs and practices, natural-care units, and community life patterns analyzed. Community as both context and target of change explored in relation to nursing approaches in health promotion and maintenance. Prerequisite: graduate standing.

**NURS 579 Transcultural Nursing Practices (3)** Study of nursing practices in different cultures. Seminar focus is on theoretical formulations and comparative analysis of values, patterns, techniques, and practices of nursing care in many societies. Rituals, myths, taboos, and beliefs are studied in relation to the subculture(s) of caring and nursing practices.

**NURS 580 Current Issues in Occupational and Environmental Medicine (2, max. 12)** *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with ENV H 596; AWSp.

**NURS 582 Socio-Cultural Perspectives of Public Health Genetics (2)** Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with ANTH 574/PHG 521.

**NURS 587 Role Transition Seminar (2)** Emphasis on transition to doctoral study and eventual post-graduate roles. Includes information to clarify expectations and skills to facilitate success: various forms of scholarly and interpersonal communication, principles of scholarly collaboration, giving and receiving critiques, and other topics developed by participants. Credit/no credit only.

**NURS 588 Philosophical Basis of Nursing Inquiry (3)** Overview and critical analysis of historical and contemporary views of knowledge development and of science, with particular emphasis on the ways these views influence approaches to nursing inquiry. Emphasis on analyzing the underlying epistemological and ontological assumptions and implications of diverse approaches to knowledge generation in nursing.

**NURS 589 Theoretical Perspectives in Nursing (3)** Critical analysis of theory development, including evaluation of relationships among theories, evidence, and explanation. Diverse approaches used to appraise historical and contemporary milestones in the development and evaluation of nursing knowledge. Emphasis on process and implications of theory development for nursing research, practice, education, and systems. Prerequisite: NURS 588. Offered: W.

**NURS 590 Ecology of Human Health (5)** Focus on the pluralistic constructions of health as related to different environments. Personal and biological characteristics vary, interact with, and transform the person and the environment. Emphasis on nursing as a social construction which is interactive with the human's experience of health and healing.

**NURS 591 Advanced Seminar in Nursing Science (3, max. 15)** In-depth analysis and evaluation of literature in focused areas of research. Synthesis of literature related to selected fields of nursing science. Oral analysis of assigned papers and topics. Prerequisite: graduate standing or permission of instructor.

**NURS 592 The Science of Nursing Therapeutics (4)** Addresses the state of the science of nursing therapeutics. Students examine the practices of nursing to promote, maintain, and restore human health from an ecological perspective. Therapeutics considered from the perspectives of the individual, family, and community systems.

**NURS 595 Synthesis of Nursing Science (3)** Provides a forum for critical analysis, integration, and synthesis of core content provided during the initial year of the Ph.D. in Nurse Scientist Program and further planning of program of study. Prerequisite: completion of first year required courses of doctoral program. Credit/no credit only.

**NURS 596 Colloquium, Scientific Conduct, and Dissertation Seminar (2, max. 12)** Focuses on group discussion of issues pertinent to research conduct. Scientific conduct issues include guidelines relevant to designing, conducting, and disseminating research; risk management in reference to scientific misconduct and negligence; and collaborative and peer-review skills relevant to intra- and interdisciplinary research. Credit/ no credit only.

**NURS 599 Selected Readings in Nursing Sciences (1-3, max. 18)** Analysis of synthesis of selected readings with faculty mentor. Credit/no credit only. Prerequisite: permission of instructor.

## Nursing Clinical

**NCLIN 402 Practicum: Care in Illness I (4)** Provides supervised nursing care to individuals and families with acute and chronic illness. Emphasis on increasing skill in systematic assessment, developing competency in selected nursing therapies, and developing role as care agent for persons of all ages. Credit/ no credit only.

**NCLIN 406 Practicum: Care in Illness II (4-10, max. 10)** Provides supervised nursing care to individuals and families with acute and chronic illness. Emphasis on increasing skill in systematic assessment, developing competency in selected nursing therapies, and developing role as caring agent for persons of all ages. Credit/no credit only.

**NCLIN 409 Partnerships in Community Health (6)** Analysis, application, and evaluation of nursing process at level of community. Formulation of community health diagnoses as basis for community-level interventions to maintain and promote biopsychosocial health, prevent disease, and enable self care by the community. Analysis of nursing's role in community health/mental health.

**NCLIN 411 Transition to Professional Practice (12-20)** Intensive field work in a nursing care specialty focusing on critical examination, synthesis, and evaluation of professional nursing care. Client populations include individuals and/or groups reflecting diverse settings, ages, ethnic communities. Emphasizes mastering theoretical concepts, applying research findings, improving skill competency, developing leadership capabilities.

**NCLIN 414 Practicum: Health Promotion (4)** Provides the opportunity to apply the nursing process to promote health and prevent illness. Integrates the

perspectives of the client with the current scientific bases for health promotion. Incorporates analysis of the effect of multiple dimensions on health and wellness. Credit/no credit only. Corequisite: NURS 413. Offered: A.

**NCLIN 500 Comprehensive Health Assessment (2)** Provides framework for systematic collection, interpretation, and communication of data to determine health status of individuals. Develops beginning advanced practice competence in history-taking and screening physical examination of adolescents and adults. Analysis of multiple health indicators to determine health status. Credit/no credit only. Prerequisite: permission of instructor.

**NCLIN 501 Diagnostic Health Assessment (1-5, max. 5)** Provides framework for learning symptom analysis, selection/performance of examination techniques, and selection/interpretation of common diagnostic procedures. Develops beginning competence in focused history-taking and directed physical exam to evaluate common health problems in adolescents and adults. Credit/no credit only. Prerequisite: NCLIN 500, which may be taken concurrently.

**NCLIN 502 Pediatric Health Assessment and Promotion (1-5, max. 5)** Gives experience in obtaining a health history and performing a physical assessment of infants, children, and adolescents. Interviewing techniques, problem-oriented charting, and a systems approach to the physical examination. Emphasis on screening principles, health promotion, and wellness care for children/families. Credit/no credit only. Prerequisite: permission of instructor.

**NCLIN 503 Advanced Fieldwork Community Health Nursing (2-6, max. 12)** Guided experience in delineating nursing roles in community settings. Development of a philosophy of community health nursing. Application of core concepts pertaining to health, ethics, care, and community. A minimum of four hours of guided experience weekly. Prerequisite: graduate standing and permission of instructor.

**NCLIN 505 Diagnostic Testing and Monitoring in Serious Illness (2)** Lecture, discussion, and laboratory sessions to develop students' assessment, diagnostic, and monitoring expertise in the care of acutely ill individuals. Students refine clinical decision-making skills, apply specialized assessments, gain insight into clinical experts' critical thinking, and refine assessment knowledge for a specific patient population. Prerequisite: NCLIN 501 or equivalent.

**NCLIN 508 Seminar in Group Treatment (1)** Seminar on the theoretical basis for working with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

**NCLIN 509 Practice Teaching in Physiological Nursing (3)** Guided experience in selected teaching-learning situations in nursing, in both classroom and clinical situations. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Minimum of seven hours of guided experience weekly.

**NCLIN 512 Advanced Practicum in Parent and Child Nursing I (2-12, max. 25)** Clinical seminar and practicum provide opportunities to develop advanced nursing practice competencies in the care of women, parents, children, and/or adolescents. Application of theory and principles to direct care, consultation, education and/or care coordinator roles with individuals and/or groups.

**NCLIN 525 Managing Clinical Effectiveness Within Care Systems (1)** Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

**NCLIN 526 Managing Organizational Effectiveness Within Care Systems (1)** Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

**NCLIN 527 Managing Effective Access and Utilization Within Care Systems (1)** In depth inquiry into health care access and resource utilization patterns among diverse populations, with emphasis on management strategies for establishing effective population-system fit.

**NCLIN 528 Advanced Practice in Care Systems Management (4-8, max. 8)** Analysis of relationship between theory and practice in real-time conditions. Comparative analysis of structure and behavior of management approaches. Prerequisite: core courses in Care Systems Management.

**NCLIN 541 Specialization in Clinical Practice (1-10, max. 10)** Clinical fieldwork and seminar opportunities to synthesize, apply, evaluate, and communicate knowledge about a specific domain of advanced clinical practice. Clinical fieldwork emphasizes the refinement of assessment and diagnostic skills. Seminars focus on critical analysis of clinical issues. Students develop a professional portfolio to highlight their expertise.

**NCLIN 544 Roles in Clinical Practice (1-10, max. 20)** Clinical fieldwork emphasizes analytical skills in the implementation of intervention and evaluation strategies for practice, education, and/or administration. Seminars focus on critical analysis of role-related issues. Students refine their professional portfolio of expertise. Credit/no credit only. Prerequisite: NCLIN 541.

**NCLIN 549 Nurse Practitioner Clinical Practicum I: Adults/Older Adults (1-10, max. 10)** Clinical fieldwork and seminar in advanced nursing practice with individual/groups. Students practice under clinical preceptor supervision. Focuses on data collection/critical thinking related to health status and threats to health, incorporating knowledge from the biological, behavioral, and social sciences. Credit/no credit only. Prerequisite: permission of instructor, or NCLIN 501 or equivalent.

**NCLIN 550 Nurse Practitioner Clinical Practicum II: Adults/Older Adults (1-10, max. 10)** Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 549, emphasizing critical thinking related to the differential diagnosis/management of health problems and human responses. Students practice under clinical preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 549 or permission of instructor.

**NCLIN 551 Advanced Practice Nursing Clinical Practicum III: Adults/Older Adults (1-10, max. 10)** Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 550, emphasizing the integration and application of previous learning in the care of people with multiple health problems. Students practice under preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 550 or permission of instructor.

**NCLIN 552 Nurse Practitioner Clinical Practicum IV: Adults/Older Adults (6-10)** Intensive clinical experience in which students integrate previous learning to assume responsibility for care of older adults and/or adults with multiple health problems. Students practice as an advanced practice nurse supervised by a preceptor, assuming increasing responsibility for planning/implementing therapies and for documenting/evaluating outcomes. Credit/no credit only. Prerequisite: NCLIN 551.

**NCLIN 553 Seminar in Primary Care I: Health Promotion (2)** Weekly seminars with supervised field study within selected primary-care and wellness settings. Emphasis on health assessment and strategies related to improving health in people of all ages. Analysis of, and counseling on, life-styles, nutrition, physical fitness, stress management, self-care, and prevention. Credit/no credit only. Prerequisite: graduate standing, permission of instructor.

**NCLIN 554 Occupational Health Nursing: Practice Issues (2-6, max. 6)** In-depth overview of occupational health and safety. Includes discussion of American workforce, work environments, regulations, and political issues; identifies trends which affect practice; introduces prevalent health disorders which result from occupational exposure; examines and applies nursing theory to the prevention and control of occupational injuries and illnesses.

**NCLIN 556 Seminar in Primary Care II: Management of Common Health Concerns (3)** Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

**NCLIN 557 Seminar in Primary Care III: Management of Common Health Concerns (3)** Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

**NCLIN 558 Occupational Health Nursing: Program Development (2-6, max. 6)** In-depth examination of occupational health and safety programs including organizational analyses, budgeting, marketing, case management, and workers' compensation; also political, economic, legal, and ethical issues. Focuses on development, implementation, and evaluation of programs including health promotion, EAP, and health surveillance. Applies public health and nursing sciences to selected work-related problems.

**NCLIN 559 Seminar in Primary Care IV: Management of Common Health Concerns (3-5)** Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: permission of instructor; nurse practitioner students register for NURS 510 concurrently.

**NCLIN 560 Seminar in Primary Care V: Complex Clinical Decision Making (1-11, max. 11)** Seminar with associated field study. Synthesis of advanced knowledge base and clinical family nurse practitioner skills with effective management of complex clinical problems. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

**NCLIN 566 Advanced Clinical Practicum in Psychosocial Nursing (1-6, max. 12)** Seminar and associated field study. Focuses on development of advanced clinical and role-function skills. Provides practice in settings with selected populations corresponding to subspecialty interests with supervision by expert clinicians. Seminar uses inferential process leading from the observed to the conceptual. Credit/no credit only. Prerequisite: NURS 556, NURS 559, NURS 567.

**NCLIN 569 Practicum in Biopsychosocial Assessment (2/4, max. 4)** Practicum in either physical health assessment with opportunity to refine skills in taking health history and performing physical examinations or psychosocial assessment with opportunity

to refine skills in psychosocial assessment interview, mental status examination, standardized clinical assessment instruments. Credit/no credit only. Prerequisite: NCLIN 500 and NCLIN 501, NURS 549 which may be taken concurrently.

**NCLIN 573 Advanced Field Study in Family Nursing (2-9, max. 9)** Advanced practice development in direct care, consultation, and/or care coordination with individual families or groups of families across the life span. Opportunities provided to strengthen interpersonal therapeutic process skills, family nursing approaches relevant to family health promotion, problematic family health patterns. Prerequisite: concurrent registration in NURS 572, NCLIN 574; recommended: NURS 571.

**NCLIN 581 Seminar in Advanced Community Health Nursing (2-6, max. 6)** Focuses on construction and analysis of community health nursing theories/models, presentation of community problems, and interventions/evaluation strategies. Synthesizes nursing theories and organizational/community concepts into conceptual framework of CHN practice. Analyzes research questions that emerge from field of study. Prerequisite: NURS 563, NURS 576, and NURS 578 or permission of instructor.

**NCLIN 599 Independent Study Clinical Practicum (1-12, max. 25)** Clinical practicum to develop advanced-practice nursing skills in care of individuals, groups, communities, or care systems. Individually arranged with faculty member for application of theory and principles to direct care, consultation, education or care coordinator roles. Prerequisite: matriculated MN student or post-masters student, and permission of academic adviser and instructor. Offered: AWPoS.

## Nursing Methods

**NMETH 403 Introduction to Research in Nursing (3)** Organization of the structure of nursing knowledge through research. Concepts and processes of research utilized in the investigation of nursing science.

**NMETH 499 Undergraduate Research (1-5, max. 12)** Supervised individual scholarly inquiry on a specific nursing problem.

**NMETH 520 Methods of Research in Nursing (3)** Research process as it applies to nursing. Use of the literature in building theoretical rationale. Selection of appropriate methods. Presentation of findings. Minimum of two laboratory hours weekly. Prerequisite: a course in statistics.

**NMETH 521 Methods of Research in Nursing (2)** Continuation of 520, with emphasis on methods of research applied to the solution of problems in all fields of nursing.

**NMETH 575 Methodological Issues in Family Research (3)** Emphasizes research with the family as unit of analysis. Examines patterns of family functioning in relation to responses to heal situations. Reviews family units from generational and intergenerational perspectives. Critiques methods assessing dyadic and triadic relationships and therapeutic interventions on family outcomes. Prerequisite: permission of instructor.

**NMETH 580 Methodological Perspectives in Nursing Inquiry (5)** Allows students to translate philosophical and theoretical perspectives into research methodologies. Foci will include: the relationship of theoretical perspectives to methodologies; the methodological issues among and between varying schools of thought (including contemporary empiricist, interpretive, and critical/postmodern); and how the methodologies influence choices of research design and methods.

**NMETH 582- Interpretative Methods in Nursing Research (-4)** Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of instructor.

**NMETH -583 Interpretative Methods in Nursing Research (-4)** Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of instructor.

**NMETH 585 Meta-Analysis (4)** Meta-analysis examined as a method to synthesize research. Overview of meta-analytic methods; description of the collection, analysis, synthesis, and reporting of studies; explanation of statistical calculations; and discussion of reliability and validity measures incorporated into meta-analytic design. Prerequisite: permission of instructor.

**NMETH 586 Instrument Development and Testing (4)** Includes measurement theory, reliability, validity, level of measurement, and the process of scale development, modification, or translation. Students learn to evaluate, develop, modify, translate, and test instruments for use in research. Prerequisite: student in health science discipline and permission of instructor.

**NMETH 587 Methods of Theory Testing: Causal Modeling with Path Analysis and Structural Equation Modeling (4)** Includes causal inferencing and theory testing through causal modeling with path analysis and structural equations modeling. Students learn to evaluate theory models and to apply the content by developing and testing models. Prerequisite: student in health science discipline and permission of instructor.

**NMETH 590 Special Topics in Nursing Research (2-3, max. 9)** Examination of a specific research method, with evaluation of appropriateness, efficiency, rigor of measurement, and potential for inference for nursing research. Prerequisite: minimum of 5 credits of basic nursing research methodology at graduate level and permission of instructor.

**NMETH 591 Clinical Outcome Research I (4)** Examination of philosophical, analytical, and methodological decisions and processes in evaluating the effectiveness of interventions and programs designed to enhance health outcomes. Alternative designs are addressed in consideration of underlying assumptions about prevention/causation research; clinical human phenomena; design sensitivity; and threats to validity. Theory development emphasized. Prerequisite: permission of instructor.

**NMETH 592 Clinical Outcome Research II (2-4, max. 4)** Application and evaluation of philosophical, methodological, and analytical concepts and issues examined in 591. Two modules are offered: a) case study and small-n studies and b) large-n studies. Students demonstrate application of decision-making process involved in development of clinical outcome study. Prerequisite: permission of instructor.

**NMETH 598- Special Projects ([1-12]-, max. 12)** Fulfills the requirements of the non-thesis option for Master's students in nursing. Projects involve scholarly inquiry with in-depth focused analysis, culminating in a written product/report for dissemination. Credit/no credit only. Prerequisite: NMETH 520 and NMETH 521 or permission of instructor.

**NMETH 600 Independent Study or Research (\*)** Credit/no credit only.

**NMETH 700 Master's Thesis (\*)** Credit/no credit only.

**NMETH 800 Doctoral Dissertation (\*)** Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

# College of Ocean and Fishery Sciences

## Dean

Arthur R.M. Nowell  
207 Ocean Sciences

## Associate Dean

Ken Chew



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/College\\_Ocean\\_Fish.html](http://www.washington.edu/students/gencat/academic/College_Ocean_Fish.html)



College Web page:  
[www.cofs.washington.edu](http://www.cofs.washington.edu)

The marine environment has been a dominant factor in the history of the Pacific Northwest from the time of the first Native American settlements to the modern days of aquaculture, container ships, and waterfront condominiums. It is not surprising, therefore, that the University of Washington has a long tradition of commitment to teaching, research, and public service in subjects related to marine and freshwater activities.

The College of Ocean and Fishery Sciences comprises five of the major units of the University in the marine and freshwater sciences: the Applied Physics Laboratory; the Schools of Aquatic and Fishery Sciences, Marine Affairs, and Oceanography; and the Office of Marine Environmental and Resource Programs, which includes the Washington Sea Grant Program. Each of the units of the College focuses on a different aspect of the aquatic environment, but there is much overlap of interests.

The College offers both undergraduate and graduate instructional programs in fisheries and oceanography, and graduate programs in marine affairs. For undergraduates, it is easy to pursue joint undergraduate degrees with departments such as Zoology, Chemistry, and Geology in the College of Arts and Sciences. College faculty, staff, and students carry out research in oceans, estuaries, and freshwater lakes and rivers all over the world. Facilities for research and teaching range from ocean-going vessels to well-equipped laboratories and classrooms.

The College also supports career-oriented resources for students to complement traditional course work and research. An annual Career Fair, held each February, brings more than 30 potential employers to campus to meet with students and discuss career possibilities and employment opportunities. A well-equipped Career Center is available for students, providing information about career planning, résumé preparation, and job opportunities in the marine and freshwater sciences. *Northwest Water Work*, a semi-monthly summary of current employment opportunities and internships available in water-related areas, is published by the College and made available free of charge to students. Internships are encouraged as a way to help students bridge the transition from the classroom to employment after graduation. The College also supports educational outreach activities and innovative learning technologies.

In 1999, the College had 200 undergraduate and 250 graduate students enrolled, a faculty of 198 members, and a total budget of \$60 million, making it one of the largest institutions of its kind in the nation.

The School of Aquatic and Fishery Sciences is concerned with wise management of fish and shellfish stocks, ecological relationships between aquatic organisms and their environment, culture of aquatic plants and animals, and impacts of human population pressures on the aquatic environment.

The School of Oceanography carries out research and teaching on the physical, chemical, geological and geophysical, and biological processes in the ocean, and interactions of the ocean with the earth, the biosphere, and the atmosphere. It is concerned with the study of ocean currents and mixing, life in the sea, the chemical composition and properties of seawater, the sediments and rocks beneath the sea, and the geophysics of the sea floor. It offers both undergraduate and graduate degrees.

The School of Marine Affairs is concerned with policy and institutional issues related to the ocean. It combines natural sciences and engineering with law, economics, international affairs, and public administration. Marine affairs, coastal zone management, ports and marine transportation, atmospheric and marine policy, living marine resources, and international law of the sea are all part of the School's teaching and research programs. It offers a Master of Marine Affairs degree.

The Applied Physics Laboratory is a research and development unit with strong capabilities in marine science and technology, acoustic sensors and sound propagation, marine instrumentation, and polar science and technology. No degrees are offered, but a regular seminar series is presented. APL faculty members with joint appointments in other University departments teach courses and advise graduate students on theses. Part-time employment for students, including a program offering four years of support to students who contemplate a career in engineering or science, is also provided.

The Washington Sea Grant Program is a component of the National Sea Grant Program which was created by Congress to enhance the wise use and protection of the nation's marine resources through coordinated efforts in research, education, and public service. The Washington Sea Grant Program is administered as a division of the College but has additional statewide and multi-institutional responsibilities. It funds research and education throughout the state; supports advisory services; presents workshops, short courses, and lectures; and produces publications. The University of Washington was one of the first four universities in the country designated in 1971 as Sea Grant Colleges in recognition of outstanding sustained programs in research, education, and advisory services in the marine area.

## Aquatic and Fishery Sciences

116 Fishery Sciences



General Catalog Web page:  
[www.washington.edu/students/gencat/academic/Fisheries.html](http://www.washington.edu/students/gencat/academic/Fisheries.html)



School Web page:  
[www.fish.washington.edu](http://www.fish.washington.edu)

The School of Aquatic and Fishery Sciences, formerly known as the School of Fisheries, established in 1919, is the largest and most diverse academic fisheries program in the United States. Students benefit from our faculty, whose breadth of expertise includes marine and freshwater ecology, habitat restoration, quantitative fishery management, invertebrate and finfish aquaculture, and a number of disciplines related to physical, biological and societal processes that bear on growing issues of fisheries conservation. Faculty and students in the School draw upon a wide range of disciplines including biology, botany, chemistry, genetics, mathematics, nutrition, oceanography, physics, physiology, and zoology to conduct basic and applied research in the field of fishery science.

## Courses

A full spectrum of undergraduate- and graduate-level courses allows students to learn the basic principles of fishery science and to develop expertise in specialized fields such as quantitative fishery management, aquaculture, and aquatic ecology. Among the wide variety of courses open to students are ichthyology, world fisheries and aquaculture, salmonid behavior and life history, fisheries stock assessment, ecology of marine fishes, genetics in fish management and production, and physiological effects of water pollutants.

The School cooperates with other units on campus (Biology, Civil and Environmental Engineering, Forest Resources, Marine Affairs, Quantitative Science, Program on the Environment, and Oceanography) to offer jointly listed courses. Instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

## Advising

The Student Services Office is located in 116 Fishery Sciences. Students can receive assistance regarding curriculum, course scheduling, and graduation requirements.

## Related Programs

The Center for Quantitative Science is an interdisciplinary program sponsored by the Office of Undergraduate Education, the School of Aquatic and Fishery Sciences, and the College of Forest Resources. It is dedicated to providing high-quality instruction in mathematical and applied statistical methods for undergraduate students who major in the biological and ecological sciences, renewable resources management, and environmental studies. The philosophy of the center is to provide instruction in an atmosphere that emphasizes the use of quantitative methods to better understand a variety of scientific phenomena. Faculty represent various applied scientific disciplines within Forest Resources, Fisheries, and other campus units. Undergraduates may wish to complete a minor in quantitative science to document their understanding of the mathematical and statistical methods used in the analysis of data.

*Quantitative Ecology and Resource Management:* The graduate program offered by the Quantitative Ecology and Resource Management (QERM) interdisciplinary group provides a unique opportunity for students to study the application of statistical, mathematical, and decision sciences to a broad array of terrestrial and marine ecology, natural resource management, and biometrical and mathematical biology problems. The QERM program of study leads to Master of Science and Doctor of Philosophy degrees, and is designed to attract mathematically trained students interested in working on contemporary ecological or resource-management problems from a quantitative perspective. Faculty associated with this interdisciplinary program come from thirteen campus units, including Statistics, Applied Mathematics, Forest Resources, Aquatic and Fishery Sciences, Zoology, Biostatistics, and Marine Affairs. This pool of faculty talent is available to enrich the academic experience of all QERM students. Prospective students interested in QERM should contact the Graduate Program Coordinator at (206) 616-9571 or [qerm@cqs.washington.edu](mailto:qerm@cqs.washington.edu).

*Joint Curriculum in Fishery Management:* This curriculum is offered jointly by the School of Marine Affairs and the School of Aquatic and Fishery Sciences. Parallel two-year master's degree programs in the two departments train the professional fishery manager and others concerned with aquatic resource management in skills needed to participate effectively in the wide range of activities common to contemporary fisheries management. This includes fishery biology, quantitative methods, economics, law, policy analysis, and ocean science. Students generally apply to either the School of Aquatic and Fishery Sciences or the School of Marine Affairs. Once accepted into their first program, students petition to be accepted into the second.

## Research

The faculty, staff, and students of the School conduct basic and applied research on regional, national, and international fishery and aquatic resource problems. Research foci are grouped under major disciplines of aquatic biodiversity (e.g., microbiology, marine mammals, fish systematics), aquatic organismal processes (e.g., aquaculture, physiology, pollution/toxicology), and aquatic ecology (marine fisheries, stream/riparian ecology, policy, and management). Examples of research projects include the influence of physical oceanographic factors on recruitment of larval fish and shellfish, stock assessment of marine fishes, mechanisms controlling growth and growth efficiency in fishes, application of molecular biotechnology to the study of phylogeny, behavioral studies of homing and straying in Pacific salmon, contaminant transport through aquatic food chains, effects of forest practices on fish habitat, development of mitigation measures for restoring damaged wetlands, and approaches for reducing pollution caused by aquaculture effluent.

The School continues to coordinate long-term programmatic research on anadromous fishes. The Alaska Salmon Program, the High-Seas Salmon Program, and the Wetland Ecosystem Team, as well as individual projects collectively focus on the origins, abundance, migratory patterns, and ocean distribution of Pacific salmon and steelhead trout; spawning distribution, growth, and abundance of sockeye salmon in Bristol Bay, Alaska; and environmental (physical and biological) factors influencing salmonid productivity.

Researchers in the School collaborate with scientists within the University and with investigators employed by other agencies. The School benefits from the presence in Seattle of laboratories of the National Marine Fisheries Service, the U.S. Geological Service's Biological Resources Division, and the Washington State Departments of Ecology, Fish and Wildlife, and Natural Resources. The headquarters and research staff of the International Pacific Halibut Commission are located on the campus as well. Researchers also collaborate with the scientific staff of private companies located in the Puget Sound region and elsewhere. School of Fisheries researchers frequently participate in inter-institutional projects that involve scientists from other states and countries.

The research program is enhanced through the activities of several institutes and centers with which the School collaborates closely.

The *Washington Cooperative Fish and Wildlife Research Unit* is supported by the U.S. Department of Interior through the U.S. Department of Interior's Biological Resources Division—Cooperative Research Units—the University of Washington, the Washington State Departments of Ecology, Fish and Wildlife, and Natural Resources, and the Wildlife Management Institute. The unit conducts research related to management and conservation of fish and wildlife and their habitats.

The *Center for Streamside Studies* is an interdisciplinary unit of the College of Forest Resources and the College of Ocean and Fishery Sciences. The center conducts research related to management issues that surround the production and protection of forest, fish, wildlife, and water resources associated with streams and rivers in the Pacific Northwest.

The *Western Regional Aquaculture Center* is one of five regional aquaculture centers supported by the U.S. Department of Agriculture. Participating scientists from twelve Western states conduct research directed toward enhancement of commercial aquaculture production.

The *Olympic Natural Resources Center* is an interdisciplinary research and educational program related to the marine and forest resources of the Olympic Peninsula in Washington state.

## Facilities and Services

The Fishery Sciences, Fisheries Teaching and Research, Marine Studies, and Fisheries Center buildings are located adjacent to the Lake Washington Ship Canal. The buildings contain classrooms, laboratories, and support facilities. The Fisheries-Oceanography Library, a branch library offering research materials in fisheries, food science, oceanography, and wildlife science, is located nearby in the Oceanography Teaching Building. The School's Fish Collection has served as a resource for teaching and varied scientific investigations for over 50 years. One of five major permanent facilities on the west coast of the United States, the collection is by far the largest in our region in terms of number of specimens, containing in excess of 230,000 juvenile and adult specimens, and well over 3.3 million eggs and larvae. Together the collections represent some 3,778 species in 1,419 genera and 310 families.

An annual run of several thousand salmon has been developed and is maintained at the School by the release of thousands of fingerlings each spring. Returning adults use a fish ladder to enter the School's Teaching and Research Hatchery facility. The run is the basis for both instruction and research on the life cycle of Pacific salmon, as well as the focus for the School's popular outreach programs, which accommodate thousands of school children annually.

The Marine Molecular Biotechnology Laboratory is jointly operated by the Schools of Fisheries and Oceanography. Advanced equipment is available for semi-automated sequencing of DNA as well as other techniques of molecular biology.

Other laboratories provide for the study of the physiology, biochemistry, and behavior of fishes and of the effects of pollutants on fishes. Physiological facilities include equipment for surgical procedures and biochemical analysis of body fluids and tissues from both freshwater and marine fishes.

The School uses various small vessels for instructional and research work, including tow netting, purse seining, and trawling. These vessels, as well as chartered vessels, are used in regular courses or training cruises to introduce students to shipboard operations. Fisheries field stations in Alaska and at Big Beef Creek on Hood Canal provide additional opportunities for field studies and research in stream and estuarine ecology.

## Financial Aid

The University of Washington Financial Aid Office administers a variety of government and University funded financial aid programs for which applicants must submit the Free Application for Federal Student Aid form (FAFSA). Please check with the Financial Aid Office, located in 105 Schmitz Hall, for applications and timelines. The FAFSA may also be obtained at any college, university, or high school in the United States.

Through the generous donations of alumni and friends, the School of Fisheries has established a strong scholarship program to assist students. Scholarships are awarded on the basis of academic merit and other factors. The application process commences in spring; please check with the Office of Student Services for applications and deadlines to apply for scholarships.

## Employment

Fisheries biologists are employed in three major sectors in the economy: public, private, and nonprofit. Jobs in the public sector are found with federal, state, county, and municipal agencies. The private sector includes fisheries and seafood companies and environmental consulting firms. Nonprofit agencies are involved in research, public policy, and public education. Much of their work is done by volunteers. Paid staff may be involved in field research, grant writing, public relations work and volunteer coordination.

One factor that has expanded the job base in fisheries in recent years has to do with national policies on endangered species, marine mammals, environmental quality, and overharvesting or harvesting of nontarget species. For example, observers are required on all large commercial fishing vessels and much work is done in public agencies regarding the health of fish and shellfish stocks and the environments that support them. Much of the information gathering is done in the field and also might involve becoming familiar with important aspects of public policy and interacting with public groups.

There is a Career Center run through the College of Ocean & Fishery Sciences (COFS) located at 202 Ocean Sciences Building. In addition to collecting and disseminating job announcements, the Career Center also publishes an employment newsletter (Northwest WaterWorks) twice monthly, listing current openings. This publication can be picked up at Student Services. Those who are not members of the UW community may also subscribe to receive either an electronic or print version by calling (206) 543-0719. Also, each winter the College also organizes a Career Fair specifically for COFS students.

## Graduate Program

Graduate Program Coordinator  
116 Fishery Sciences, Box 355020  
(206) 543-7457  
graduate@fish.washington.edu

The School offers programs leading to the Master of Science and Doctor of Philosophy degrees.

## Admission Requirements

Minimum requirements for admission to the graduate program in the School are a bachelor's degree from an institution of recognized standing, a GPA of 3.00 in the last two years of college work, and approval of the School and the Graduate School. Students enter the School from varied disciplines at many universities. All have in common a strong background in the sciences and mathematics. Previous training in fisheries is not required.

Applicants for the graduate program must submit a completed application form and description of their interests and objectives, GRE scores (general test only is required), transcripts of all previous college course work, three letters of recommendation, and a TOEFL score (only for applicants who are non-native English speakers). Admission is also dependent upon program resources and fit between student and program. Admissions are limited to autumn quarter. Applicants may contact the School of Aquatic and Fishery Sciences Student Services Office for complete application materials, including a list of faculty and their research interests or check on the Fisheries Web page ([www.fish.washington.edu](http://www.fish.washington.edu)).

## Master of Science

Applicants without a master's degree from a recognized school are expected to start at the master's level. A minimum of 45 quarter credits, including completion of a thesis research project, leads to the Master of Science degree. A minimum of 45 400-level or graduate credits must be earned, including successful completion of the School of Fisheries core curriculum plus 18 credits of FISH 700 (Thesis Research). A seminar on results of the research and oral defense of the thesis are required for graduation. The degree must be completed within six years of initial enrollment.

## Doctor of Philosophy

The student must complete at least three years of graduate study and complete a dissertation to earn the Ph.D. Completion of a master's degree program may be applied toward one year of the doctoral program residency requirement. The core classes must be taken if the student has obtained a master's degree

from another program or received a master's degree from the School of Aquatic and Fishery Sciences under a different set of requirements than those outlined here. In some instances, students who have initially been accepted into a master's program will be allowed to proceed directly to the Ph.D. Preparation for a Ph.D. dissertation requires registration for 27 credits of FISH 800 (Dissertation Research). Requirements must be completed within 10 years.

### Financial Aid

General information on graduate student support is available from the Office of Student Financial Aid, 105 Schmitz. The majority of first-year graduate students are offered research assistantships by appropriate faculty members, depending on the availability of research funding. The School of Fisheries also has a limited number of fellowship opportunities for outstanding entering students. Other students may have their studies supported by the agency for which they work or they may be international students with scholarships from their home countries.

Graduate applicants are urged to discuss their financial needs with professors in their potential major fields during the early stages of the graduate application process. The graduate applicant will automatically be considered for any fellowships, research assistantships, or teaching assistantships available from the School of Aquatic and Fishery Sciences.

## Faculty

### Chair

David A. Armstrong

### Professors

Armstrong, David A. \* 1978; MS, 1974, Oregon State University; PhD, 1978, University of California (Davis); shellfish physiology.

Bare, B. Bruce \* 1969, (Adjunct); MS, 1965, University of Minnesota; PhD, 1969, Purdue University; forest land management, valuation, taxation, management science.

Brown, George W. \* 1967, (Emeritus); PhD, 1955, University of California (Berkeley); fish biochemistry and biochemical ecology.

Burgner, Robert L. \* 1956, (Emeritus); PhD, 1958, University of Washington; salmon ecology and salmon biology.

Chew, Kenneth K. \* 1962; PhD, 1962, University of Washington; shellfish biology and aquaculture.

Conquest, Loveday L. \* 1976; PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Erickson, Albert W. \* 1974, (Emeritus); PhD, 1964, Michigan State University; wildlife biology and marine mammals.

Ford, E. David \* 1985; PhD, 1968, University College, London (UK); forest ecology and ecophysiology, crop growth, quantitative methods, philosophy of science.

Francis, Robert C. \* 1983; PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.

Gallucci, Vincent \* 1976; PhD, 1971, North Carolina State University; biomathematics and population dynamics.

Gunderson, Donald R. \* 1978; PhD, 1975, University of Washington; marine fisheries and stock assessment.

Halver, John E. \* 1975, (Emeritus); PhD, 1953, University of Washington; nutrition, biochemistry, toxicology.

Hilborn, Ray \* 1987; PhD, 1974, University of British Columbia (Canada); population dynamics and resource policy.

Karr, James \* 1991; PhD, 1970, University of Illinois; ecology and conservation biology, water resources, environmental sciences, natural resources.

Kocan, Richard M. \* 1978; PhD, 1967, Michigan State University; aquatic toxicology, fish and wildlife diseases.

Landolt, Marsha L. \* 1975; PhD, 1976, George Washington University; fish and shellfish disease.

Liston, John \* 1957, (Emeritus); PhD, 1955, University of Aberdeen (UK); food science, marine microbiology.

Mathews, Stephen B. \* 1972, (Emeritus); PhD, 1967, University of Washington; quantitative fishery management.

Miles, Edward L. \* 1974, (Adjunct); PhD, 1965, University of Denver; international law and organization, science and international relations, marine policy.

Miller, Bruce S. \* 1971; PhD, 1969, University of Washington; life history and ecology of marine fishes, especially early life history.

Miller, Marc \* 1979, (Adjunct); PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology, tourism, and social/cultural change.

Naiman, Robert J. \* 1988; PhD, 1974, Arizona State University; forest stream ecosystems, aquatic landscape dynamics.

Pietsch, Theodore W. \* 1978; PhD, 1973, University of Southern California; ichthyology.

Pigott, George M. \* 1965, (Emeritus); PhD, 1963, University of Washington; food engineering.

Royce, William F. 1983, (Emeritus); PhD, 1943, Cornell University; applications of fisheries science.

Seymour, Allyn H. 1962, (Emeritus); PhD, 1956, University of Washington; radioecology.

Skalski, John R. \* 1987; PhD, 1985, Cornell University; environmental sampling and effects assessment on wild populations, parameter estimation.

Smith, Lynwood S. \* 1965, (Emeritus); PhD, 1962, University of Washington; fish physiology.

Swartzman, Gordon Leni \* 1973, (Research); PhD, 1969, University of Michigan; ecological modeling, quantitative natural resource management.

Taub, Frieda B. \* 1959; PhD, 1959, Rutgers University; aquatic ecology, ecotoxicology, ecological risk assessment, harmful algae, closed ecological systems.

Wissmar, Robert C. \* 1972; PhD, 1972, University of Idaho; ecology.

Wooster, Warren S. \* 1976, (Emeritus); PhD, 1953, University of California (San Diego); effects of climate change on marine ecosystems, use of scientific information in marine management.

### Associate Professors

Anderson, James J. \* 1981; PhD, 1977, University of Washington; fisheries and oceanography.

Bentzen, Paul \* 1993; PhD, 1989, McGill University (Canada); molecular population/evolution genetics of fishes and other aquatic organisms.

Dong, Faye M. \* 1982; PhD, 1976, University of California (Davis); fish nutrition, seafood quality.

Grue, Christian E. \* 1989; PhD, 1977, Texas A&M University; wildlife toxicology, wildlife and fisheries science.

Herwig, Russell P. \* 1991, (Research); PhD, 1989, University of Washington; environmental microbiology, bioremediation, molecular microbial ecology, microbial phylogenetics.

Huppert, Daniel D. \* 1987, (Adjunct); PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Pikitch, Ellen \* 1987, (Affiliate); PhD, 1983, Indiana University; marine fisheries population dynamics, assessment and management.

Quinn, Thomas P. \* 1986; PhD, 1981, University of Washington; fish ecology, evolution and behavior.

Sibley, Thomas H. \* 1978; PhD, 1976, University of California (Davis); freshwater ecology.

Vanblaricom, Glenn R. \* 1993; PhD, 1978, University of California (San Diego); aquatic wildlife, ecology of marine communities, wildlife-fisheries interactions.

### Assistant Professors

Beauchamp, David A. 1999; PhD, 1987, University of Washington; lake ecology, food web modeling.

Edwards, Richard T. \* 1993, (Adjunct Research); PhD, 1985, University of Georgia; aquatic ecology, biogeochemistry.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**FISH 401 Systematics, Zoogeography, and Evolution of Fishes (5) NW** Advanced course in ichthyology with emphasis on living bony fishes of the world; past and present biodiversity, evolutionary history, classification, comparative morphology, geographic distribution, and historical zoogeography. Recommended: 10 credits biological science. Offered: odd years; Sp.

**FISH 405 Molluscan Aquaculture and Fisheries (5) NW** Biology, ecology, management, and economic importance of oysters, clams, scallops, mussels, abalones, cephalopods, and other mollusks. Emphasis on techniques for production through aquaculture as well as harvest strategies for wild stocks. Field trips. Recommended: 10 credits biological science. Offered: Sp.

**FISH 406 Crustacean Fisheries and Aquaculture (4) NW** Biology, ecology, management, and economic importance of shellfish, emphasizing crustaceans. Wild populations and aquaculture production of important phyla discussed. Field trips. Recommended: 10 credits biological science. Offered: W.

**FISH 415 Physiology of Aquatic Animals (5) NW** Types, occurrences, and roles of inorganic and organic substances in supporting physiological functions, including osmoregulation, respiration, circulation, bioenergetics, digestion, and musculo-skeletal systems. Shows the integration of these processes, including stress and reproductive responses, by neuroendocrine systems. Recommended: 10 credits biological science. Offered: odd years; W.

**FISH 420 Life History of Marine Fishes (5) NW** Modes of reproduction, spawning, development, identification and ecology of eggs and larvae. Food and feeding, aging, subpopulation identification, movements, species assemblages/habitat associations of juvenile and adult fishes. Not available for credit to students who have received credit for 425. Recommended: FISH 311.

**FISH 428 Restoration of Fish Communities and Habitats in River Ecosystems (5) NW** Examines opportunities to encourage recovery through natural developmental processes that enhance the complexity of habitats and connectivity between habitats in the river basin. Class discussion and participation on field trips focuses on current restoration concepts for ecosystems, designs of projects, and case studies. Recommended: fish ecology and hydrology courses. Offered: odd years; Sp.

**FISH 429 Seminar in Streamside Studies (1, max. 6)** Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Offered: jointly with CFR 429 AWSp.

**FISH 430 Biological Problems in Water Pollution (3/5) NW** Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities. Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with CEE 461; W.

**FISH 434 Ecological Effects of Waste Water (3/5) NW** Principles of aquatic ecology that relate to causes and effects of water quality problems in lakes and streams. Population growth kinetics, nutrient cycling, eutrophication; acidification, oxygen/temperature requirements, and effects of various wastes on aquatic animals. Offered: jointly with CEE 462; A.

**FISH 438 Biological Monitoring and Assessment (5) NW** Explores the technical questions (conceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools—existing and needed—to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with BIOL 438.

**FISH 439 Attaining a Sustainable Society (1/3, max. 3) NW** *Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with ENVIR 439; A.

**FISH 444 Aquatic Resource Conservation Genetics (4) NW** Genetic concepts and methods in conservation and management of aquatic species. Population, evolutionary and quantitative genetic principles. Use of proteins, mitochondrial DNA, and microsatellite DNA in analyzing genetic variation. Genetic aspects of threatened populations and artificial propagation. Laboratory experience with analytical techniques. Recommended: GENET 371.

**FISH 447 Watershed Ecology and Management (3) NW** Explores fundamental ecological processes at the watershed scale, identifies human-induced changes to ecological systems, and discusses approaches to improve watershed management. Includes lectures, field trips, and discussions with organizations and agencies about how they are addressing ways to improve watershed management. Offered: W.

**FISH 450 Salmonid Behavior and Life History (4) NW** Marine distribution, homing migration, and spawning behavior of adult salmon: incubation, emergence, migration, and residence of fry; fingerling distribution and residence with reference to species interaction and population evolution. Recommended: FISH 311. Offered: A.

**FISH 451 Reproduction and Early Development of Fishes (4) NW** Reproductive development, sexual maturation, spawning and incubation in selected fish species; embryology and developmental traits of different salmonid and non-salmonid species; practical experience in artificial spawning techniques, egg handling and care, incubation techniques and the handling of newly-hatched alevins. Recommended: FISH 310; FISH 311. Offered: A.

**FISH 452 Fish and Shellfish Nutrition (5) NW** Basic nutritional requirements and interactions of finfish and shellfish in nature and artificial environments. Feed ingredient classification, processing, and nu-

trient profiles. Fish feed formulation techniques. Experimental design and completion of laboratory nutritional study. Recommended: 10 credits biological science. Offered: Sp.

**FISH 454 Aquatic Wildlife Ecology (3) NW** Conceptual examination of relationships of aquatic wildlife populations (mammals, birds, reptiles, amphibians) to one another and to the aquatic realm. Application of conceptual background to contemporary high-profile issues in aquatic wildlife ecology, conservation, and management. Included is exposure to primary technical literature in the field. Offered: jointly with ESC 454; even years; Sp.

**FISH 455 Introduction to Wildlife Toxicology (3) NW** Overview of wildlife toxicology: history/development of the field, regulatory framework; methods used to assess risks contaminants pose to wildlife; major classes of contaminants and their direct, sublethal, and indirect effects; and contemporary threats of contaminants to wildlife, their habitats, and prey. Offered: jointly with ESC 457; even years; W.

**FISH 456 Fundamentals of Fish Population Dynamics and Management (4) NW** Conveys fundamental concepts of fish population dynamics and fishery management within context of real-world fisheries problems. Lectures discuss notation, terminology, mathematical models, fisheries principles, and case studies. Laboratory time devoted to practical applications, problems. Recommended: either MATH 125, MATH 135, or Q SCI 292; Q SCI 381. Offered: jointly with Q SCI 456; A.

**FISH 457 Methods of Abundance Estimation (4) NW** Methods of estimating fish abundance by direct sampling and indirectly from tagging, catch, and effort analysis. Confidence limits and bias adjustments. Design of marine fishery surveys using statistical sampling principles. Laboratory work with real fishery data and data collected during trawl sampling survey. Recommended: Q SCI 292; Q SCI 381; Q SCI 456 or FISH 456. Offered: jointly with Q SCI 457; W.

**FISH 458 Fisheries Stock Assessment (4) NW** *Francis* Emphasizes quantitative analysis of fisheries data to determine how the fishery would respond to alternative management actions. Major topics include production models, stock and recruitment, catch at age analysis, and formulation of harvest strategies. Recommended: either Q SCI 456 or FISH 456. Offered: jointly with Q SCI 458; Sp.

**FISH 475 Marine Mammalogy (3/5) NW** Evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying and the management and conservation of them. Recommended: 15 credits of biological science, vertebrate anatomy, and physiology, for laboratory sections. Offered: odd years; Sp.

**FISH 480 Marine Resource Conservation and Management (3) I&S/NW** *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with ENVIR 480 and SMA 480.

**FISH 490 Aquatic Microbiology (5) NW** Considers role, identity, and distribution of microorganisms in aquatic environments; in fish, shellfish, and marine mammals. Control and identification of seafood-borne disease. Recommended: either BIOL 102 or BIOL 203; either CHEM 220, CHEM 224, or CHEM 239. Offered: A.

**FISH 495 Senior Project (3)** Self-directed research project. Applied or basic research in an area relating to fisheries science. Credit/no credit only. Offered: AWSpS.

**FISH 497 Special Topics in Fisheries (1-5, max. 5) NW** One-time offerings of topics in fisheries by resident or visiting faculty.

**FISH 498 Internship/Experiential Learning (1-15, max. 15)** Structured, practical training in the fishing industry, government agencies and other areas utilizing fisheries, food science, or quantitative science expertise. Experiences are supervised and evaluated. Written reports required. Credit/no credit only. Offered: AWSpS.

**FISH 499 Undergraduate Research (1-15, max. 15)** Individual research within the School of Fisheries. Each project supervised by an individual faculty member. Written reports required. Offered: AWSpS.

## Courses for Graduates Only

**FISH 507 Special Topics in Fisheries (1-5, max. 15)** Recommended: permission of instructor.

**FISH 510 Current Topics in Genetics and Physiology (2, max. 8)** Contemporary problems and issues in genetics and physiology as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

**FISH 511 Current Topics in Evolution, Ecology, and Behavior (2, max. 8)** Contemporary problems and issues in evolution, ecology and behavior as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

**FISH 512 Current Topics in Quantitative Science (2, max. 8)** Contemporary problems and issues in quantitative science as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

**FISH 513 Current Topics in Management, Conservation, and Restoration (2, max. 8)** Contemporary problems and issues in management, conservation, and restoration as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

**FISH 514 Current Topics Aquaculture, Utilization, and Pathology (2, max. 8)** Contemporary problems and issues in aquaculture, utilization, and pathology as they relate to fisheries and aquatic sciences. Topic varies. Credit/no credit only.

**FISH 521 Scientific Methods in Aquatic Sciences (4)** The process, strategies, and approach of scientific discovery and the scientific method as applied to areas of fisheries science. Case studies illustrate principles. Applies principles to the development of a written research proposal.

**FISH 522 Classical Literature of Fisheries Science and Aquaculture (2)** Discussion of the classic literature of fisheries science and aquaculture. Both oral and writing communication skills stressed. Credit/no credit only. Offered: A.

**FISH 525 Ecology and Behavior of Fishes (3)** Basic principles of ecology and behavior (e.g., habitat associations, competition and predation, migrations and movements, reproductive patterns) as applied to fishes. Critical evaluation of current literature and fieldwork required. Recommended: 311 or equivalent or permission of instructor.

**FISH 526 Advanced Fisheries Ecology II: Populations, Communities, and Ecosystems (5)** Recent advances in the study of aquatic communities and ecosystems in relation to a number of contemporary issues in fisheries science and management. Focus on case histories drawn from freshwater, estuarine, and marine ecosystems. Emphasis on relationships between science and public policy in attempting to resolve these issues.

**FISH 527 Aquatic Community Responses to Chemical Stress (3)** Aquatic ecotoxicology; bridging the gap between physiological and ecosystem responses to toxic chemicals. Detecting effects

against natural variability; altered species abundances and dominance, counter-intuitive responses. Case histories, controversies on data interpretation. Recommended: at least one course in ecology, limnology, oceanography or permission of instructor.

**FISH 529 Topics in Streamside Studies (1)** Discussion by invited speakers on current research related to streamside studies. Offered: jointly with CFR 529; AWSp.

**FISH 535 Aquatic Toxicology (3)** Principles of toxicology applied to aquatic organisms. Recognition of physiological and biochemical responses of organisms to toxins and practical application of toxicity testing methods to identification of pollution and toxins in aquatic environment. Toxicity test design, interpretation, and data analysis. Recommended: organic or biochemistry and physiology or equivalent or permission of instructor.

**FISH 542 Principles and Applications of Molecular Methods (3)** Techniques of molecular analysis with emphasis on DNA methods, including PCR, DNA sequencing, RFLP, RAPD and VNTR analysis and cloning. Applications of these techniques to fisheries, aquaculture, oceanography, population and evolutionary studies, and other areas of science. Prerequisite: permission of instructor. Offered: jointly with OCEAN 574; A.

**FISH 543 Molecular Techniques (4)** Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 permission of instructor. Offered: jointly with OCEAN 575.

**FISH 547 Stream and River Ecology (5)** Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Offered: jointly with ESC 547; Sp.

**FISH 548 Special Topics in Streamside Studies (2, max. 6)** Contemporary problems and issues in forestry, fisheries, and wildlife management in watersheds. Topics vary, yet focus on interactions of land and water resources in the forests of the Pacific Northwest. Recommended: permission of instructor. Offered: jointly with ESC 548.

**FISH 552 Current Topics in Fish Nutrition (5)** Nutrient requirements of finfish and shellfish for growth, development, and reproduction. Feed ingredient classification, processing, and nutrient profiles. Fish feed formulation techniques. Critical review of historical papers and current literature in finfish and shellfish nutrition. Offered: Sp.

**FISH 556 Mathematical Analysis in Fisheries Stock Assessment (3)** Analytic approaches to stock assessment and population management applications of parent-progeny models and logistic models; biological and economic yields of natural populations; analysis of population data on computers. Recommended: Q SCI 292, 392, 456, and 483 or permission of instructor.

**FISH 557 Estimation of Population Parameters (4)** Statistical analysis of population data; design and analysis of mark-recapture experiments on natural populations; laboratory work on computers. Recommended: probability theory and Q SCI 292 and 483.

**FISH 558 Advanced Analysis in Fisheries Stock Assessment (3)** Deterministic and stochastic representations of age-dependent and size-dependent models for stock assessment; analysis of multi-species models; risk analysis and uncertainty in fisheries management strategies; analysis of population data on computers. Recommended: 456, 458, 557, or permission of instructor.

**FISH 565 Marine Fish Biology (9)** Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific Ocean. Prerequisite: permission of instructor. Offered: Friday Harbor Laboratories.

**FISH 581 Fishery Management: Case Studies (5)** Examination of historical case studies chosen to illustrate specific fishery management problem areas. Faculty presentations occupy first half of quarter, student presentations the second half. Prerequisite: FISH 580. Offered: jointly with SMA 581.

**FISH 582 Fishery Management: Contemporary Issues (5)** Focuses on multi-disciplinary, in-depth analysis of specific problems, including biological and economic assessments, evaluation of alternative management systems, and formulation of specific research, data collection, and management recommendations. Prerequisite: FISH 581. Offered: jointly with SMA 582.

**FISH 600 Independent Study or Research (\*)** Credit/no credit only.

**FISH 700 Master's Thesis (\*)** Credit/no credit only.

**FISH 800 Doctoral Dissertation (\*)** Credit/no credit only.

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## Marine Affairs

3707 Brooklyn Avenue Northeast



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/School\\_Marine.html](http://www.washington.edu/students/genocat/academic/School_Marine.html)



School Web page:  
[www.sma.washington.edu](http://www.sma.washington.edu)

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## Graduate Program

Graduate Program Coordinator  
3707 Brooklyn NE, Box 355685  
(206) 543-4326, (206) 543-7004  
uwsma@u.washington.edu

## Master of Marine Affairs

The School of Marine Affairs offers an interdisciplinary program of study leading to the Master of Marine Affairs degree. Marine affairs concerns management and policy questions on the uses of the coastal and offshore regions of the ocean and their resources. The core curriculum includes courses from marine affairs, economics, law, oceanography, political science, and public affairs. The School of Law has a related Master of Laws degree program with specialization in marine affairs.

The School of Marine Affairs offers an internationally recognized master's degree program for launching careers in marine policy and administration. Students learn creative approaches to resolving marine problems and conflicts, charting rational use of living and non-living marine resources, and managing human activities on the coasts, at sea, and in estuaries, wetlands, and large inland bodies of water.

A major program objective is to prepare students for professional careers in policy making, management, teaching, and research. Breadth of study is emphasized, and all students are expected to gain familiarity with relevant aspects of the social, technological, and environmental sciences. In addition, each student is expected to develop a professional and scholarly proficiency in a particular aspect of marine affairs.

Completion of the M.M.A. program normally requires two academic years for students who have received a baccalaureate degree. During the first year, students develop a comprehensive understanding of the marine affairs field and acquire analytic skills. During the second year, a special competence is developed in an

area of concentration (e.g., ocean and coastal management, ports and marine transportation, marine environmental protection, marine resources management), and a thesis is prepared and presented under the guidance of a faculty supervisory committee. Individual courses of study may be adjusted to accommodate prior experience and academic background, and especially qualified students, such as those in mid-career, may be able to meet the degree requirements in 18 months of study.

## Admission Requirements

Admission to the School of Marine Affairs is based on evaluation of required application materials in competition with other applicants. Required materials include Graduate Record Examination general-test scores, completed departmental supplementary information form, three letters of recommendation, official academic transcripts, and a statement of career objectives. Applicants must apply directly to, and be accepted by, the University's Graduate School. Course sequences begin each autumn quarter, and new students normally are admitted only at that time.

## Financial Aid

The School of Marine Affairs has a limited number of positions for graduate student appointments as research assistants. Applicants in need of support are urged to investigate outside sources of funding.

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## Faculty

### Chair

Marc Hershman

### Professors

Alverson, Dayton L. \* 1982, (Affiliate); PhD, 1967, University of Washington; marine affairs.

Bodansky, Daniel \* 1989, (Adjunct); JD, 1984, Yale University; international law, international environmental and human rights law, civil procedure.

Crutchfield, James A. \* 1960, (Emeritus); PhD, 1954, University of California (Berkeley); natural resources economics, policy and management, especially marine and environmental resources.

Delaney, John R. \* 1977, (Adjunct); PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.

Echols, Louie S. 1983, (Affiliate); LLB, 1967, Yale University; legislative and budget process, program management, science and public policy.

Francis, Robert C. \* 1983, (Adjunct); PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.

Gallucci, Vincent \* 1976, (Adjunct); PhD, 1971, North Carolina State University; biomathematics and population dynamics.

Heath, G. Ross \* 1984, (Adjunct); PhD, 1968, University of California (San Diego); geochemistry of sediments.

Hershman, Marc \* 1976; JD, 1967, Temple University; LL.M., 1970, University of Miami (Florida); coastal zone management law.

Miles, Edward L. \* 1974; PhD, 1965, University of Denver; international law and organization, science and international relations, marine policy.

Miller, Marc \* 1979; PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology, tourism, and social/cultural change.

Olson, David J. \* 1974, (Adjunct); PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Vesper, Karl H. \* 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.

Wooster, Warren S. \* 1976, (Emeritus); PhD, 1953, University of California (San Diego); effects of climate change on marine ecosystems, use of scientific information in marine management.

### Associate Professors

Copping, Andrea \* 1992, (Affiliate); PhD, 1982, University of Washington; marine environment and water quality, marine science/marine policy.

De Master, Douglas Paul \* 1994, (Affiliate); PhD, 1978, University of Minnesota; marine resource management, conservation biology.

Denning, Michael J. \* 1992, (Affiliate); PhD, 1984, University of Washington; international trade, transportation, logistics; urban waterfront redevelopment; seaport management.

Duxbury, Alyn C. \* 1954, (Emeritus); PhD, 1963, Texas A&M University; estuarine processes and the management of human uses of these marine systems.

Fluharty, David L. \* 1983; PhD, 1977, University of Michigan; natural resource and environmental policy.

Goodwin, Robert F. 1973, (Affiliate); MA, 1972, University of Washington; geography of the coastal zone, coastal zone management, urban waterfront development.

Huppert, Daniel D. \* 1987; PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Jones, Linda L. 1984, (Affiliate); PhD, 1978, Scripps Oceanographic Institution; marine mammal management, ecology of cetaceans.

Kaczynski, Włodzimierz M. \* 1977; PhD, 1973, University of Gdansk (Poland); fishery economics, international joint ventures in marine fisheries, international fisheries policy.

Leschine, Thomas M. \* 1983; PhD, 1975, University of Pittsburgh; marine pollution management, ocean policy studies.

Marasco, Richard 1980, (Affiliate); PhD, 1970, University of California (Berkeley); fishery economics, fishery management.

### Assistant Professor

Allen, Craig H. 1994; JD, 1989, University of Washington; marine affairs, evidence, environmental regulation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**SMA 455 Marine Business Environment in Russia and Eastern Europe (3) I&S** *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SISRE 455.

**SMA 480 Marine Resource Conservation and Management (3) I&S/NW** *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480 and ENVIR 480.

**SMA 499 Undergraduate Research (1-3, max. 6)** Research on assigned topics under the supervision of faculty members. Prerequisite: permission of instructor.

## Courses for Graduates Only

**SMA 500 Marine Affairs (5)** *Hershman* Surveys a wide range of academic disciplines and substantive problems pertinent to interaction of human beings and the world's oceans and coasts. Management of living/nonliving resources, shipping, scientific research, pollution, recreation, and others. Lecture and discussion by invited specialists.

**SMA 505 Introduction to Administrative Law and Process (2)** *Hershman* Constitutional and administrative law applied to selected coastal and marine statutes. How to research legislative and administrative materials. Reading and briefing selected judicial opinions. Control of administrative agencies by the executive, legislative, and judicial branches. Designed for non-law graduate students pursuing natural resources and environmental subjects. Prerequisite: permission of instructor.

**SMA 506 International Law of the Sea (4)** *Allen* Ways nations claim authority to regulate activities at sea. Fundamental policies and decisions regarding navigation for commercial and military purposes, fisheries, exploitation and conservation, continental shelf resources, scientific research, protection of environment, deep-sea mining, and other uses of the ocean. Offered: jointly with LAW B 561.

**SMA 507 International Organizations and Ocean Management (3)** *Miles* Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with PB AF 507.

**SMA 508 National Marine Policy Processes (3)** *Miles* Comparative institutional dimensions of marine policy processes. Marine policy context at the national level and the dynamics that drive policy formulation and policy implementation.

**SMA 509 Integrated Coastal Management (3)** *Christie, Hershman* Managing multiple uses of coastal waters and the adjacent land; conflicts arising from competition for space and resources; organization, scientific, and economic problems associated with coastal management; planning and management experience in the United States and Southeast Asia. Prerequisite: SMA 500 or permission of instructor.

**SMA 510 Ecological Concepts for Decisionmakers (3)** *Olson* Evaluation of ecological assumptions implicit in discussion, development, and implementation of environmental policy. Lectures focus on marine environmental policy debates and decisions that exemplify the use of ecological concepts. Group projects to evaluate the ecological foundations of management plans, regulations, legislation, or other policy problems.

**SMA 511 Coastal Environment Management (3)** *Leschine* Coastal zone planners and managers evaluate proposed and ongoing use activities that affect wetland, estuarine, and nearshore environments. Concepts and techniques for retrieving, analyzing, and using technical environmental information in planning and decision making. Washington State case examples and practical exercises.

**SMA 514 Marine Pollution Management Issues (3)** *Leschine* Management and policy aspects of marine pollution, emphasizing the two-way interaction between environmental managers and environmental and policy scientists which shapes policy.

**SMA 515 U.S. Coastal and Ocean Law (4)** *Hershman* Study of the legal framework in the United States controlling allocation and use of coastal and marine resources. Topics include coastal zone man-

agement, fisheries management, protection of marine mammals and endangered species, marine pollution, offshore oil and gas development, and marine transportation. Offered: jointly with LAW B 565.

**SMA 516 Seaport Management (3)** Role of port and harbor agencies in management of marine uses: cargo and trade, economic development, tourism and recreation, fisheries, environmental protection. Management functions of planning, marketing, finance, engineering, environmental assessment. Examples and guest speakers from Port of Seattle and other Puget Sound ports. Prerequisite: SMA 500 or permission of instructor.

**SMA 517 Marine Uses: Transportation and Commerce (3)** *Fleming* Role of the oceans in the transportation of people and materials, character and trends in vessel design and terminal facilities, pattern and nature of industry organization, regulations, economics of the shipping industry, management of fleets and vessels, individuals at sea and ashore, national policies affecting the merchant marine and port facilities. Prerequisite: SMA 500 or permission of instructor.

**SMA 519 Marine Policy Analysis (3)** *Leschine* Goal is appreciation for and basic working knowledge of techniques used in policy analysis. Techniques are explored in both quasi-realistic settings and in application to real world problems of marine policy.

**SMA 536 Applied Microeconomics for Marine Affairs (3)** *Huppert* Acquaints students with microeconomic tools commonly employed in policy analysis. Emphasis is placed on mastery of basic concepts, definitions, and models useful to marine policy, including determinants of price and outputs in competitive markets, effects of other market structures, market failure, and applied welfare economics.

**SMA 537 Economic Aspects of Marine Policy I (3)** *Huppert* Development of pertinent economic concepts and their application to selected topics in marine policy decision making, including maritime policy, OCS oil and gas development, and wetlands management. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with ECON 537.

**SMA 538 Economic Aspects of Marine Policy II (3)** *Huppert* Development of pertinent economic concepts and their application to fisheries management and development. Prerequisite: SMA 508 or permission of instructor. Offered: jointly with ECON 538.

**SMA 540 International Strategic Planning for Marine Resources (3)** *Kaczynski* Marine economies are affected by shrinking resources, population pressure, expanding economic globalization. Case studies from the third world and economies in transition illustrate strategic economic planning. Students research selected topics. Prerequisite: SMA 500 or permission of instructor. Offered: A.

**SMA 550 Special Topics in Marine Studies (1-3, max. 18)** Examination of various aspects of marine studies. Content varies, depending upon the interests of the faculty and students. Intended for the joint participation by the faculty and advanced students in the investigation of selected topics. One or more groups are organized each quarter.

**SMA 555 Russian Ocean Policy (3)** *Kaczynski* Russian ocean policy following Perestroika and disintegration of Soviet empire. Discusses Russian navy, fishery industry, merchant marine, ocean research fleet in light of international agreements and joint ventures and new politic, economic, and social environments. Prerequisite: knowledge of Soviet/Russian socio-economic problems or permission of instructor. Offered: jointly with SISRE 555.

**SMA 600 Independent Study or Research (\*)**

**SMA 700 Master's Thesis (\*)**

## Oceanography

108 Oceanography Teaching Building



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Oceanography.html](http://www.washington.edu/students/genocat/academic/Oceanography.html)



School Web page:  
[www.ocean.washington.edu](http://www.ocean.washington.edu)

The School of Oceanography, which had its beginnings in 1930, offers courses and conducts basic research in oceanography, the science that examines physical, geological, chemical, and biological processes in the ocean and interactions of the ocean with the earth, the biosphere, and the atmosphere. Education and research in the School include studies of seawater in motion; life in the sea; chemical composition and properties of seawater; interactions between the sea and the atmosphere, the sea and the land, sediments and rocks beneath the sea; and the geophysics of the ocean floor. Because the science of oceanography is interdisciplinary in nature, joint programs are maintained in the areas of astrobiology, atmospheric sciences, biochemistry, environmental chemistry, geochemistry, geophysical fluid dynamics, geophysics, and marine biology and botany with the departments of Applied Mathematics, Astronomy, Atmospheric Sciences, Botany, Chemistry, Genetics, Geological Sciences, Geophysics, Microbiology, and Zoology, and with the other units in the College of Ocean and Fishery Sciences.

### Courses

A full spectrum of basic and advanced courses is offered in each area of specialization: biological, chemical, and physical oceanography, and marine geology and geophysics. Among the wide variety of courses open to students are molecular approaches to oceanographic questions, marine microbiology, zooplankton ecology, aquatic organic geochemistry, estuarine circulation and mixing, ocean and climate variation, sedimentary dynamics and history of the ocean, marine science of coastal zone management, and human impacts on the ocean.

Summer-quarter instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

### Advising

The Student Services Office is staffed by an academic counselor, who assists students with curriculum, scheduling, and career counseling. Students also consult with a faculty adviser.

### Research

Each year the School participates in a broad range of oceanographic investigations, ranging from individual research projects to multidisciplinary or multiuniversity projects. Major biological programs are carried out in Puget Sound, in the waters of the continental shelf off Washington and California, and in the North Pacific Ocean. These projects include investigations of the processes governing the communities of organisms in the water column and on the seabed, and microorganisms occurring in extreme environments (hydrothermal vents, polar sea ice, abyssal habitats). Chemical oceanography includes study of the distribution and fluxes of organic and inorganic chemicals and stable and radioactive isotopes in the water column and sediments on local, regional, and global scales with special emphasis on the ocean carbon cycle. Geological investigations include theoretical studies and field experiments on sediment motion and sedimentary processes. This work ranges from the deep waters of the Scotian Rise in the Atlantic Ocean to Prudhoe Bay, Barents Sea, New Guinea, the Amazon, and the east and west coasts of the United States.

Geophysical research is concerned with the oceanic crust and upper mantle. Topics include seismic experiments on plate boundaries, crustal formation, hydrothermal processes in the Juan de Fuca-Gorda Ridge System, and studies of the earth's magnetic field. Physical oceanographic programs range from large-scale circulation studies of the North Pacific, the North Atlantic, the tropical oceans, and the Antarctic circumpolar current to coastal and estuarine circulation studies and small-scale mixing programs. The theoretical and experimental programs include studies of air-sea interaction, surface and internal waves, oceanic fronts, and sea ice.

Studies in local waters include sediment transport, mixing processes, subsurface structure, and biological communities in the fjords and inlets of Puget Sound. The Puget Sound Regional Synthesis Model (PRISM), an interdisciplinary initiative, proposes to develop and sustain a dynamic understanding of the environmental and human factors that will shape the estuary's future.

### Facilities and Vessels

Housed in four large and several smaller buildings on campus by Portage Bay, the School is equipped with extensive laboratories and teaching facilities, including controlled-environment rooms, a paleomagnetism laboratory, a sea-ice laboratory, a marine molecular biotechnology laboratory, and a geophysical fluid dynamics laboratory. The new 100,000 square-foot Oceanography Sciences Building features state-of-the-art laboratory facilities and provides additional office space for faculty and students.

The School operates its own midscale interactive computer and highly specialized laboratory instruments, such as mass spectrometers, scanning electron microscopes, and seawater sediment transport flumes. Access to other more sophisticated facilities and instruments, as well as super computers, is available on campus. Docks provide mooring for the School's two research vessels. Deep-ocean research programs are accommodated on the 274-foot *R/V Thomas G. Thompson*. Graduate students are involved in all of the cruises, most often for their thesis research. The 65-foot *R/V Clifford A. Barnes* undertakes short cruises into Lake Washington and Puget Sound for the instructional and research programs.

Friday Harbor Laboratories on San Juan Island offer unique opportunities for research and study. Specialized courses in new areas of oceanography are offered each summer. The facilities are used by faculty members and students throughout the year for oceanographic research.

### Funding

The School is supported primarily by funds from the state of Washington and federal agencies. Major sources of federal funding include the National Science Foundation, National Oceanic and Atmospheric Administration, Office of Naval Research, and Department of Energy. Funds are also provided by various state and local government agencies and private organizations.

## Graduate Program

Graduate Student Services  
108 Ocean Teaching, Box 357940  
(206) 543-5039  
[student@ocean.washington.edu](mailto:student@ocean.washington.edu)

The School of Oceanography provides excellent instruction and research opportunities at the graduate level in all areas: biological, chemical, and physical oceanography, and marine geology and geophysics. The program of study emphasizes independent research in conjunction with basic and specialized courses. Interdisciplinary research is encouraged, and students enjoy the opportunity to work across the usual scientific boundaries. Course work during the first two years is required in each option; specialized course

work is structured to fit the student's background and objectives. Foreign-language proficiency is required only when deemed crucial to scholarly research.

### Admission

Students enter the School from varied undergraduate disciplines at many universities. All have in common a strong background in the sciences and mathematics; most have never taken courses in oceanography. Evaluation of candidates is based on Graduate Record Examination scores, the undergraduate transcript (scholarship and depth), three letters of recommendation, and the applicant's statement of objectives and interests. Admission can be accommodated at the beginning of any quarter except winter, although autumn entry is most common. <b>Master of Science

The program of study includes course work in the student's area of interest and the other oceanography options, and the completion of an approved research project and oral presentation of the results. Thesis and non-thesis programs are offered; most students select the non-thesis option.

### Doctor of Philosophy

The degree program places a strong emphasis on research following completion of course requirements and General Examination. Upon successful completion of the General Examination, the student undertakes an original research investigation, which is described in the dissertation and defended during the Final Examination.

### Financial Aid

Normally all students pursuing a graduate degree are supported by research or teaching assistantships, or by fellowships and scholarships from national or private sources. Most appointments continue through the summer when students are engaged in research.

## Faculty

### Chair

Bruce W. Frost

### Professors

Aagaard, Knut \* 1968; PhD, 1966, University of Washington; physical oceanography, ocean circulation, arctic oceanography.

Ahmed, Saiyed I. \* 1973; PhD, 1963, Johann Wolfgang Goethe University (Germany); marine phytoplankton, ecology and nitrogen assimilation, biofouling, anoxic marine environments.

Anderson, George C. \* 1972, (Emeritus); PhD, 1954, University of Washington; plankton ecology, biological oceanography.

Baker, Edward T. 1983, (Affiliate); PhD, 1973, University of Washington; distribution, characterization, and impacts of hydrothermal emissions, linkage to tectonic processes.

Banse, Karl \* 1960, (Emeritus); Doct, 1955, University of Kiel (Germany); biological oceanography, plankton production and methodology, polychaete systematics.

Baross, John A. \* 1984; PhD, 1973, University of Washington; microbial oceanography, bacterial ecology.

Cannon, Glenn A. \* 1983, (Affiliate); PhD, 1969, Johns Hopkins University; physical oceanography of coastal waters and deep-sea hydrothermal venting.

Carpenter, Roy \* 1968; PhD, 1968, University of California (San Diego); marine geochemistry of metals and hydrocarbons in coastal zones.

Cattolico, Rose A. \* 1975, (Adjunct); PhD, 1973, State University of New York (Stony Brook); plastid replication, nucleic acid biochemistry in synchronized unicellular algae.

- Creager, Joe S. \* 1958, (Emeritus); PhD, 1958, Texas A&M University; geological oceanography, sedimentology.
- Criminale, William O. \* 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, mathematical physics, nonlinear mechanics, stability theory.
- D'asaro, Eric A. \* 1980; PhD, 1980, Massachusetts Institute of Technology; physical oceanography, internal waves, turbulence and mixing processes.
- Delaney, John R. \* 1977; PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.
- Deming, Jody W. \* 1988; PhD, 1981, University of Maryland; evolution and ecology of marine bacteria in the pressurized ocean.
- Devol, Allan H. \* 1975; PhD, 1975, University of Washington; biogeochemistry, sediment diagenesis, anoxic systems, carbon fluxes.
- Emerson, Steven R. \* 1976; PhD, 1974, Columbia University; marine geochemistry, chemical oceanography, sediment diagenesis.
- Eriksen, Charles C. \* 1986; PhD, 1977, Massachusetts Institute of Technology; experimental physical oceanography; equatorial and upper ocean dynamics, internal waves.
- Ewart, Terry E. \* 1956, (Emeritus); PhD, 1965, University of Washington; physics, ocean microstructure, diffusion, acoustic transmission.
- Francis, Robert C. \* 1983, (Adjunct); PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.
- Frost, Bruce W. \* 1969; PhD, 1969, University of California (San Diego); biological oceanography, marine zoogeography, plankton ecology and systematics.
- Gammon, Richard H. \* 1985; PhD, 1970, Harvard University; atmospheric, marine, and environmental chemistry; biogeochemical cycles, global climate change.
- Gregg, Michael C. \* 1974; PhD, 1971, University of California (San Diego); physical oceanography, ocean microstructure.
- Harrison, Don Edmunds \* 1985, (Affiliate); PhD, 1977, Harvard University; ocean circulation modeling, large-scale atmosphere-ocean interaction, climate diagnostics/dynamics.
- Heath, G. Ross \* 1984; PhD, 1968, University of California (San Diego); geochemistry of sediments.
- Hedges, John I. \* 1976; PhD, 1975, University of Texas (Austin); organic geochemistry, sources, transport, fate of organic material in coastal zones.
- Hickey, Barbara M. \* 1973; PhD, 1975, University of California (San Diego); dynamics of coastal oceanography, estuary-ocean interactions, submarine canyons, buoyant plumes.
- Holloway, Gregory \* 1983, (Affiliate); PhD, 1976, University of California (San Diego); physical oceanography, turbulence theory, geophysical fluid dynamics.
- Holmes, Mark L. 1973, (Research); PhD, 1975, University of Washington; estuarine geologic processes, natural hazards in Puget Sound, crustal evolution at mid-ocean ridges.
- Johnson, Harlan Paul \* 1976; PhD, 1972, University of Washington; paleomagnetism and marine geophysics.
- Jumars, Peter A. \* 1975, (Affiliate); PhD, 1974, University of California (San Diego); biological oceanography, benthos, biological sedimentary dynamics and spatial statistics.
- Lewin, Joyce C. 1965, (Research Emeritus); PhD, 1953, Yale University; algal physiology, physiology and nutrition of marine diatoms, ecology of marine diatoms.
- Lewis, Brian T. R. \* 1970; PhD, 1970, University of Wisconsin; marine geophysics, marine seismology, gravity, magnetics, and computer modeling of those processes.
- Martin, Seelye \* 1969; PhD, 1967, Johns Hopkins University; geophysical fluid dynamics, properties of sea ice.
- McCormick, Norman J. \* 1966, (Adjunct); PhD, 1965, University of Michigan; thermal and optical radiative transfer, optical oceanography, reliability and risk analysis.
- McDuff, Russell E. \* 1981; PhD, 1978, University of California (San Diego); marine geochemistry.
- McManus, Dean A. \* 1959, (Emeritus); PhD, 1959, University of Kansas; geological oceanography, continental shelf sediments.
- McPhaden, Michael J. \* 1982, (Affiliate); PhD, 1980, Scripps Oceanographic Institution; equatorial ocean dynamics, climate scale air-sea interaction.
- Merrill, Ronald T. \* 1967, (Adjunct); PhD, 1967, University of California (Berkeley); geomagnetism, geophysics of solids, rock magnetism.
- Mobley, Curtis D. 1979, (Affiliate); PhD, 1977, University of Maryland; optical oceanography and radiative transfer, especially numerical modeling.
- Moore, Dennis W. 1996, (Affiliate); PhD, 1968, Harvard University; equatorial oceanography, geophysical fluid dynamics, and inertial boundary currents.
- Morison, James H. \* 1972, (Affiliate); PhD, 1980, University of Washington; upper ocean physical processes in the polar regions.
- Murray, James W. \* 1973; PhD, 1973, Massachusetts Institute of Technology; marine geochemistry, aquatic chemistry.
- Nelson, Bruce K. \* 1986, (Adjunct); PhD, 1985, University of California (Los Angeles); isotopic and geochemical investigations.
- Nittrouer, Charles \* 1998; PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.
- Nowell, Arthur R. M. \* 1978; PhD, 1975, University of British Columbia (Canada); physical oceanography, turbulent boundary layer dynamics, sediment transport.
- Perry, Mary J. \* 1976, (Affiliate); PhD, 1974, University of California (San Diego); biological oceanography, phytoplankton physiology, nutrient cycling.
- Quay, Paul D. \* 1977; PhD, 1977, Columbia University; chemical oceanography, stable isotope geochemistry, ocean tracers and mixing.
- Rattray, Maurice \* 1950, (Emeritus); PhD, 1951, California Institute of Technology; physical oceanography, hydrodynamics, ocean circulation modeling.
- Rhines, Peter B. \* 1984; PhD, 1967, Cambridge University (UK); the circulation of the oceans and evolution of climate.
- Richey, Jeffrey E. \* 1973; PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.
- Roden, Gunnar I. 1966, (Research Emeritus); MS, 1956, University of California (San Diego); physical oceanography; fronts, topographic effects on oceanic flow, ocean circulation.
- Sanford, Thomas B. \* 1979; PhD, 1967, Massachusetts Institute of Technology; physical oceanography, dynamics of ocean currents, motional induction, instrumentation.
- Sarachik, Edward S. \* 1984, (Adjunct); PhD, 1966, Brandeis University; atmospheric dynamics, large scale atmosphere/ocean interactions, equatorial dynamics, climate change.
- Spindel, Robert C. 1987, (Adjunct); PhD, 1971, Yale University; ocean acoustics, signal processing, acoustic navigation systems, acoustic tomography.
- Sternberg, Richard \* 1965, (Emeritus); PhD, 1965, University of Washington; geological oceanography, marine sedimentation processes.

### Associate Professors

Balistreri, Laurie S. 1995, (Affiliate); MS, 1977, University of Washington; aqueous and environmental geochemistry, processes controlling trace elements in aquatic systems.

Duxbury, Alyn C. \* 1954, (Emeritus); PhD, 1963, Texas A&M University; estuarine processes and the management of human uses of these marine systems.

Feely, Richard A. \* 1983, (Affiliate); PhD, 1974, Texas A&M University; chemical oceanography, oceanic sources and sinks for carbon dioxide.

Holcomb, Robin T. 1988, (Affiliate); PhD, 1979, Stanford University; volcanology.

Howe, Bruce M. 1987, (Research); PhD, 1986, University of California (San Diego); physical oceanography, acoustic tomography.

Johnson, Gregory C. \* 1990, (Affiliate); PhD, 1991, Massachusetts Institute of Technology; large-scale ocean circulation, dynamics, and variability.

Kawase, Mitsuhiro \* 1988; PhD, 1986, Princeton University; geophysical fluid dynamics; oceanic general circulation; tracer oceanography.

Kelly, Kathryn A. \* 1996, (Affiliate); PhD, 1983, University of California (San Diego); physical oceanography, combining models with satellite observations.

Kessler, William S. \* 1995, (Affiliate); PhD, 1989, University of Washington; equatorial waves and circulation, tropical air-sea interaction and heat balance, climate variability.

Krieger-Brockett, Barbara \* 1975, (Adjunct); PhD, 1976, Wayne State University; reaction engineering, chemical kinetics and catalysis simulation.

Kunze, Eric L. \* 1987; PhD, 1985, University of Washington; mesoscale phenomena, wave/mean flow interaction double diffusion and mixing.

Lessard, Evelyn J. \* 1989; PhD, 1984, University of Rhode Island; microzooplankton ecology and physiology; physical/biological interactions at oceanic fronts.

Lilley, Marvin D. \* 1984; PhD, 1983, Oregon State University; chemical oceanography.

Mofjeld, Harold 1970, (Affiliate); PhD, 1970, University of Washington; tsunami dynamics, long waves and currents in the ocean, storm surge inundation.

Nystuen, Jeffrey A. 1999, (Affiliate); PhD, 1985, University of California (San Diego); acoustical oceanography, applied to oceanic rainfall and physics of the air-sea interface.

Riser, Stephen C. \* 1981; PhD, 1981, University of Rhode Island; physical oceanography, mesoscale mixing, physics of mesoscale eddies, numerical modeling.

Rothrock, David A. \* 1970; PhD, 1969, Cambridge University (UK); physical oceanography, polar oceanography, polar ice remote sensing and modeling.

Shuman, Frank R. 1999, (Affiliate); PhD, 1978, University of Washington; monitoring activities in marine waters: sediment, water, plants and animals, toxic substances.

Warner, Mark J. \* 1989; PhD, 1988, University of California (San Diego); physical oceanography, ocean ventilation and mixing processes.

Wilcock, William S. D. \* 1993; PhD, 1992, Massachusetts Institute of Technology; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics.

Williams, Kevin L. 1998, (Affiliate); PhD, 1985, Washington State University; propagation and scattering of sound in the ocean: applied to remote sensing and sediment acoustics.

**Assistant Professors**

Armbrust, E. Virginia \* 1996; PhD, 1990, Massachusetts Institute of Technology; chloroplast inheritance, sexual cycle of unicellular algae.

Bullister, John L. 1991, (Affiliate); PhD, 1984, University of California (San Diego); chemical tracers of large-scale ocean circulation and mixing, gases in the ocean and atmosphere.

Butterfield, David A. 1997, (Affiliate); PhD, 1990, University of Washington; geochemical systematics of hydrothermal fluids, relation to seafloor volcanism and microbial activity.

Cronin, Meghan 1998, (Affiliate); PhD, 1993, University of Rhode Island; upper-ocean heat, salt, and momentum balances, western boundary currents, eddy-mean flow interaction.

Dushaw, Brian D. 1992, (Affiliate); PhD, 1992, University of California (San Diego); acoustic tomography, applications to ocean temperature, tidal dissipation, ocean mixing.

Hautala, Susan L. \* 1994; PhD, 1992, University of Washington; physical oceanography, abyssal and paleoabyssal circulation.

Keil, Richard G. \* 1991; PhD, 1991, University of Delaware; chemical oceanography, marine organic chemistry.

Kelley, Deborah S. 1992, (Research); PhD, 1990, Dalhousie University (Canada); geo-microbiological processes in hydrothermal systems, volatile flux from mantle to hydrosphere.

Lee, Craig M. 1998, (Affiliate); PhD, 1995, University of Washington; upper-ocean processes, internal waves, fronts, interactions between dynamics and biology.

MacCready, Parker \* 1986, (Research); PhD, 1991, University of Washington; ocean circulation in estuaries and the southern ocean.

Napp, Jeffrey M. 1991, (Affiliate); PhD, 1986, University of California (San Diego); biological-physical interactions in the epipelagic zone, zooplankton ecology, fisheries oceanography.

Newton, Jan A. 1998, (Affiliate); PhD, 1989, University of Washington; production and export of organic material, estuarine/coastal dynamics and marine water quality.

Oltman-Shay, Joan M. 1991, (Affiliate); PhD, 1986, University of California (San Diego); nearshore waves and currents: wave climatology, generation and dissipation, sediment dynamics.

Sabine, Christopher L. 1999, (Affiliate); PhD, 1992, University of Hawaii; carbon cycling in the global oceans including air-sea fluxes and estimates of anthropogenic carbon.

Thompson, LuAnne \* 1990; PhD, 1990, Massachusetts Institute of Technology; numerical modeling of mesoscale and general circulation of the oceans.

Tynan, Cynthia T. 1999, (Affiliate); PhD, 1993, University of California (San Diego); biological-physical processes, distribution and abundances of plankton and marine mammals.

**Senior Lecturer**

Emerick, Christina M. 1985; PhD, 1985, Oregon State University; marine geochemistry and tectonics.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

**OCEAN 401 General Physical Oceanography I (3) NW** Physical properties and processes; theories and methods describing ocean currents, waves, and tides. Prerequisite: either MATH 126, MATH 129, or MATH 136; PHYS 123; OCEAN 202. Offered: A.

**OCEAN 402 General Physical Oceanography II (3) NW** Physical properties and processes; theories and methods describing ocean currents, waves, and tides. Prerequisite: OCEAN 401. Offered: W.

**OCEAN 421 Chemical Oceanography (4) NW** Physical and chemical properties of seawater and marine products; processes determining the chemical makeup of the oceans. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; OCEAN 202. Offered: Sp.

**OCEAN 433 General Biological Oceanography (4) NW** Marine organisms, their quantitative distribution in time and space and their interactions with the ocean. Prerequisite: either BIOL 102 or BIOL 203; OCEAN 401. Offered: W.

**OCEAN 450 Marine Geology and Geophysics (4) NW** Sedimentological and petrologic processes that determine the geologic record. Prerequisite: either GEOL 101 or GEOL 205. Offered: A.

**OCEAN 452 Principles of Sediment Transport by Turbulent Flow (3) NW** Theoretical and experimental techniques used in studying erosion, transportation, and deposition of sediment. Initial motion of sediments, bed-load motion, suspension of sediment by turbulent flows, erosion and deposition of sediments, and applications of sediment transport theory to problems of geological interest. Prerequisite: GEOL 455. Offered: jointly with GEOL 452.

**OCEAN 460 Oceanic Data Interpretation (5) NW** Collection and analysis of marine data. Laboratory analysis of samples, data handling, and modeling of marine problems. Prerequisite: OCEAN 402; OCEAN 433; OCEAN 450. Offered: Sp.

**OCEAN 485 Topics in Oceanography (1-5, max. 12) NW** Specialized topics in oceanography. Various techniques in solving oceanographic problems. For students with senior standing. Offered: WSp.

**OCEAN 499 Undergraduate Research (1-12, max. 24)** Research on assigned topics that may involve laboratory work, fieldwork, or literature surveys. Offered: AWSp.

**Courses for Graduates Only**

**OCEAN 500 Current Problems in Oceanography (1)** Discussion of research topics that are currently being investigated within the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AW.

**OCEAN 501 Estuarine Circulation and Mixing (3)** Observed patterns of currents, mixing, and stratification from deep fjords to shallow coastal plain estuaries. Physical understanding of basic processes, such as tides, wind stress, topographic effects on turbulence, sill hydraulics, and exchange flow. Vertical mixing and residence times important to biological and pollution studies. Prerequisite: permission of instructor.

**OCEAN 506 Interdisciplinary Seminar in Oceanography (1-3, max. 12)** Lectures, discussions, and work on selected problems of an interdisciplinary nature. Prerequisite: permission of instructor.

**OCEAN 509 Seminar (1)** Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: AWSp.

**OCEAN 510 Physics of Ocean Circulation (5)** Structure of ocean basins; physical properties of seawater and the equation of state; heat, salt, fresh water budgets; tidal potential; Coriolis effect and geostrophic balance; major current systems and

water masses; mixing, stirring in the ocean; simple waves; modern experimental methods in physical oceanography. Prerequisite: permission of instructor. Offered: A.

**OCEAN 511 Introduction to Fluid Dynamics (4)** Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH/ATM S 505; A.

**OCEAN 512 Geophysical Fluid Dynamics I (4)** Dynamics of rotating stratified fluid flow in the atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincare, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasigeostrophy. Prerequisite: OCEAN 511 or ATM S/AMATH 505. Offered: jointly with ATM S 509; W.

**OCEAN 513 Geophysical Fluid Dynamics II (3)** Theories, models of large-scale dynamics of oceans, atmospheres. Potential vorticity, Q principles; Rossby waves, ray tracing, Green's function, setup of general circulation; atmospheric "channels" versus ocean "basins"; wave-mean flow interaction, mountain drag, internal momentum flux; "Lagrangian" motion of particles, tracers; cascades, eddy flux of heat, moisture, Q. Prerequisite: OCEAN 512. Offered: Sp.

**OCEAN 514 Waves (3)** Application of marine hydrodynamics principles to wave motion in oceans. Offered: W.

**OCEAN 515 Ocean Circulation: Observations (3)** Modern large- and mesoscale ocean observations, interpreted in terms of contemporary circulation theories. Spectrum of temporal variability; eddies and eddy fluxes; ventilation; advection and diffusion in the abyss; transports of heat and salt; climatic scale of variability; modern methods for determining circulation. Prerequisite: OCEAN 510 or permission of instructor. Offered: Sp.

**OCEAN 516 Ocean Circulation: Theories (3)** Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite: OCEAN 512 or permission of instructor.

**OCEAN 517 Methods and Measurements in Physical Oceanography (2)** Principal instruments and experimental methods of physical oceanography. Devices and systems that measure pressure, temperature, electrical conductivity, sea state, and velocity. Prerequisite: permission of instructor. Offered: alternate years.

**OCEAN 519 Seminar in Physical Oceanography (1, max. 9)** Discussion of selected problems of current interest in physical oceanography. Prerequisite: OCEAN 510 or permission of instructor.

**OCEAN 520 Marine Chemistry (5)** Processes controlling the chemical composition of seawater. Chemical distributions in the ocean, marine physical chemistry, chemical equilibrium, and concepts of mass balance. Mechanisms and models used to explain distributions of stable and radioactive isotopes, gases, trace metals, and biochemicals in the world's oceans. Offered: A.

**OCEAN 521 Aquatic Chemistry (3)** Application of physical chemistry and thermodynamics to processes that control chemical composition of natural waters. Equilibrium approach. Acid/base chemistry, the carbonate system, dissolution and precipitation, metal ions in solution, oxidation-reduction chemistry, silicate mineral reactions. Prerequisite: OCEAN 520 or permission of instructor. Offered: A.

**OCEAN 522 Marine Organic Geochemistry (3)**

Sources, reactions, and fates of organic molecules in the marine environment along with the stable isotope geochemistry of marine organic substances. Prerequisite: CHEM 237 and CHEM 239 or permission of instructor.

**OCEAN 523 Geochemical Cycles (4)**

Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with CHEM 523 and ATM S 508.

**OCEAN 529 Seminar on Chemical Oceanography (\* max. 9)**

Lectures, discussions, and readings on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

**OCEAN 530 Biological Oceanography: Bacteria and Protozoa (3)**

Bacteria in the marine environment; fate of organic carbon in the ocean and the interrelationship of the carbon cycle with other biogeochemical cycles. Prerequisite: permission of instructor. Offered: W.

**OCEAN 531 Biological Oceanography: Phytoplankton (3)**

Phytoplankton in the marine environment: ecology, primary productivity, and physiology. Phytoplankton growth and photosynthetic patterns; spatial and temporal distributions of phytoplankton; methods for determining distributions and rates of production and growth. Prerequisite: permission of instructor. Offered: W.

**OCEAN 532 Biological Oceanography: Zooplankton (3)**

Distribution and abundance of pelagic animals in space and time; analysis of their interactions. Small-scale distributions and behavior, population dynamics and energetics, trophic structure and dynamics, pelagic community structure, models of populations and food chains, secondary production and biogeography. Prerequisite: permission of instructor. Offered: Sp.

**OCEAN 533 Biological Oceanography: Benthos (3)**

Analysis of marine benthic communities; new research questions and method; ecologically important physics of benthic boundary layer; theories, mechanics, and observations of deposit feeding; succession as consequence of physical processes and biological interactions. Environments include deep-sea, continental shelves, estuaries, and intertidal, focusing on soft substrata. Prerequisite: permission of instructor. Offered: Sp.

**OCEAN 534 Methods and Measurements in Biological Oceanography (2)**

Methods for bacteria, phytoplankton, and zooplankton population assessment. Rate measurements of phytoplankton, zooplankton, and bacterial production. Benthos measurements, including deep-sea environments. Prerequisite: permission of instructor.

**OCEAN 535 Biological Oceanography for Physical Scientists (5)**

Principles and practice of biological oceanography for students with strong background in physical sciences but little recent exposure to biology. Ecological principles at individual, population, and community levels; overview of discipline of biological oceanography; case studies of interdisciplinary problems shared with the physical sciences. Prerequisite: permission of instructor. Offered: W.

**OCEAN 536 Seminar in Geostatistics (1-3, max. 3)**

Lectures and discussions on selected problems in the applications of statistics in earth science.

**OCEAN 539 Seminar in Biological Oceanography (\* max. 9)**

Lectures, discussions, and work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

**OCEAN 540 Marine Geological Processes (5)**

Principles of thermodynamics, heat and mass transfer, fluid mechanics, continuum mechanics, and time-series analysis applied to marine geological and geophysical data. Applications to thermal balance of the oceanic lithosphere; Pleistocene sedimentation and global climate change; and sediment transport in high energy environments. Prerequisite: permission of instructor. Offered: W.

**OCEAN 541 Marine Sedimentary Processes (5)**

Erosion, transportation and deposition of sediment in estuarine, beach, continental shelf and slope, and deep sea environments. Development of equations characterizing boundary shear flows, initiation of grain motion, bedload and suspended load transport. Evolution of primary bed forms, processes of sediment accumulation, and measurement techniques. Prerequisite: permission of instructor.

**OCEAN 544 Geochemical Evolution of Oceanic Lithosphere (3)**

Chemical principles of magmatic evolution and hydrothermal interaction as they apply to the formation and evolution of the oceanic lithosphere. Comparisons of theoretical models with field studies conducted using submersibles and deep ocean drilling. Prerequisite: permission of instructor.

**OCEAN 545 Physics of the Oceanic Lithosphere I (3)**

Physical processes responsible for the formation and evolution of the oceanic lithosphere. Thermodynamic mechanisms of mantle creep; fluid dynamics of mantle flow, decompressional melting, formation of oceanic crust, and cooling of the oceanic lithosphere. Prerequisite: GPHYS 501 and GPHYS 504 or permission of instructor. Offered: jointly with GPHYS 545.

**OCEAN 546 Physics of the Oceanic Lithosphere II (3)**

Physical processes responsible for the formation and evolution of the oceanic lithosphere. Rheology, fault mechanics, plate flexure, marine gravity, the relationship between gravity and topography, magnetic properties of ocean crust, and character of marine magnetic anomalies. Prerequisite: OCEAN 545 or permission of instructor. Offered: jointly with GPHYS 546.

**OCEAN 549 Seminar in Geological and Geophysical Oceanography (\* max. 9)**

Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

**OCEAN 550 Geochemistry and Geophysics of Melt Generation (3)**

Mantle flow beneath mid-ocean ridges and hotspots, major element systematics, constraints from trace elements and isotopes on melting and mantle reservoirs, melt extraction, and crustal thickness and axial topography. Prerequisite: OCEAN 544 or permission of instructor. Offered: alternate years.

**OCEAN 551 Marine Seismology (3)**

Practical application of seismic techniques to the study of the ocean basins. Analysis of refraction data, multichannel reflection profiling, surface wave studies, and earthquake analysis. Prerequisite: GPHYS 502 or permission of instructor. Offered: jointly with GPHYS 551.

**OCEAN 552 Seminar in Geophysics and Geological Data Analysis (1)**

Practical geophysical data analysis, map projections, gridding multibeam bathymetry processing, gravity and magnetic anomalies, downward continuation, magnetic inversion, seismic refraction and reflection, and microearthquake locations. Prerequisite: permission of instructor.

**OCEAN 559 Advanced Seminar on Mid-Ocean Ridge Processes (\* max. 9)**

Lectures, discussions, and practical work on selected topics of current interest in mid-ocean ridge research. Prerequisite: permission of instructor.

**OCEAN 560 Atmosphere/Ocean Interactions (3)**

Observations and theory of phenomena of the coupled atmosphere-ocean system. El Niño/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509 or OCEAN 512. Offered: jointly with ATM S 560; alternate years; Sp.

**OCEAN 569 Topics in Physical Oceanography (1-4, max. 9)**

Lecture series on topics of major importance in physical oceanography. Offered: AWSp.

**OCEAN 570 Marine Microbial Interactions (1-3, max. 9)**

Structure, function, and dynamics of natural mixed-species populations of marine bacteria and their interactions with higher organisms; mixed-species culture methods; synecological field methods; species assemblages in specialized environments; mutualisms; sites and patterns of genetic exchange. Prerequisite: OCEAN 530 or permission of instructor. Offered: alternate years.

**OCEAN 571 Marine Primary Productivity (1-3, max. 9)**

Patterns and mechanisms of marine phytoplankton primary production. Small-to-global-scale patterns of production; environmental regulation of production; absorption of electromagnetic radiation; fluorescence; carbon fixation; trophic interactions; remote sensing and other optical methods. Prerequisite: OCEAN 531 or permission of instructor. Offered: alternate years.

**OCEAN 572 Zooplankton Ecology (1-3, max. 9)**

Life history strategies, dynamics and production of populations, vertical migration, interspecific interactions and community structure, models of complex assemblages of zooplankton, sampling methods and analysis, spatial heterogeneity. Prerequisite: OCEAN 532 or permission of instructor. Offered: alternate years.

**OCEAN 573 Benthic Biological Processes (1-3, max. 9)**

Processes characteristic of soft-bottom benthic environments; areas and methods of rapid current progress; open research questions; deposit feeding; passive larval recruitment; physical, chemical, geological, and biological feedbacks in ecological succession; scaling of laboratory systems. Prerequisite: OCEAN 533 or permission of instructor. Offered: alternate years.

**OCEAN 574 Principles and Applications of Molecular Methods (3)**

Techniques of molecular analysis with emphasis on DNA methods, including PCR, DNA sequencing, RFLP, RAPD and VNTR analysis and cloning. Applications of these techniques to fisheries, aquaculture, oceanography, population and evolutionary studies, and other areas of science. Prerequisite: permission of instructor. Offered: jointly with FISH 542; A.

**OCEAN 575 Molecular Techniques (4)**

Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 permission of instructor. Offered: jointly with FISH 543; W.

**OCEAN 578 Advanced Topics in Biological Oceanography (\* max. 18)**

Specialized research areas. Topic varies each year. Offered at Friday Harbor Laboratories. Prerequisite: permission of director of Friday Harbor Laboratories. Offered: S.

**OCEAN 580 Aquatic Kinetics (3)**

Reaction rates and mass transport in water. Theories of chemical kinetics; experimental results from: CO<sub>2</sub> hydrolysis, Fe, Mn, and H<sub>2</sub>S oxidation, stable isotope fractionation, mineral dissolution; homogeneous, heterogeneous, microbial catalysis; reaction and transport at air-water, sediment-water, and O<sub>2</sub>/H<sub>2</sub>S interfaces. Prerequisite: permission of instructor.

**OCEAN 581 Geochemical Modeling (3)** Background to modeling concepts frequently encountered in chemical oceanography: box models, advection-diffusion problems, sediment diagenesis equations, and boundary layer (air-water and sediment-water interface) models. Problems requiring application of the models to chemical distributions in the ocean. Prerequisite: permission of instructor.

**OCEAN 582 River Basin Biogeochemistry (3)** The function of rivers and river basins in transporting materials to the oceans and their importance in biogeochemical cycles. Origin of water and water routing within drainage basins, sources and modification of dissolved and particulate materials in transport, ecological theory, and estuarine mixing zone transformations. Prerequisite: permission of instructor.

**OCEAN 583 Isotope Biogeochemistry (3)** The use of stable isotopes to study biogeochemical cycles in the oceans and atmosphere; specifically carbon, nitrogen, and sulfur cycles. Isotopic effects during photosynthesis, respiration, organic matter degradation,  $\text{CaCO}_3$  dissolution, methanogenesis, nitrification/denitrification, and sulfate reduction. Prerequisite: permission of instructor.

**OCEAN 584 Radiochemical Tracers and Ocean Mixing (3)** Distribution of natural and bomb-produced radioactive tracers in the ocean. Application of models used to derive information concerning time scales of (1) gas transfer at the water atmosphere interface; (2) whole ocean, thermocline, and deep-ocean water circulation; and (3) particulate settling in the marine environment. Knowledge of elementary differential equations suggested. Prerequisite: permission of instructor.

**OCEAN 585 Paleoceanography (3)** History of environmental changes on earth over the past 100 million years as reconstructed from records in deep-sea sediments, ice sheets, and other ocean/terrestrial substrates. Examination of isotopic, geochemical, micropaleontological, and dating techniques. Role of the ocean in climate change. Prerequisite: permission of instructor.

**OCEAN 590 Advanced Topics in Oceanography (9-18, max. 18)** Advanced topics examining specialized and interdisciplinary areas of oceanographic research. Offered at Friday Harbor Laboratories. Prerequisite: permission of Director of Friday Harbor Laboratories. Offered: S.

**OCEAN 591 Marine Science in the Coastal Zone (4)** Major oceanic and nearshore processes, conditions, and their influence on human activities in coastal zone. Methods of understanding and accessing the accumulated knowledge on marine processes and its applications to decision-making process. Lectures and discussions of biological, chemical, geological, and physical oceanography. Generation and use of data bases as interpretative tools. Offered: A.

**OCEAN 600 Independent Study or Research (\*)** Offered: AWSpS.

**OCEAN 700 Master's Thesis (\*)** Offered: AWSpS.

**OCEAN 800 Doctoral Dissertation (\*)** Offered: AWSpS.



# School of Pharmacy

## Dean

Sid Nelson

## Associate Dean

Stanley S. Weber

## Assistant Dean

Nanci L. Murphy

 *General Catalog Web page:*  
[www.washington.edu/students/gencat/academic/School\\_Pharmacy.html](http://www.washington.edu/students/gencat/academic/School_Pharmacy.html)

 *School Web page:*  
[depts.washington.edu/pha/](http://depts.washington.edu/pha/)

Established in 1894, the University of Washington School of Pharmacy strives to advance health care in the region through its educational, service, and research programs. The School's three departments—Medicinal Chemistry, Pharmaceutics, and Pharmacy—as well as the Dean's Office are located in the H-Wing of the Health Sciences Building.

The School of Pharmacy offers a four-year professional program leading to the Doctor of Pharmacy (Pharm.D.) degree. The curriculum is designed to educate students to contribute to the safe, effective, and cost-efficient use of medications in a variety of settings. Instruction emphasizes enhancing the critical-thinking and problem-solving skills necessary to provide rational drug therapy, promote healthy lifestyles and disease prevention, enhance patient compliance, reduce medication-related problems, and improve health outcomes. Students are given the opportunity to use elective choices to design a program compatible with individual areas of interest. In the final year of the program, students complete experiential training at pharmacy settings located primarily in the Puget Sound area. The School is fully accredited by the American Council on Pharmaceutical Education, and graduates meet the educational requirements for licensure in all fifty states.

Consideration for admission to the professional program requires a minimum of two years of prepharmacy training. An applicant who is admissible to the University is not assured admission to the School of Pharmacy. Admission is competitive and based on a number of factors. Academic preparedness, motivation, oral and written communication skills, critical-thinking ability, and decision-making skills are among the criteria used to determine a candidate's aptitude for the pharmacy program. An on-site interview and writing assignment are required as part of the admission process. Further details on admission requirements, application procedures, and program content may be obtained from the School's Office of Academic and Student Programs or its Web site at [depts.washington.edu/pharmin/](http://depts.washington.edu/pharmin/).

The School also seeks to promote the life-long learning of pharmacists by offering opportunities for post-graduate education and continuing-education seminars. An external Pharm.D. program is available for those pharmacists who would like to pursue an advanced degree beyond the baccalaureate degree. Continuing-education programs are provided throughout the year to meet the needs of the community.

To foster the interests of students who seek to engage in creative discovery and research, the School also offers graduate education in the pharmaceutical sciences. Graduate school information may be obtained from the individual departments offering the advanced degrees.

## Medicinal Chemistry



*General Catalog Web page:*  
[www.washington.edu/students/gencat/academic/Medicinal\\_Chem.html](http://www.washington.edu/students/gencat/academic/Medicinal_Chem.html)



*Department Web page:*  
[depts.washington.edu/medchem/](http://depts.washington.edu/medchem/)

## Graduate Program

Graduate Program Coordinator  
H164 Health Sciences, Box 357610  
(206) 543-2224  
[medchem@u.washington.edu](mailto:medchem@u.washington.edu)

The Department of Medicinal Chemistry offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy. The department offers diverse opportunities for study and research at the interface between biology and chemistry, with emphasis on issues of biomedical importance. In addition to specialized training acquired during their thesis work, graduates also acquire a broad foundation in medicinal chemistry, pharmacology, and biochemistry, which is important in the rapidly evolving, multidisciplinary biomedical arena. One major area of interest is the elucidation of protein and small ligand structure and function using computational methods as well as NMR, mass spectroscopy, and other biophysical techniques. A second area of interest is the role of enzymes such as the cytochrome P450 enzymes and glutathione-S-transferases in the metabolism of drugs and environmental contaminants. Issues of biomedical importance include elucidation of enzyme attributes that modulate drug metabolite profiles, rates of reaction, and susceptibility to inhibition. Further aspects include functional consequences of phenotypic and genotypic diversity in the population and the role of biotransformation processes in toxification and detoxification reactions.

The primary mission of the program is to ensure that students possess a firm foundation in medicinal chemistry, pharmacology, and biochemistry, and ultimately are able to provide an understanding and rationale at the molecular level for events that occur at the biological level.

Most students proceed directly to the doctoral degree program. Satisfactory completion of cumulative examinations and at least two quarters of teaching experience are requirements for the doctoral degree.

Graduates from the program must possess the skills necessary to develop quantitative and qualitative methodologies to pursue studies at the whole-animal, organ, microsomal, or purified-enzyme levels; to elucidate and evaluate the chemical transformations that occur in metabolic processes by isolation, purification, spectroscopic investigation, structural determination, and chemical synthesis; and, ultimately, to provide an understanding and rationale at the molecular level for events that occur at the biological level.

Most students proceed directly to the doctoral degree program. Participation in a cumulative examination process and at least two quarters of teaching experience are additional requirements for the doctoral program. Satisfactory completion of cumulative examination requirements are necessary to work for the Ph.D. degree.

## Admission Requirements

Students who intend to work toward the Doctor of Philosophy degree must apply for admission to the Graduate School and meet the requirements outlined in the Graduate Study section of this catalog. Graduate students must satisfy the requirements for an advanced degree in force at the time the degree is to be awarded. Graduate study requires approval of the Graduate School and the Department of Medicinal Chemistry.

## Special Requirements

Students with undergraduate degrees in pharmacy or in the biological or physical sciences are accepted for graduate study in medicinal chemistry. Undergraduates who plan to pursue graduate study are encouraged to expedite their programs by selection of pertinent electives. Although the choice of electives varies with the student's ultimate goals, graduate study in medicinal chemistry requires an adequate background in biological and physical sciences.

## Master of Science

A student in the master's degree program must present at least 27 credits of course work, inclusive of thesis and non-thesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.

## Doctor of Philosophy

A student in the doctoral program must present a minimum of 45 credits of course work, inclusive of dissertation and non-thesis research. Credits earned for the master's degree may be applied toward the doctoral degree. The student must pass a General Examination for admission to candidacy for the doctoral degree. Satisfactory completion of departmental cumulative examinations precedes scheduling of the General Examination. The student must complete a research project, prepare an acceptable dissertation and pass a Final Examination. Research for the doctoral degree must be done at the UW.

## Financial Aid

Financial support in the form of research assistantships and fellowships may be available to students in good standing throughout their graduate careers. Availability of financial support varies from year to year, and prospective applicants should contact the graduate program coordinator for additional information.

## Faculty

### Chair

Allan E. Rettie

### Professors

Baillie, Thomas A. \* 1981, (Affiliate); PhD, 1973, University of Glasgow (UK); MSc, 1973, University of London (UK); medicinal chemistry.

Elmer, Gary W. \* 1971; PhD, 1970, Rutgers University; medicinal chemistry.

Floss, Heinz G. \* 1987, (Adjunct); PhD, 1961, Technical University of Munich (Germany); bioorganic and natural products chemistry.

Huitric, Alain C. 1955, (Emeritus); PhD, 1954, University of California (San Francisco); medicinal chemistry.

Kharasch, Evan D. \* 1984, (Adjunct); PhD, 1983, MD, 1984, Northwestern University; clinical pharmacology of anesthetic agents, drug metabolism, and drug interactions.

Krupski, Edward 1983, (Emeritus); PhD, 1949, University of Washington; medicinal chemistry.

McCarthy, Walter \* 1949, (Emeritus); PhD, 1949, Indiana University; medicinal chemistry.

Nelson, Sidney D. \* 1977; PhD, 1974, University of California (San Francisco); medicinal chemistry, chemical toxicology.

Nelson, Wendel \* 1965; PhD, 1965, University of Kansas; medicinal chemistry.

Rettie, Allan E. \* 1984; PhD, 1983, University of Newcastle-on-Tyne (UK); in vitro drug metabolism in man.

Trager, William F. \* 1972; PhD, 1965, University of Washington; medicinal chemistry, bioanalytical chemistry drug metabolism.

### Associate Professors

Atkins, William M. \* 1991; PhD, 1988, University of Illinois; protein engineering.

Daggett, Valerie D. \* 1993; PhD, 1990, University of California (San Francisco); molecular modeling studies of peptides and proteins.

Kunze, Kent \* 1989; PhD, 1981, University of California (San Francisco); medicinal chemistry and drug metabolism.

### Assistant Professors

Campbell, Patricia A. \* 1998; PhD, 1991, University of Alberta (Canada); protein and peptide solution state in NMR spectroscopy.

Hackett, Murray \* 1995; MS, 1987, Oregon State University; PhD, 1991, University of Nevada; biological mass spectrometry: applications in microbial pathogenesis; high resolution separations.

Haining, Robert L. 1999, (Research); PhD, 1991, Washington State University; in vitro expression of human oxidative enzymes.

## Pharmaceutics



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Pharmaceutics.html](http://www.washington.edu/students/genecat/academic/Pharmaceutics.html)



Department Web page:  
[depts.washington.edu/pceut/](http://depts.washington.edu/pceut/)

## Graduate Program

Graduate Program Coordinator  
H272 Health Sciences, Box 357610  
(206) 543-9434  
[pceut@u.washington.edu](mailto:pceut@u.washington.edu)

The Department of Pharmaceutics offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy.

### Program Description

The program provides research training in the fundamental aspects of drug disposition, drug delivery, and drug action in animals and man. Drug disposition includes the phenomena of absorption, distribution, and elimination. Pharmacokinetics is the study of the time course of these processes and the time course of pharmacological effects. Drug delivery includes targeting of drugs to tissues or specific cells to improve their therapeutic effect. These areas of research have a wide range of applications, particularly in the pharmacological characterization of new drug molecules in pharmaceutical development. Graduates of this program possess expertise in a variety of analytical techniques and the elaboration of mathematical models to describe drug disposition and pharmacological processes.

During the first two years of study, students take courses in medicinal chemistry, pharmacology, physiology, biochemistry, mathematics, computer science, biostatistics, and pharmacokinetics.

The department's research program includes seven NIH-funded laboratories addressing a variety of fundamental and clinical problems pertaining to drug transport, metabolism, and toxicity associated with several diseases (AIDS, cystic fibrosis, leukemia, epilepsy), as well as pain management and transplantation. Most projects involve collaborative arrangements with investigators from other departments in the University or at the Fred Hutchinson Cancer Research Center. The collaborative relationship of the faculty of the Departments of Pharmaceutics and Medicinal Chemistry in the field of drug metabolism has received worldwide recognition.

This research can involve experimental animal work, in vitro studies, clinical investigation, or a combination of approaches. Graduate students are given the opportunity to participate in interdisciplinary research, providing an added dimension to their training.

A wide range of career paths are available to graduates of this program. Opportunities include research in the pharmaceutical industry; research in hospitals, institutes, and foundations; teaching and research in academic institutions; and positions with government regulatory agencies.

### Admission Qualifications

Students with undergraduate degrees in pharmacy, chemistry, or in the biological sciences are accepted for graduate study in pharmaceutics. Undergraduates who plan to pursue graduate study may expedite their programs by selection of pertinent electives. This information can be obtained from the graduate program coordinator.

### Financial Aid

All students in the program receive financial support in the form of research assistantships, Public Health Service predoctoral training fellowships and other fellowships such as the William E. Bradley Graduate Fellowship and those from the American Foundation for Pharmaceutical Education.

## Faculty

### Chair

Rene H. Levy

### Professors

Gibaldi, Milo \* 1978; PhD, 1963, Columbia University; critical analysis of literature on drug discovery and development.

Hammarlund, E. Roy \* 1960, (Emeritus); PhD, 1951, University of Washington; pharmaceutics.

Hu, Shiu-Lok 1988; PhD, 1978, University of Wisconsin; molecular virology, immunology and vaccine research.

Levy, Rene H. \* 1970; PhD, 1970, University of California (San Francisco); metabolic interactions among antiepileptic drugs and between cytokines and drugs.

Shen, Danny D. \* 1984; PhD, 1975, State University of New York (Buffalo); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anticonvulsants.

Slattery, John T. \* 1978; PhD, 1978, State University of New York (Buffalo); pharmacokinetics/pharmacodynamics of alkylating agents, oncology/bone marrow transplant/gene therapy.

Unadkat, Jashvant D. \* 1985; PhD, 1982, University of Manchester (UK); mechanisms of transport of anti-HIV drugs across placenta, CSF-blood barrier, and intestine.

### Associate Professors

Anderson, Gail \* 1981, (Adjunct); PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Bowdle, T. Andrew 1981, (Adjunct); MD, 1980, PhD, 1983, University of Washington.

Constantinides, Panos 1999, (Affiliate); PhD, 1983, Brown University; physical-chemical principles governing drug formulation.

Ho, Rodney J. Y. \* 1990; PhD, 1987, University of Tennessee; drug targeting and disposition with emphasis on anti-HIV and carrier therapy.

Kunze, Kent \* 1989, (Adjunct); PhD, 1981, University of California (San Francisco); medicinal chemistry and drug metabolism.

Thummel, Kenneth E. 1989; PhD, 1987, University of Washington; first-pass intestinal and hepatic drug metabolism.

## Pharmacy



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Pharmacy.html](http://www.washington.edu/students/genecat/academic/Pharmacy.html)



Department Web page:  
[depts.washington.edu/pharma/](http://depts.washington.edu/pharma/)

## Graduate Program

Graduate Program Coordinator  
H375 Health Sciences, Box 357630  
(206) 543-6788

The Department of Pharmacy offers graduate training leading to the Doctor of Philosophy degree.

### Program Description

The graduate program in pharmaceutical outcomes research in the Department of Pharmacy provides M.S.- and Ph.D.-level training with a focus on economic evaluation of pharmaceuticals, pharmacoepidemiology, and drug-policy evaluation. Pharmaceutical outcomes research is the study of the health and cost consequences of pharmaceuticals and pharmaceutical-related policies on individuals and populations. Graduates of this program are trained to assess the use, outcomes, and cost of pharmaceuticals and pharmaceutical policies and practices. Students are prepared for careers in (1) teaching and research in colleges and universities; (2) pre- and post-marketing efficacy and safety; (3) policy analysis for industry, health insurance, and governmental agencies; and (4) drug-use management and evaluation within managed health-care organizations.

Successful completion of a doctoral preliminary examination, comprehensive examination, teaching assistantships, and research experience are necessary requirements prior to advancement to candidacy.

### Admission Requirements

Students with undergraduate or graduate degrees in a health-science discipline or those with sufficient experience and interest in pharmaceutical outcomes and policy research will be considered for admission. Applicants must apply to the Graduate School and the Department of Pharmacy and meet the admission criteria outlined in the Graduate School section of this catalog. Applications materials can be obtained by contacting the graduate program coordinator in the Department of Pharmacy or by visiting the graduate program Web page at [depts.washington.edu/porpp/gradprog.htm](http://depts.washington.edu/porpp/gradprog.htm).

### Financial Aid

Financial support in the form of research assistantships, teaching assistantships, and fellowships may be available to prospective and continuing students. Availability of financial support varies each year. Prospective students should contact the graduate program coordinator for more information on financial support.

## Faculty

### Chair

Danny D. Shen

### Professors

Ellsworth, Allan J. 1981; PharmD, 1977, Philadelphia College of Pharmacy and Science; primary care, family medicine.

Gibaldi, Milo \* 1978, (Adjunct); PhD, 1963, Columbia University; critical analysis of literature on drug discovery and development.

Hall, Nathan A. \* 1951, (Emeritus); PhD, 1948, University of Washington; pharmacy practice.

Hansten, Philip D. 1989; PharmD, 1968, University of California (San Francisco); drug interactions.

Horn, John R. \* 1978; PharmD, 1977, University of Cincinnati; pharmacotherapeutics, with emphasis on drug interactions.

Orr, Jack E. 1956, (Emeritus); PhD, 1943, University of Wisconsin; pharmacy history.

Shen, Danny D. \* 1984; PhD, 1975, State University of New York (Buffalo); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anticonvulsants.

### Associate Professors

Anderson, Gail \* 1981; PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Bauer, Larry \* 1980; PharmD, 1980, University of Kentucky; clinical pharmacokinetics and drug metabolism, drug interactions.

Black, Douglas J. 1981; PharmD, 1983, University of Washington; infectious diseases.

Gardner, Jacqueline S. \* 1990; PhD, 1980, University of Washington; pharmacoepidemiology, drug therapy use and effects, pharmacist practice patterns.

Gray, Shelly L. 1995; PharmD, 1989, University of Michigan; geriatric pharmacy.

Hebert, Mary F. 1996; PharmD, 1987, University of California (San Francisco); transplantation, immunology pharmacotherapeutics.

Heckbert, Susan R. \* 1990, (Adjunct); MD, 1981, Case Western Reserve University; MPH, 1987, PhD, 1990, University of Washington; clinical epidemiology, cardiovascular epidemiology, pharmacoepidemiology.

Narducci, Warren 1998; PharmD, 1980, University of Nebraska; educating the public on prevention/screening.

Somani, Shabir M. 1994, (Affiliate); MS, 1982, MBA, 1992, University of Minnesota; hospital pharmacy administration.

Sullivan, Sean \* 1992; PhD, 1992, University of California (Berkeley); pharmacoconomics.

Weber, Stanley S. 1996; PharmD, 1975, University of Cincinnati; psychiatric pharmacy practice, pharmacy distance learning.

Williams, Donald H. 1974, (Affiliate); BPharm, 1958, Massachusetts College of Pharmacy; pharmacy law.

### Assistant Professors

Hazlet, Thomas K. \* 1996; DPH, 1991, University of California (Berkeley); pharmaceuticals policy, outcomes, and bioethics.

Johnson, Eric S. 1992; PhD, 1999, University of Washington; pharmacoconomics, osteoarthritis, diabetes.

Joseph, Jutta C. 1997; PharmD, 1988, University of Michigan; pediatrics/child wellness, teen health, asthma, cross-cultural practices.

McCune, Jeannine S. 1998; PharmD, 1995, University of North Carolina; drug metabolism.

Ramsey, Scott D. \* 1990, (Adjunct); MD, 1990, University of Iowa; PhD, 1994, University of Pennsylvania; cost effectiveness analysis and health care economics.

Veenstra, David 1997; PhD, 1996, PharmD, 1996, University of California (San Francisco); pharmacoconomics, medicinal chemistry, molecular modeling.

### Senior Lecturer

Dawson, Karan N. 1976; MS, 1978, University of Washington; psychotropics, geriatrics, teaching methods.

### Lecturers

Lam, Annie Y. 1996; PharmD, 1997, University of Washington; drug disposition and age, long-term-care pharmacy.

Murphy, Nanci L. 1989; BPharm, 1977, Washington State University; geriatrics, patient teaching.

O'Sullivan, Teresa 1990; PharmD, 1990, University of Minnesota; cystic fibrosis, general medicine, practice-related education, medical literature evaluation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Medicinal Chemistry

**MEDCH 400 Fundamental Concepts in Medicinal Chemistry (3)** *Trager* Principles of physical organic chemistry; chemical bonding, stereochemistry, acids/bases, and reaction mechanisms relevant to processes such as drug distribution, specificity, and metabolism. Prerequisite: either CHEM 239 or CHEM 337. Offered: A.

**MEDCH 401 Immunizing and Antimicrobial Agents (4)** *Daggett, Elmer* Chemical and biologic properties of agents used to prevent or treat infectious diseases, including diagnostic, prophylactic, and therapeutic uses of immunizing biologicals and spectrum, action mechanisms, resistance patterns, toxicity, and therapeutic applications of antibiotics, antifungals, and antivirals. Prerequisite: MICROM 301, MICROM 302, MEDCH 450, or comparable biochemistry course, PharmD major, or permission of instructor. Offered: Sp.

**MEDCH 402 Medicinal Chemistry (3)** *S. Nelson* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: A.

**MEDCH 403 Medicinal Chemistry (3)** *W. Nelson, Rettie* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: W.

**MEDCH 404 Medicinal Chemistry (3)** *Atkins, W. Nelson* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: Sp.

**MEDCH 420 Alternative and Complementary Medicines (2)** *Elmer* Study of popular alternative and complementary medicines used in the United States. Focus on herbal products with some coverage of homeopathic and other non-nutritional dietary supplements. Demonstration of resources for current objective information on these controversial medicines. Credit/no credit only. Offered: A.

**MEDCH 435 Diagnostic Medicinal Chemistry (3)** *S. Nelson* Examination of clinical diagnostic tests with regard to the chemical or biochemical rationale of the testing method, interpretation of test results, and major factors influencing test values with special emphasis on the effects of medications. Clinical laboratory data from patients considered in light of these factors. Prerequisite: MEDCH 451 or BIOC 406 or equivalent, or permission of instructor. Offered: W.

**MEDCH 450 Medicinal Biochemistry I (3)** *Campbell, Kunze* Introduction to biochemistry for PharmD students with an emphasis on those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: W.

**MEDCH 451 Medicinal Biochemistry II (3)** *Campbell, Kunze* Continuation of discussions of those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: Sp.

**MEDCH 490 Metabolism of Drugs (3)** *Trager* Processes of drug metabolism, their mechanisms, and their implications in modern therapy. Bioactivation of prodrugs and biotransformations in the inactivation and elimination of drugs, and the relationship to drug toxicity and drug design. Prerequisite: either CHEM 239 or CHEM 337. Offered: W, even years.

**MEDCH 495 Special Studies in Medicinal Chemistry (\* max 6)** Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 499 Independent Study/Research (\* max. 24)** Research problems in medicinal chemistry. Prerequisite: cumulative GPA of 2.50 and permission of instructor. Offered: AWSpS.

### Courses for Graduates Only

**MEDCH 501 Advanced Medicinal Chemistry (4)** *Elmer, S. Nelson* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSp.

**MEDCH 502 Advanced Medicinal Chemistry (4)** *W. Nelson* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSp.

**MEDCH 503 Advanced Medicinal Chemistry (4)** *Atkins* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSp.

**MEDCH 520 Seminar (1, max. 15)** Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with PCEUT 520; AWSpS.

**MEDCH 521 Advanced Medicinal Chemistry (3)**

Application of integrated data from the physical and biological sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisite: CHEM 457, CHEM 531, and BIOC 442, or permission of instructor. Offered: Sp.

**MEDCH 525 Laboratory Methods in Drug Metabolism (3)**

*Atkins, Daggett, Kunze, Rettie, Thummel* Advanced course covering techniques for the isolation of tissue subcellular fractions, characterization of product formation kinetics, enzyme inhibition kinetics, Western and Northern blot analysis, PCR, enzyme genotyping, and computer-based approaches for prediction of catalytically-sensitive sites on a drug molecule. Includes a weekly lab. Offered: jointly with PCEUT 525; even years; A.

**MEDCH 527 Drug Metabolism (3)**

*Rettie* Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes reaction mechanisms, ultrastructural considerations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism. Offered: jointly with PHCOL 527; odd years; W.

**MEDCH 528 Proteins in Therapy and Disease (3)**

*Atkins, Daggett* Examination of enzyme catalysis and of protein structure and dynamics. Principles applied to topics of therapeutic relevance including: peptides and proteins as drugs, structure-based drug design, drug metabolism, protein engineering, and role of mutant or incorrectly folded proteins in disease states. Prerequisite: comprehensive course in biochemistry or consent of instructor. Offered: even years; W.

**MEDCH 530 Mass Spectrometry of Drugs, Toxicants, and Metabolites (3)**

*Hackett* Current approaches to the combination of liquid chromatography with mass spectrometry for small molecules. Mass spectrometry of drugs, toxicants, metabolites. Emphasis on interpretation skills, with problem sets each week. Introduction to LC/MS instrumentation. Ionization methods appropriate for small molecules. Capillary LC/MS and capillary electrophoresis. Offered: odd years; Sp.

**MEDCH 541 Macromolecular Mass Spectrometry (3)**

*Hackett* Emphasis on problem sets designed to teach basic interpretation skills with respect to proteins and peptides. Basics of mass spectrometry instrumentation for large molecules, including electrospray and MALDI-TOF. Classical techniques in protein chemistry, including Edman chemistry and amino acid analysis. Prerequisite: permission of instructor; recommended: concurrent registration in CHEM 520. Offered: even years; Sp.

**MEDCH 550 Mechanistic Studies in Medicinal Chemistry (1)**

*S. Nelson* Discussion of research strategies and methods used to carry out studies of mechanisms of drug action, metabolism, and toxicities. Emphasis is on problem solving through theoretical and experimental approaches and on data analysis and interpretation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 551 Flavin and Heme-Containing Monooxygenases (1)**

*Rettie* Discussion of research strategies and methodologies concerning the structure, function, and polymorphic expression of human monooxygenases, especially the cytochrome P450s and flavin-containing monooxygenases. Emphasis placed on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 552 Medicinal Chemistry Aspects of Drug Action and Drug Metabolism (1)**

*W Nelson* Discussion of research strategies, methodologies, and

literature concerning the mechanisms of drug action and drug metabolism, particularly as these apply to opiate drugs and beta blockers. Emphases placed on problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 553 Structure and Function of Macromolecular Protein Assemblies (1)**

*Atkins* Discussion of research strategies, methods, and current literature concerning macromolecular self-assembly processes and protein-protein interactions as they relate to biological specificity. Emphasis on experimental approaches used in current literature. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 554 The Mechanism of Action and Pharmacokinetics of Biotherapeutic Agents and Other Natural Products (1)**

*Elmer* Discussion of the literature, research possibilities, and questions that need to be addressed in the area of the application of microorganisms and other natural products for therapeutic purposes. Emphases on problem solving, research strategies, literature evaluation, and data analysis. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 555 Current Topics in Biological Mass Spectrometry (1)**

*Hackett* Emphasis on applications in the area of protein toxins, bioactive peptides, and microbial diseases and on current developments in the use of small scale separations with mass spectrometry. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 556 Mechanistic Aspects of Drug Metabolism (1)**

*Trager* Discussion of research strategies methodologies and new approaches with regard to elucidating the chemical mechanisms and enzymology of metabolic reactions catalyzed by cytochrome P-450. Emphasis on trying to develop in vitro techniques which are predictive of in vivo drug behavior. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 557 Molecular Modeling Studies of Medicinal Chemistry (1)**

*Daggett* Discussion of research strategies, simulation methodologies, and literature concerning protein and peptide structure, function, dynamics, and folding. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

**MEDCH 558 Human Cytochrome P-450 Biochemistry (1)**

*Kunze* Presentation and discussion of research strategies and methodologies related to current problems in human drug metabolism by cytochrome P-450 enzymes. Emphasis on hypothesis testing and experimental problem solving in the areas of enzyme kinetics and mechanism. Prerequisite: permission of instructor. Offered: even years; AWSpS.

**MEDCH 559 Protein NMR Spectroscopy (1)**

*Campbell* Combines a comprehensive theoretical treatment of high resolution NMR spectroscopy with a practical description of the experimental techniques applicable to proteins and other biological macromolecules. Offered: AWSpS.

**MEDCH 582 Topics in Medicinal Chemistry (1, max. 10)**

Discussion of pertinent articles from current literature. Credit/no credit only. Offered: AWSp.

**MEDCH 590 Doctor of Pharmacy Thesis (1)**

Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

**MEDCH 599 Cumulative Exams for Medicinal Chemistry (1)**

Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWSpS.

**MEDCH 600 Independent Study or Research (\*)**

Credit/no credit only. Offered: AWSpS.

**MEDCH 700 Master's Thesis (\*)**

Credit/no credit only. Offered: AWSpS.

**MEDCH 800 Doctoral Dissertation (\*)**

Credit/no credit only. Offered: AWSpS.

**Pharmaceutics****PCEUT 331 Pharmaceutical Formulation: Principles and Dosage Forms (4)**

*Ho, Lee, Unadkat* Physicochemical principles involved in formulating stable dosage forms suitable for human administration. Hands-on laboratory experience with formulating extemporaneous preparations routinely encountered in community and hospital pharmacies. Offered: A.

**PCEUT 336 Pharmaceutical Compounding (1)**

Explores techniques used in compounding formulations of drug products. Participation in didactic and laboratory sessions to enable students to develop advanced compounding skills and experience with quality assurance procedures. Offered: jointly with PHARM 336. Prerequisite: PCEUT 331; PHARM 334.

**PCEUT 402 Drug Therapy and the Media (2)**

*Gibaldi, Sullivan* Review of media to provide a perspective on disease and drug therapy. Elements include drug discovery and development, clinical trials, the pharmaceutical industry, regulatory agencies, and socioeconomic consideration. Preparation of written and oral summaries of media reports.

**PCEUT 405 Clinical Pharmacokinetics (5)**

*G. Anderson, Levy* Basic principles of pharmacokinetics and their application to the clinical setting, including: single-dose intravenous and oral kinetics, multiple dosing, nonlinear pharmacokinetics, metabolite kinetics, pharmacogenetics, and the role of disease in drug clearance and dose requirements, and kinetics of drug-drug interactions. Prerequisite: PCEUT 331. Offered: W.

**PCEUT 406 Biopharmaceutics and Drug Delivery (3)**

*Ho, Shen, Slattery* Principles and assessment of drug product bioavailability and bioequivalence, drug-drug and food-drug interactions for orally administered drugs, drug delivery via non-oral routes, and the systemic delivery of biotechnology drugs. Prerequisite: PCEUT 405. Offered: Sp.

**PCEUT 493 Current Biomedical Literature (1, max. 6)**

*Gibaldi* Discussion of current biomedical literature with emphasis on drug therapy. Credit/no credit only. Offered: AWSp.

**PCEUT 495 Special Studies in Pharmaceutics (\* max. 6)**

Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: Permission of instructor. Offered: AWSpS.

**PCEUT 499 Undergraduate Research (1-6, max. 12)**

*Ho, Hu, Levy Slattery, Shen, Unadkat* Research problems in drug disposition, drug targeting, and drug development. Prerequisite: Cumulative GPA of 2.5 and permission of the instructor. Offered: AWSpS.

**Courses for Graduates Only****PCEUT 501 Advanced Pharmacokinetics I (5)**

*Ho, Shen, Slattery, Thummel, Unadkat* Drug absorption, distribution, excretion, metabolism, and effects in mammalian systems. Compartmental model and model-independent approaches examined. Drug disposition studied in a physiologically realistic context taking nonlinear events into account. Aimed at development of innovative methods for data analysis and evaluation in biological systems. Prerequisite: PCEUT 405 or PCEUT 506, or permission of instructor. Offered: Sp.

**PCEUT 502 Advanced Pharmacokinetics Concepts (4)** *Levy, Shen, Slattery, Thummel, Unadkat* Recent developments and emerging concepts in theoretical and experimental pharmacokinetics. Clearance concepts and models, metabolite kinetics, mass balance relationship, protein binding, non-linear systems. Prerequisite: PCEUT 405, PCEUT 506 or permission of instructor. Offered: Sp.

**PCEUT 506 Pharmacokinetic Principles (2)** *Hansten, Ho, Levy, Shen, Slattery, Thummel, Unadkat* Coverage of basic pharmacokinetic concepts in an interactive format. Students are given reading assignments prior to class as a point of entry into discussions of the material. Topics emphasize the physiological basis for mathematical models of drug distribution, clearance, and effect. Offered: W.

**PCEUT 507 Drug Therapy Discussion Group (1, max. 12)** *Gibaldi* New and important findings and trends in pharmacokinetics, biopharmaceutics, drug metabolism, and drug toxicity, with particular emphasis on clinical significance and applicability. Credit/no credit only. Offered: AWSp.

**PCEUT 508 Drug Discovery and Development (2)** *Gardner, Gibaldi, W. Nelson, Shen* Overview of steps that lead to the introduction of new pharmacologic agents for the treatment of disease. Included are the scientific underpinnings of drug discovery, preclinical evaluation, clinical trials, regulatory considerations, and outcomes research. Credit/no credit only. Prerequisite: PharmD, student, graduate student, or permission of instructor.

**PCEUT 510 Pharmacokinetics of Drug Interactions (3)** *Hansten, Levy, Shen, Slattery, Thummel* Common pharmacokinetic mechanisms underlying the clinically important interactions between drugs. Interactions involving gastrointestinal absorption, serum drug protein binding, excretory and metabolic clearance processes are discussed. Prerequisite: PCEUT 405 or equivalent. Offered: A.

**PCEUT 513 Biotechnology, Bioinformatics, and Ecogenetics (3)** *Eaton, Rose, Thummel* Methodologies currently used for characterization, storage, and retrieval of genetic information relevant to gene-environment interactions that contribute to diseases of public health importance. Working knowledge of molecular genotyping and phenotyping, genomics, and bioinformatics related to genetic testing provided. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H/PABIO/PHG 513; A.

**PCEUT 520 Seminar (1, max. 15)** Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with MEDCH 520; AWSpS.

**PCEUT 525 Laboratory Methods in Drug Metabolism (3)** *Atkins, Daggett, Kunze, Rettie, Thummel* Advanced course covering techniques for the isolation of tissue subcellular fractions, characterization of product formation kinetics, enzyme inhibition kinetics, Western and Northern blot analysis, PCR, enzyme genotyping, and computer-based approaches for prediction of catalytically-sensitive sites on a drug molecule. Includes a weekly lab. Offered: jointly with MEDCH 525; even years; A.

**PCEUT 534 Pharmaceutical Analysis (3)** *Kalhorn, Slattery* Methods of drug and metabolite analysis from biologic matrices. Emphasis on practical aspects of assay design, optimization, and validation. Approaches to troubleshooting both assay methodology and instrumentation problems are also covered. Credit/no credit only. Offered: W.

**PCEUT 583 Topics in Pharmaceutics (1, max. 15)** Discussion of pertinent articles from current literature and recent laboratory results. Credit/no credit only. Offered: AWSp.

**PCEUT 584 Pharmacokinetic Discussion Group (2)** *Slattery* Student initiated discussions of pharmaceuticals concepts in relation to current literature. Preparatory to departmental cumulative examinations. Credit/no credit only.

**PCEUT 586 Pharmaceutical Biotechnology (3)** *Gibaldi, Ho, Thummel* Applications of biotechnology in designing therapeutic products, with emphasis on research and development of biopharmaceuticals. Consideration of molecular cloning, high throughput screening, production, physical stability, delivery systems of protein therapeutics in relation to pharmacokinetic and therapeutic responses. Prerequisite: PCEUT 331; concurrent registration in MEDCH 450 or permission of instructor. Offered: W.

**PCEUT 590 Doctor of Pharmacy Thesis (1)** Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

**PCEUT 598 Independent Research (\* max. 24)** Basic and clinical research problems in drug disposition and effect. Prerequisite: 2.5 GPA and permission of instructor. Offered: AWSpS.

**PCEUT 599 Cumulative Exams for Pharmaceutics (1)** Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWSpS.

**PCEUT 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSpS.

**PCEUT 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSpS.

**PCEUT 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.

## Pharmacy

**PHARM 304 Profession of Pharmacy (3)** *Awan* Overview of the profession of pharmacy emphasizing practice opportunities and specialization. Introduction to clinical and ethics case evaluation techniques using the Pharmacist's Workup of Drug Therapy format. Off site pharmacy visitation required. Credit/no credit only. Prerequisite: PHARM 309.

**PHARM 305 Introductory Pharmacy Practicum (3)** *O'Sullivan* Preparation and dispensing of prescriptions at Rubenstein Memorial Pharmacy in Hall Health Center or other selected community pharmacies. Designed for PharmD students with little or no experience in pharmacy. Under direct supervision of clinical faculty and other licensed pharmacy preceptors. Credit/no credit only.

**PHARM 309 Quantitative Methods I (3)** *Murri, O'Sullivan* Instruction in methods essential for conducting pharmacy calculations, interpreting and evaluating data and literature related to pharmacy, and responding to drug information inquiries from health professionals and patients. Introduction to statistical concepts necessary for pharmacy course work.

**PHARM 334 Pharmacy Practice (3)** *Narducci* Focuses on principles of contemporary pharmacy practice with emphasis on preparation and dispensing of the top 100 prescription drugs and related nonprescription therapies. Laboratory exercises in patient assessment and counseling, preparation of sterile products, and use of technology for dispensing medications and maintaining patient records. Prerequisite: PCEUT 331.

**PHARM 335 Dispensing Practicum (2/4, max. 4)** *O'Sullivan* Under preceptor supervision, students master competencies necessary for distributional responsibilities in the institutional and ambulatory care pharmacy practice settings. Credit/no credit only.

**PHARM 336 Pharmaceutical Compounding (1)** Explores techniques used in compounding formulations of drug products. Participation in didactic and laboratory sessions to enable students to develop advanced compounding skills and experience with quality assurance procedures. Offered: jointly with PCEUT 336. Prerequisite: PCEUT 331; PHARM 334.

**PHARM 403 Chemical Dependency Concepts (1)** *Lipper, Michaelene* Genesis of addiction: harm reduction strategies, legal and ethical considerations, medication management in the substance-abusing population, impaired pharmacist rehabilitation, community resources. Course offered to PharmD professional students. Prerequisite: permission of instructor. Credit/no credit only.

**PHARM 409 Applied Pharmacokinetics (2)** *Bauer* Pharmacokinetics of specific drugs. Influence of age, weight, sex, and disease states on patient-specific dosage regimens emphasized. Advanced kinetic concepts are discussed and put into applied context. Prerequisite: PCEUT 405.

**PHARM 411 Medical Devices for Home Health Care (3)** *Downing* Study of medical devices commonly provided by pharmacists to their patients, including their selection and adaptation for specific patient needs. Lectures include display and demonstration of actual devices.

**PHARM 412 Nonprescription Drugs and Self-Care (2)** *Ellsworth* Overview of common classes of non-prescription medications with emphasis on case examples. Covers patient assessment, non-drug therapy, selection of nonprescription products if appropriate, and referral decisions to patients. Oral presentation required.

**PHARM 437 Chemical Dependency Issues in Practice (3)** *Lippert, Michaelene* Emphasis on drug classes, pharmacologic management of abstinence and withdrawal, drug testing, drug use in pregnancy, treatment options and recovery, codependency and legal and ethical considerations. Credit/no credit only. Prerequisite: PHARM 403 or permission of instructor.

**PHARM 438 Gerontological Communication Skills Seminar (2)** *Dawson* Addresses special communication needs of the elderly, ranging from individualized patient counseling to patient advocacy through development and provision of pharmacy services. Communication techniques applicable to teaching, developing innovative services, supervising, motivating, conflict resolution, and interdisciplinary interactions are explored in lecture and laboratory. Credit/no credit only.

**PHARM 440 Pharmaceutical Care Systems I (4)** *Dawson* Focuses on how human behavior and communication influence the pharmacist's activities in designing, delivering, and managing patient-focused pharmaceutical care. Writing, listening, interviewing, teaching, and critical thinking as applied to pharmacy practice are emphasized.

**PHARM 445 Pharmacy-Based Immunization Programs (1)** *Ellsworth, Gardner* Provides didactic training in the epidemiology and prevention of vaccine preventable diseases and the implementation of community-based immunization programs; practical training in vaccine administration and management; and a community practicum in vaccine administration. Credit/no credit only. Prerequisite: MEDCH 401.

**PHARM 446 Community-based Screening (1)** *Downing, Gardner, Odegard* Examines the practical application of cholesterol, hypertension, bone density, body composition, and wellness assessment techniques and counseling for health behavior modification. Following didactic and laboratory training, students will obtain practice by conducting a screening at a community location. Course offered following their first professional year. Credit/no credit only. Offered: W.

**PHARM 447 Overview of Contraceptive Management (1)** *Gardner* Didactic overview of contraceptive methods, fertility interventions, and medical abortions. Establishes forum for interactive discussion. Includes patient screening criteria and selection and monitoring outcomes of currently available barrier and hormonal methods of contraception and medical abortions. Offered to students following their first professional year, as well as other health science professional students. Prerequisite: permission of instructor. Offered: Sp.

**PHARM 452 Contemporary Problems (1)** Discussion of current trends affecting the role of pharmacy in health-care delivery. Credit/no credit only.

**PHARM 460 Principles of Professional Practice Management (3)** Emphasizes the major issues and barriers of providing pharmaceutical care, managing human resources, evaluating workflow and facility design, complying with legal and safety standards, managing drug distribution services, implementing effective systems of payment for services, and marketing pharmaceutical care services of a community pharmacy.

**PHARM 462 Drug Use Review (3)** Introduction to purpose, principles, and techniques of utilization review. Emphasis on steps in drug use review process, including criteria development, data collection, analysis, and interventions. Examples of drug use review and evaluation activities in a variety of practice settings, including hospitals, nursing homes, and ambulatory care pharmacy networks. Guest speakers.

**PHARM 468 Case Studies in Pharmaceutical Care (3, max. 9)** *Dawson* Small groups of students work with an instructor to review cases illustrating various aspects of specific diseases: pathophysiology, clinical features, psychosocial factors, therapeutic interventions with emphasis on drug therapies, and community resources. Analytic reasoning, self-study skills, and knowledge are emphasized.

**PHARM 479 Quantitative Methods II (4)** *Blough, Sullivan* Introduction to basic biostatistical concepts in the field of pharmacy. Prerequisite: PHARM 309.

**PHARM 483 Institutional and Healthcare Systems Pharmacy Practice (2)** *Somani* Presentation of topics regarding current contemporary institutions pharmacy practice. Discussion of new systems technology, home care programs, managed care, computer applications, budgeting, formulary systems, drug information services, intravenous admixture programs, quality assurance process, and patient oriented services.

**PHARM 488 Elective Advanced Practicum (1-16, max. 40)** *Plein* Advanced-level geriatric clinical pharmacy experience in institutional (hospital, nursing home, long-term-care facility) and ambulatory patient-care facilities under direct supervision of a clinical preceptor. Credit/no credit only.

**PHARM 490 Fluid and Electrolytes and Parenteral Nutrition (2)** *Awan, Edwards* Principles of fluid and electrolyte therapy, including saline, water, and acid-base balance, carbohydrate, protein, lipid, vitamin, and mineral requirements in parenteral nutrition. Nutritional assessment, complications of parenteral nutrition, stability and compatibility of intravenous solutions, modifications of parenteral nutrition in pediatrics and specific disease states are also covered.

**PHARM 491 Cancer Pharmacotherapeutics (2)** *Kwok, O'Connor, Takeuchi* Pharmacotherapy of cancer, covering supportive care (antibiotics, antiemetics, analgesics, nutrition) to the antineoplastic agents themselves. Specialists in each area serve as guest lecturers.

**PHARM 492 Pharmaceutical Services for Long-Term Care (2)** *Lam* Scope of pharmaceutical services for long-term care (LTC) and systems for services. Responsibilities of the pharmacist for

distributive, administrative, and clinical pharmacy services for nursing homes and other long-term-care facilities. Economic considerations in provision of LTC pharmaceutical services, role of the consultant pharmacist for home-health-care organizations. Pharmaceutical services for independently living elderly.

**PHARM 495 Special Studies in Pharmacy (\* max. 6)** Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific areas. Students undertake independent study under the individual direction of a faculty member.

**PHARM 497 Drug Therapy for the Elderly (4)** *Gray* Current knowledge of the effects of aging on the clinical use of drugs for elderly and aged patients. Topics include drugs of choice, drug therapy monitoring, and multiple drug regimens in the treatment of multiple pathologies.

**PHARM 498 Case Conference: Geriatrics (1)** *Plein* Students taking geriatric pharmacy clerkships in various clinical settings meet with faculty to present case studies of elderly patients requiring complex drug therapies. Credit/no credit only.

**PHARM 499 Independent Study/Research (\* max. 6)** Applied pharmaceutical research problems. Credit/no credit only.

### Courses for Graduates Only

**PHARM 502 Neonatal Drug Therapy (3)** *Joseph* Clinical applications of drugs used with acute and chronically ill preterm and term neonates. Review of neonatal pharmacotherapeutics. Examination of selected therapeutic agents in relation to indications, efficacy, therapeutic and adverse effects, monitoring parameters, and dosing principles in the neonate.

**PHARM 509 Medical Literature Evaluation (2)** *Gibaldi, Odegard, O'Sullivan* Introduction to the processes involved in the assessment of primary and tertiary medical literature. Students are required to read and critique medical literature. Classes are conducted in a journal club format.

**PHARM 510 Current Topics in Infectious Disease Pharmacotherapy (3)** *Bauer, Black* Specialty topics of infectious disease pharmacotherapeutics, emphasizing the optimum use of antibiotic therapy. Discussion format using primary medical literature. Topics chosen for discussion reflect contemporary issues. Prerequisite: PHARM 560.

**PHARM 511 Current Topics in Immunology and Immunotherapeutics (2)** *Hebert* Overview of the immune system and pharmacologic agents which modulate the immune response. Credit/no credit only. Prerequisite: second, third, or fourth year PharmD student or permission of instructor.

**PHARM 512 Clinical Applications of Drug Interactions (2)** *Hansten, Horn* Discussion of the clinical evaluation and management of drug-drug interactions using patient situations. Focus on patient- and drug-related factors that predispose patients to adverse drug interactions, as well as clinical management of patients found to be at risk. Credit/no credit only. Prerequisite: third or fourth year PharmD student.

**PHARM 514 Primary Care Pharmacotherapeutics (3)** Explores clinical applications and therapeutic issues for selected drug categories commonly used in primary care settings and across age groups. Selected drug categories defined by pharmacokinetics, indications for use, efficacy, therapeutic and adverse effects, monitoring parameters, dosing principles, common drug interactions. Patient education, socioeconomic, and behavioral factors emphasized.

**PHARM 515 Pharmacotherapeutics for Acute/Critical Illness (3)** *Landis* Analysis of issues that impact the assessment, prescription, and evaluation of pharmacotherapeutic regimens for patients who are acutely or critically ill. Current research, clinical contextual considerations, and pharmacotherapeutic principles are emphasized as the basis for decisions relevant to the management of pharmacotherapy in acute care clinical practice.

**PHARM 530 Methods in Pharmaceutical Outcomes Research (3)** *Sullivan* Emphasis on design and methods of research. Overview of scientific methods, including theory construction. Instruction in writing research proposals and integration of statistical methods with design. Formulation and discussion of hypothetical research projects related to pharmaceutical outcomes. Prerequisite: graduate standing in pharmacy and one statistics course or permission of instructor. Offered: odd years.

**PHARM 532 Methods in Pharmaceutical Policy Analysis (3)** *Hazlet* Introduction to the tools used in and the framework and dominant contexts for pharmaceuticals policy development and analysis. Methods reviewed in a series of sessions presenting a specific method and case analyses involving pharmaceuticals development. Project and in-class presentation required. Prerequisite: graduate standing in pharmacy or permission of instructor.

**PHARM 533 Pharmacoepidemiology (3)** *Gardner, Heckbert, Johnson* Overview of pharmacoepidemiology including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: Graduate student or with permission. Offered: jointly with EPI 533.

**PHARM 534 Evaluating Cost and Outcomes in Health and Medicine 1 (3)** *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis, pharmacoeconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with HSERV 583.

**PHARM 535 Evaluating Cost and Outcomes in Health and Medicine 2 (3)** *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis, pharmacoeconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with HSERV 584.

**PHARM 541 Pharmaceutical Care Systems II (3)** *Somani, Sullivan* Introduces students to the complexities and policies of the medical care system as it relates to the profession of pharmacy. Emphasis will be placed on the role of organizations, institutions, financing, reimbursement, mechanisms, and public policy in delivery of pharmaceutical care.

**PHARM 543 Pharmacy Laws and Ethics (4)** *Hazlet* Study of the laws regulating the practice of pharmacy. Professional liability, warranties, and contracts are discussed. Case studies of ethical considerations of pharmacy practice.

**PHARM 550 Pharmacotherapeutics for Older Adults (4)** *Gray* Clinical use of drugs for older adults. Age-related pharmacokinetics, pharmacodynamics, and pharmacotherapeutics as applied to selecting and monitoring drug regimens for elderly patients. Problem solving regarding drugs of choice for older people with multiple pathologies. Prerequisite: fourth year PharmD student or permission of instructor.

**PHARM 560 Therapeutics I (10)** *Black, Hansten* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

**PHARM 561 Therapeutics II (9)** *Bauer, Horn* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

**PHARM 562 Therapeutics III (9)** *Anderson, Hebert* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

**PHARM 573 Laboratory and Functional Assessment: Geriatrics (1)** *Lam* Application of laboratory data and functional assessment in planning care for older adults. Case study/seminar format in which students recommend appropriate tests, interpret test results, and gain experience in performing tests of function. Recommended: MEDCH 435. Prerequisite: PHARM 560, 561, and 562, or permission of instructor.

**PHARM 574 Clinical Introductory Practicum (1)** *O'Sullivan* Students spend three days in a patient care setting, under the guidance of preceptors or advanced students, as an introduction to the practicum experience. Credit/no credit only.

**PHARM 575 Institutional Clinical Practicum (5, max. 15)** *O'Sullivan* Under faculty supervision, fourth year students provide pharmaceutical care in an inpatient environment. Credit/no credit only.

**PHARM 576 Ambulatory Care Clinical Practicum (5, max. 15)** *O'Sullivan* Under faculty supervision, fourth year students provide pharmaceutical care in an outpatient environment. Credit/no credit only.

**PHARM 577 Advanced Practicum (5, max. 40)** *O'Sullivan* Under faculty supervision, fourth year students gain experience in practice settings of their choice. Credit/no credit only.

**PHARM 578 Advanced Elective Practicum (1-10, max. 20)** *Gardner, Gray, O'Sullivan, Plein* Faculty-supervised practicums either in areas of traditional practice or in innovative practice plans designed by faculty and student. Objectives, activities, schedules, and lengths are site- and preceptor- specific. Credit/no credit only.

**PHARM 586 Clinical Case Conference (2)** *Bauer, Horn* Weekly pharmacotherapy case conference emphasizing current therapeutics and clinical decision making. Credit/no credit only.

**PHARM 590 Doctor of Pharmacy Thesis (1)** Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to

critically evaluate biomedical literature. Credit/no credit only.

**PHARM 595 Special Studies in Pharmacy (1-6, max. 24)** Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific pharmaceutical areas. Students may undertake independent study under the individual direction of a faculty member. Credit/no credit only.

**PHARM 596 Seminars in Pediatric Pharmacotherapy (2)** *Joseph* Overview of drug disposition and medication utilization as it applies to the pediatric patient. Specific emphasis on neonatology and ambulatory pediatrics. Prerequisite: third year PharmD student or permission of instructor.

**PHARM 597 Graduate Seminar (1)** *Gardner, Hazlet, Sullivan* Interactive discussion of topical issues, methods, or analytic techniques. Topics vary. Credit/no credit only. Prerequisite: graduate program student.

**PHARM 599 Independent Study/Research (1-6, max. 24)** Applied pharmaceutical research problems. Credit/no credit only.

**PHARM 600 Independent Study or Research (\*)** Credit/no credit only.

**PHARM 700 Master's Thesis (\*)** Credit/no credit only.

**PHARM 800 Doctoral Dissertation (\*)** Credit/no credit only.

# Daniel J. Evans School of Public Affairs

## Dean

Marc M. Lindenberg  
208F Parrington Hall

## Associate Dean

J. Patrick Dobel  
230 Parrington Hall



General Catalog Web Page  
[www.washington.edu/students/genctat/academic/PubAffairs.html](http://www.washington.edu/students/genctat/academic/PubAffairs.html)



School Web Page:  
[evans.washington.edu](http://evans.washington.edu)

The Daniel J. Evans School of Public Affairs is a graduate professional school providing education and research for the public service. The school confers the Master of Public Administration (M.P.A.) degree with day and evening program options. The Evans School's program of study is designed to train highly skilled managerial leaders and policy analysts for a wide range of careers in the public and nonprofit sectors. The academic and professional orientation of the degree program gives Evans School students the knowledge and skills necessary to make significant contributions to regional, national and international policy.

Graduates hold leadership positions such as mayors and city managers; local and regional government administrators; foreign service officers; senior military and public safety positions; assistants to elected officials; analysts with budget offices, legislative staff units, and city councils; directors of social service agencies; leaders and staff of nonprofit organizations and administrators of arts organizations. In addition, a number of alumni are employed in private sector positions involving substantial contact with public agencies.

## Graduate Program

Graduate Program Coordinator  
109 Parrington Hall, Box 353055  
(206) 543-4900  
[evansuw@u.washington.edu](mailto:evansuw@u.washington.edu)

### Master of Public Administration

#### Day Program

The M.P.A. program is designed for present and future leaders of the public and nonprofit sectors. The program emphasizes broad-based public policy analysis and management knowledge, while students pursue one or more specialized policy fields known as Gateways. The core devotes considerable time to mastering the basic analytic and managerial skills needed by good analysts and managers. The curriculum draws upon the wide range of academic disciplines throughout the University of Washington.

Full-time day students complete 60 credit hours of course work, encompassing the core requirements, an internship and a degree project. They generally take two academic years (six quarters) to complete the degree program. Part-time and Evening Degree students typically take three or more academic years to complete the M.P.A.

The M.P.A. program has five major components:

- the Required Core Curriculum;
- concentrated study in the three curricular Areas of Study: Economics, Management and Analysis, and Context and Values;
- specialized study in a chosen policy Gateway: Education and Social Policy, Environmental Policy, International Affairs, Nonprofit Management, Urban and Regional Affairs or an Independent Gateway;
- a final degree project; and
- an internship.

### Concurrent Degree Programs

In addition to the day M.P.A. program, the Evans School offers four concurrent M.P.A. degree programs: Master of Arts in International Studies (M.A.I.S.), Master of Urban Planning (M.U.P.), Master of Science in Forest Resources (M.S.) and Juris Doctor (J.D.).

### Mid-career Evening Degree Program

Mid-career professionals with seven to ten years of progressively responsible work experience in the public, nonprofit or private sectors are offered the Master of Public Administration degree through the Evening Degree Program. This program enables these students, typically midlevel managers, to work full-time while developing the leadership and analytic tools needed to attain higher leadership positions within their organization or field. The Evening Degree Program blends academic and professional perspectives to engender a practical orientation to the theories, values and managerial skills critical to success in public life.

Mid-career students must successfully complete 54 credits of graduate coursework to receive the M.P.A. degree. Degree requirements are divided between the integrated core sequence, electives, and leadership seminars. Students usually take two evening courses each quarter and graduate in three years. Mid-career students do not have an internship or degree project requirement. Although summer attendance is not required, some students take electives during the summer quarter to reduce academic year course loads.

The Evening Degree Program features three distinct components:

#### Integrated Core Sequence (21 credits)

The integrated core sequence is a series of management and analysis courses required of all students. Since the materials in these courses build upon each other, these classes must be taken in sequence. The integrated core curriculum is designed by a team of Evans School faculty and distinguished practitioners. Important core concepts (e.g., human resource management, microeconomics, policy analysis, political management) are presented in an integrated way that best reflects the actual practice of public management and policy analysis.

#### Electives (21 credits)

Mid-career students have great flexibility in designing a course of study that best suits their professional needs and interests. Students may mix their elective courses in substantive policy areas such as environmental or social welfare policy with more practice-based management courses. Students may choose their elective courses from any department within the University in consultation with their advisor. One elective must be a course on ethics or values.

### Leadership Seminar (12 credits)

Mid-career students take four leadership seminars during their program. The Evening Degree Program places special emphasis upon the development of managerial leadership. The seminars create a forum in which professionals can relate their workplace roles and challenges to the theories and skills examined in the M.P.A. curriculum. In an effort to foster a professional and academic support network among mid-career students, the seminar is open only to evening degree candidates.

The first leadership seminar focuses upon the personal aspects of leadership, the second focuses on analysis skills needed by leaders. The final two leadership seminars integrate the lessons of the program and are taken during the third year of study. These seminars replace the degree project requirement of full-time day students.

### Admission Requirements

The Daniel J. Evans School of Public Affairs admits students on an annual basis, for summer or autumn quarter only. The application deadline for either quarter is February 1.

The prospective student must hold a baccalaureate degree from an accredited college or university in the United States, or its equivalent from a foreign institution. The student's academic record should be a strong one, with a minimum GPA of 3.00 on the last 90 (quarter) or 60 (semester) credits of undergraduate work. Scores on the Graduate Record Examination (GRE) general test are also required for admission. GRE and TOEFL scores are required for international students only.

The primary criterion for admission to the school is the applicant's demonstrated ability to complete the graduate program while sustaining a high level of achievement. The Evans School's admissions committee considers grades and test scores, and gives considerable weight to professional experience, volunteer work, letters of recommendation and the applicant's writing skills as demonstrated in a personal essay.

Applicants for the Evening Degree Program must demonstrate seven to ten years of progressively responsible administrative experience. If prospective students have spent most of their careers in the private sector, they will need to demonstrate an active interest in, and contact with, public issues.

Concurrent degree applicants must apply through and be accepted into both respective programs.

Although the Evans School requires no specific prerequisite courses for admission, the school's core courses in economics and quantitative methods assume that entering students have been exposed to these subjects at the undergraduate level. Ideally new students will possess an academic or professional background in governmental processes, excellent writing skills and academic preparation in microeconomics and statistics. Students lacking sufficient preparation in these areas may be required to demonstrate aptitude prior to admission, or may be asked to take preparatory course work in addition to the basic M.P.A. degree requirements.

### Financial Aid

#### Evans School Scholarships

The Evans School offers several scholarships to entering students each year from the school's endowed fellowship funds. These typically consist of \$4000-\$5000 stipends awarded primarily on the basis of academic achievement and/or excellence in public service.

The Daniel J. and Nancy Evans Fellowship honors former U.S. Senator, Washington State Governor, and current University Regent Daniel J. Evans and his wife Nancy. The fellowship supports students who aspire to excellence in public service.

The Henry M. Jackson Fellowship, given in honor of the late U.S. Senator Henry M. "Scoop" Jackson, supports students pursuing careers in environmental policy and natural resources management.

The Brewster C. Denny Fellowship, named for former Dean Brewster Denny, supports students who are committed to excellence in public service.

The Robert J. Lavoie Fellowship provides funds to outstanding students who are preparing to work in public service. Mr. Lavoie served as a Deputy Mayor of Seattle.

The Hubert G. Locke Fellowship, established in honor of former Dean Hubert Locke, provides support for students pursuing internships in nonprofit organizations devoted to social justice issues.

The William Shelton Fellowship is funded by the Scottish Rite Foundation of Washington and supports students with a demonstrated commitment to the values of public service.

The George A. Shipman Fellowship offers support to outstanding students pursuing careers in public service. Professor George Shipman was the founder of public administration education at the University of Washington.

Applicants interested in departmental scholarships must submit the Evans School Financial Aid Form with their Evans School application.

### Assistantships

The Evans School offers approximately 20 research, teaching and staff assistantship positions each year. These positions are typically 10 to 20 hours per week and may include tuition waivers. Hiring for assistantships is a competitive process. Announcements are posted as the positions become available.

Research assistantships are open to first and second year students. First year students are eligible upon their arrival at the school. Students typically work on grant-funded studies, special conferences, and public policy colloquia series sponsored by the school's research centers. Research assistants are exposed to a wide range of policy issues, including regional growth management, international trade, state and federal entitlement programs, health-and-human-services delivery and environmental protection. In addition, up to four research fellowships are offered each year to highly qualified applicants during the admissions process. These fellowships guarantee a paid research assistantship for the first year of study and tuition support.

Teaching and staff assistantships are reserved for second year students only. Teaching assistants are hired for the Evans School's core courses and computer lab. Staff assistantships include such positions as Hubert Humphrey Fellows Coordinator, Peer Advisor, Evening Degree Program Recruitment Coordinator and Internship Coordinator.

### Work-Study Status

When hiring research assistants, preference is often given to students possessing work-study status. Work-study status is one of several forms of aid granted by the University of Washington Financial Aid Office based on information provided in a student's FAFSA. Financial aid applicants should highlight any financial change expected on the FAFSA.

### Research Facilities

The culture of the Evans School promotes the integration of extensive applied research into the academic program. Students participate in independent research work related to their degree projects. In addition to supporting the independent research of its faculty members, the school houses the Northwest Forum and several policy centers, which constitute the Institute for Public Policy and Management.

### Northwest Forum

Established in the fall of 1998 with a grant from the Henry M. Jackson Foundation, the Forum promotes vigorous, thoughtful exchanges to aid the Seattle metropolitan area and the surrounding region in advancing a healthy, vital, civil society. A central focus is to strengthen the framework for civil discourse that is an essential ingredient to democracy. The Forum hosts public forums, convenes working groups, and develops a variety of communication tools that recognize the multiple means through which information and ideas reach policymakers and citizens.

### Institute for Public Policy and Management

The Institute for Public Policy and Management (IPPM) initiates and conducts major applied-research projects for public managers and elected officials, drawing upon the skills and knowledge of University researchers, faculty members, graduate students and practitioners from various public and private organizations. Through research, consulting, conferences, publications, and training, the IPPM enhances the ability of public sector officials and the general public to understand major public policy issues and to make sound public management decisions.

### Northwest Policy Center

The Northwest Policy Center (NPC) was established in 1987 as a model regional program to develop and improve public strategies that promote economic vitality in the five-state Northwest region. NPC conducts policy research, designs and evaluates policy alternatives and promotes the continuous exchange of information among regional policymakers.

### Cascade Center for Public Service

The Cascade Center for Public Service was established in 1987 to enhance the quality of public management in the Northwest through the design and delivery of executive education programs. The center offers an extensive set of training programs, tailored to senior and mid-level public managers and to elected officials in state and local government. In addition the Center's Electronic Hallway Project is working to improve the development and availability of new teaching tools and techniques through the use of a computer distribution network to distribute new case studies, skill exercises and teaching notes.

### Human Services Policy Center

Founded in 1991, the Human Services Policy Center (HSPC) is an interdisciplinary research center focused on issues relating to families and children. It was created to help professionals forge links among schools and service agencies to improve service delivery to children and families. HSPC's mission includes program evaluation and data analysis to help policymakers and the general public better understand these critical issues. The center is a collaborative endeavor, involving faculty from several University of Washington professional schools: Public Affairs, Public Health and Community Medicine, Education, Social Work, Nursing and Communications.

### Center on Reinventing Public Education

The Center on Reinventing Public Education seeks to develop and evaluate methods of public oversight that can allow schools to be focused, effective and accountable. The center, established in 1993, pursues a national program of research and development on proposals such as charter schools, school contracting choice and school system decentralization. It also conducts research into reform initiatives in Washington and the Seattle public schools.

### Fiscal Policy Center

The Fiscal Policy Center (FPC) studies the impact of state taxes and spending on the lives of those who live in or near poverty, or who are vulnerable to changing state tax policies. This center combines strong analytical capacity with extensive community advocacy and policymaker contacts and seeks to frame public debate on state tax and spending policies. In addition to research and analysis, the FPC hosts seminars, conferences and specialized briefing sessions to communicate findings to decision-makers and to the general public.

### Urban Health Initiative

The purpose of the Urban Health Initiative (UHI) is to work closely for a period of up to ten years with five U.S. cities—Baltimore, Detroit, Oakland, Philadelphia and Richmond—to improve the health and safety of children living in these areas. Because each city is encouraged to try innovative approaches, a major responsibility of UHI is to document and share strategies that work over time, as well as those that prove less fruitful. UHI's National Program Office is a joint program of the Evans School and the School of Public Health and Community Medicine (SPHCM). UHI's National Program Director, Charles Royer, is the former mayor of Seattle (1978-1990). Mr. Royer and Deputy Director Cynthia Curreri teach at least one course per year and guest lecture in both the Evans School and SPHCM. UHI is funded by a grant from the Robert Wood Johnson Foundation.

## Faculty

### Professors

Beyers, William B. \* 1962, (Adjunct); PhD, 1967, University of Washington; economic geography, regional analysis, regional development.

Dobel, J. Patrick \* 1985; PhD, 1976, Princeton University; public ethics, public management, leadership.

Gordon, Andrew \* 1988; PhD, 1970, Columbia University; information policy, organizational dynamics, social psychology, community research.

Gordon, Margaret T. \* 1988; PhD, 1972, Northwestern University; news media and public policy, trust in government, urban policy.

Hill, Paul T. \* 1993, (Research); PhD, 1972, Ohio State University; education policy and reform.

Hyman, Barry \* 1975; PhD, 1965, Virginia Polytechnic Institute and State University; mechanical design, energy systems and policy.

Karr, James \* 1991, (Adjunct); PhD, 1970, University of Illinois; ecology and conservation biology, water resources, environmental sciences, natural resources.

Lindenberg, Marc 1998; MPA, 1970, PhD, 1973, University of Southern California; comparative politics and world politics, nonprofit management, public management, NGOs.

Locke, Hubert G. \* 1976, (Emeritus); MA, 1962, University of Michigan; criminal justice, urban policy, race and ethnic relations, ethics and public policy.

Madden, Carolyn Watts \* 1984, (Adjunct); MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

May, Peter J. \* 1979, (Adjunct); PhD, 1979, University of California (Berkeley); policy analysis, quantitative methods, federal disaster policy.

Miles, Edward L. \* 1974; PhD, 1965, University of Denver; international law and organization, science and international relations, marine policy.

Plotnick, Robert D. \* 1984; MA, 1973, PhD, 1976, University of California (Berkeley); poverty, labor and social welfare policy, economic policy analysis.

Williams, Walter \* 1970, (Emeritus); PhD, 1960, Indiana University; executive branch decision making, policy implementation.

Wolfe, Dael L. \* 1982, (Emeritus); PhD, 1931, Ohio State University; science and public policy.

Zerbe, Richard O. \* 1975; PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental policy.

Zumeta, William M. \* 1985; PhD, 1978, University of California (Berkeley); higher education policy, policy analysis, workforce policy, implementation.

### Associate Professors

Anderson, C. Leigh 1984; PhD, 1989, University of Washington; international environmental policy, international development, regulatory economics.

Brock, Jonathan 1982; MBA, 1973, Harvard University; public management, negotiation and mediation, labor relations, managing people.

Cullen, Alison \* 1995; DSc, 1992, Harvard University; environmental policy and management, quantitative decision analysis, risk analysis.

Klawitter, Marieka \* 1990; MS, 1986, PhD, 1992, University of Wisconsin; family and employment policy, sexual orientation, women's studies.

Miller, Ernest G. \* 1965, (Emeritus); PhD, 1959, Princeton University; management and organizational development, organization theory, administrative behavior.

Smith, Steven Rathgeb 1996; MSW, 1978, Washington University; PhD, 1988, Massachusetts Institute of Technology; nonprofit and public management, community development and urban policy.

Waddell, Paul A. \* 1997; PhD, 1989, University of Texas (Dallas); urban policy, land use and transportation, growth management, geographic information systems.

### Assistant Professors

Blanchard, Lloyd A. 1999; PhD, 1999, Syracuse University; public finance, budgeting, race and public policy, educational policy.

Kleit, Rachel G. 1999; PhD, 1999, University of North Carolina; urban politics, public housing, urban planning.

Madison, John J. 1995; MS, 1981, American University; PhD, 1994, George Mason University; politics of public policy, technology policy.

Page, Stephen B. 1999; PhD, 1999, Massachusetts Institute of Technology; public management, inter-agency collaboration, U.S. social policy.

### Senior Lecturers

Boehrer, John 1999; BA, 1965, Harvard University; faculty development, teaching skills, case teaching and writing, communication skills.

Carlson, Daniel L. 1988; MCP, 1972, University of California (Berkeley); urban policy, clinics.

Cormick, Gerald W. 1975; PhD, 1971, University of Michigan; mediation and negotiation.

Donaldson, Susan K. 2000; JD, 1979, University of Washington; leadership, urban policy.

McIntire, James L. 1987; MPP, 1978, University of Michigan; PhD, 1993, University of Washington; housing policy, state tax policy, labor market policy.

Royer, Charles T. 1994; LLD, 1983, Antioch College; urban policies, health policy.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**PB AF 498 Topics in Public Leadership (3-5) I&S** Examines the nature and variety of public leadership in modern political life. Discussion of the political, managerial, and ethical challenges facing today's public leaders as well as strategies of leadership in a wide variety of settings. Offered: jointly with POL S 472.

**PB AF 499 Topics in Public Policy (3-5) I&S** Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with POL S 404.

**PB AF 500 General Seminar (1, max. 9)**

**PB AF 502 Political Management of Policy Process (3)** Analyzes the issues which public managers address when they seek to make and implement public policy and programs. Pays particular attention to the institutional and political constraints on policy making and the skills needed to address them.

**PB AF 503 Administrative and Executive Leadership (3)** Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered: jointly with POL S 572.

**PB AF 504 Administrative Ethics (3)** Moral dilemmas that confront public managers. Critical view of societal and political values that prescribe moral behavior. Organizational and professional ethics. Ethical problems of public organization managers. Systematic means for understanding, analyzing, and coping with moral issues that appear in a career.

**PB AF 505 The Law of Public Administration (3)** Legal framework of public administrative action in the United States, emphasizing constitutional requirements; operation of the administrative process; management of personnel, funds, and contracts; and judicial review of administrative activity.

**PB AF 506 Ethics and Public Policy (3)** Teaches students to identify moral issues in public life. Special focus on the integration of moral concerns into public discussion in a manner which contributes to good policy and does not polarize issues. Discusses moral and political theory by focusing on contemporary cases and issues.

**PB AF 507 International Organizations and Ocean Management (3)** Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 507.

**PB AF 508 Management Approaches to Service Delivery (3)** Examines how services can be delivered in a way that is responsive to the needs of those being served and maximizes the effective utilization of resources. Topics addressed include: needs assessment, process analysis, service strategy, sustaining the service organization, case management, and services integration.

**PB AF 509 Public Organizational Theory (3)** Approaches to the study of organizational behavior in a changing society, including consideration of formal and informal organization, personality needs, role playing, client relations, and the sociopolitical and technological environments. Offered: A.

**PB AF 511 Management of Not-for-Profit Organizations (3)** Focuses upon the roles played by not-for-profit organizations in meeting the public good. Examines internal management issues such as structure, budget, and operations; and external issues such as board functions, legal status, marketing, media relations, and fund-raising.

**PB AF 513 Public Policy Analysis (3)** Production and use of analysis to support public policy decisions. Defining problems, devising alternative solutions, clarifying stakes in choices, predicting impacts of choices. Skills developed by working on specific policy problems. Assumes familiarity with statistics, microeconomic theory, and institutions and processes of American government. Prerequisite: PB AF 516 or permission of instructor. Offered: Sp.

**PB AF 514 Policy Implementation (3)** Presents set of analytic skills for anticipating and diagnosing implementation problems. Primarily for students who plan to become public-sector policy analysts or managers. Mastery of basic literature and its application to solving problems of public policy, including estimating feasibility of policy alternatives and identifying sources of implementation failure, is expected.

**PB AF 515 Decision Making for Public Managers (3)** Considers decision making from normative, prescriptive, and descriptive perspectives. Emphasizes individual decision making, with some discussion of organizational decision practice. Focuses on decision analysis; presents tools for structuring decisions; and considers the role of analysis as a basis for negotiation.

**PB AF 516 Microeconomic Policy Analysis (3)** Ways in which microeconomic analysis can contribute to the analysis of public sector issues. Supply and demand, consumer and firm behavior, competitive and monopoly markets, income distribution, market failure, government intervention. Policy applications of theory. Prerequisite: elementary economics. Offered: A.

**PB AF 517 Economics of the Public Sector (3)** Methods of analyzing effects of public expenditures and taxes on behavior of individuals and firms, on economic efficiency, and on equity and distribution of income. Theory and practice of intergovernmental fiscal relations. Application of theory to formulation of public policy. Prerequisite: PB AF 516.

**PB AF 520 Intergovernmental Relations (3)** Comparative study of the issues involved in implementing government programs across multiple jurisdictions. Issues of accountability, feasibility, politics, and constitutional limits are examined by focusing upon various methods used to implement programs across federal, state, regional, and international jurisdictions.

**PB AF 521 Public Management: Program Planning and Design (3)** Policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation.

**PB AF 522 Public Management: Budgeting (3)** Budgeting as a management process. Study of formulation and administration of government budgets, including role of budgeting in policy processes, approaches to budget formulation and analysis, development of the PPB approach, and aspects of budget administration, such as revenue estimating, allotment control, cost accounting. Prerequisite: PB AF 516 or permission of instructor. Offered: W.

**PB AF 523 Public Management: Personnel (3)** Study of line-staff decision making in acquisition and use of human resources in public organizations, including evaluation of job responsibilities, establishment of compensation levels, collective bargaining, selection and placement, performance appraisal, incentive management, and training.

**PB AF 524 Managing People in Public and Non-profit Agencies (3)** Emphasizes the role of the program manager rather than that of the personnel officer. Managing people within a variety of programmatic, bureaucratic, and political settings. Case studies form basis of class discussion, assignments.

**PB AF 525 Organizational Development in Public Agencies (3)** Philosophies, theories, and models of behavioral science interventions in organizational diagnosis and development (OD). In addition to a review of the basic literature dealing with the OD approach, emphasis is placed on examination of case studies and class experience in OD applications, including organizational diagnosis, problem confrontation, and team building. Prerequisite: permission of instructor.

**PB AF 526 Program Evaluation (3)** Theory, practice, and politics of evaluation, from simple feedback mechanisms to evaluation of large-scale ongoing programs and social experiments. Emphasis on applications of experimental and quasi-experimental evaluation. Case studies illustrate various types of evaluation. Prerequisite: background in quantitative methods.

**PB AF 527 Quantitative Analysis; Quantitative Analysis for Public Managers (3)** Introduces quantitative methods in the context of public management and policy analysis. Covers descriptive statistics, hypothesis testing, linear models, and research design and modeling. Helps students become knowledgeable consumers of empirical evidence. Prerequisite: graduate status in School of Public Affairs or permission of instructor. Offered: W.

**PB AF 528 Quantitative Analysis; Quantitative Analysis for Public Managers (3)** Introduces quantitative methods in the context of public management and policy analysis. Covers descriptive statistics, hypothesis testing, linear models, and research design and modeling. Helps students become knowledgeable consumers of empirical evidence. Prerequisite: PB AF 527. Offered: Sp.

**PB AF 530 Financial Management in the Public Sector (3)** Exploration of the managerial uses of accounting and other processes of financial management in the public sector. Topics covered include: financial planning and control, fund accounting, cost accounting, asset accounting, internal controls, auditing, financial analysis, and financial reporting. Prerequisite: permission of instructor.

**PB AF 532 Law and Economics (3)** Offered: jointly with LAW A 561.

**PB AF 534 International Affairs (3)** Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with POL S/SIS 534.

**PB AF 537 Topics in International Affairs (3, max. 12)** Examines topics of interest and import in foreign policy and international affairs. Focuses on the in-depth analysis of issues and the integration of economic, institutional, and political dimensions.

**PB AF 538 Legislative Relations (3)** Studies role of legislative bodies in American public policy making. Builds on case studies and focuses on tactics, constraints, and options involved in working within a legislative process to achieve public policy goals.

**PB AF 540 Integrated Public Management Sequence (3)** Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Offered: A.

**PB AF 541 Integrated Public Management Sequence (3)** Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: PB AF 540. Offered: W.

**PB AF 542 Integrated Public Management Sequence (3)** Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: 541. Offered: Sp.

**PB AF 543 Integrated Analytic Reasoning Sequence (3)** Introduction to the major analytic concepts and tools needed by public managers, including economic, qualitative, and quantitative analysis. Focus on learning to use and assess the different analytic tools and understand their proper use in the making of policy and the management of government and nonprofit organizations. Offered: A.

**PB AF 544 Integrated Analytic Reasoning Sequence (3)** Introduction to the major analytic concepts and tools needed by public managers, including economic, qualitative, and quantitative analysis. Focus on learning to use and assess the different analytic tools and understand their proper use in the making of policy and the management of government and nonprofit organizations. Prerequisite: PB AF 543. Offered: W.

**PB AF 545 Integrated Analytic Reasoning Sequence (3)** Introduction to the major analytic concepts and tools needed by public managers, including economic, qualitative, and quantitative analysis. Focus on learning to use and assess the different analytic tools and understand their proper use in the making of policy and the management of government and nonprofit organizations. Prerequisite: PB AF 544. Offered: Sp.

**PB AF 546 Public Leadership Seminar (3)** Focus on the societal context of managerial life. Credit/no credit only. Prerequisite: permission of instructor.

**PB AF 547 Public Leadership Seminar (3)** Integrated use of analytic and management concepts in the making of policy. Prerequisite: PB AF 546.

**PB AF 548 Public Leadership Seminars (3)** Provides a forum to reflect on the major dimensions of modern managerial leadership at the end of the program. Includes a team project working with outside clients or organizations. Prerequisite: PB AF 546, PB AF 547.

**PB AF 549 Public Leadership Seminars (3)** Provides a forum to reflect on the major dimensions of modern managerial leadership at the end of the program. Includes a team project working with outside clients or organizations. Prerequisite: PB AF 546, PB AF 547.

**PB AF 550 Public Arts Policy and Management (3)** Role of government in arts. Range of public support at federal, state, and local levels; reasons for its development and viability. Nature, evolution, functions of public arts agencies in implementing arts policy; relation of such agencies to their constituencies. Seattle, King County, and Washington State serve as case studies.

**PB AF 551 Comparative Administrative Systems (3)** Methodological problems of research in comparative administration. Theoretical and substantive aspects of administrative systems in urban-industrial and developing nations. Offered: jointly with SIS 551.

**PB AF 553 Applied Cost-Benefit Analysis (3)** Familiarity developed through problems and applications. Techniques of use stressed. Prerequisite: PB AF 516 or permission of instructor.

**PB AF 554 Nonprofit Organizations and Public Policy (3)** Examines the changing role of nonprofit organizations in American society. Selected policy topics include privatization, for-profit/nonprofit competition, public-private partnerships, tax policy, and new sources of revenues.

**PB AF 555 Topics in Nonprofit Management (3, max. 12)** Examines various topics of public importance in nonprofit management. Integrates the political, managerial, and economic dimensions of these issues.

**PB AF 558 Mediation and Negotiation as Instruments of Public Management and Policy-Making (3)** Possibilities offered by mediation and negotiation methods using a mixture of cases, readings, discussions, lectures, and guest speakers. Use of negotiation and mediation techniques to resolve disputes and disagreements over public-policy issues.

**PB AF 560 Urban Affairs (3)** Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with URBDP 560.

**PB AF 561 Urban Economics and Public Policy (3)** Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with URBDP 561.

**PB AF 562 Introduction to Neighborhood Planning and Community Development (3)** Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with URBDP 562.

**PB AF 563 Seminar in Urban Planning and Policy (1)** Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with URBDP 563.

**PB AF 569 Race and Public Policy (3)** Analyzes the way in which the persistent problem of race is expressed in the formation and implementation of social and public policy.

**PB AF 570 Social Policy Analysis and Management (3)** Examines major institutions and programs in the human resources policy area: education, regulation of labor market, health care, income maintenance, social services. Discusses alternative policy instruments, analytic perspectives, intergovernmental issues, and management issues arising across policy areas. Explores challenges of linking services and clients across separate agencies.

**PB AF 571 Education, The Workforce, and Public Policy (3, max. 6)** Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimination issues, and the role of education and training in economic development. Offered: jointly with EDLPS 563.

**PB AF 573 Topics in Education and Social Policy (3, max. 12)** Examines various issues of public importance in the areas of education and social policy. Focuses on in-depth analysis of relevant issues and the integration of the economic, administrative, and political dimensions of these issues.

**PB AF 575 Public Policy Processes (5)** Political science frameworks, approaches, and theories concerning development and implementation of public policies within American political systems. Governmental behaviors and processes, including rational, political, and bureaucratic models of governmental decision making; agenda-building processes; and normative perspectives concerning role of governmental entities. Offered: jointly with POL S 575.

**PB AF 577 Risk Assessment for Environmental Health Hazards (3/4)** Context, methodologies, types of data, uncertainties and institutional arrangements for risk assessment. Both qualitative and quantitative approaches to the identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with CEE 560/ENV H 577.

**PB AF 580 United States Energy Policy (3)** Energy policy formulation and implementation with emphasis on post-1973 developments. Energy conservation programs; changing roles of oil, coal, gas, nuclear, and solar energy; institutional, environmental and equity considerations; government research and development programs.

**PB AF 581 Information Technology and the Policy-Making Process (3)** Demystifies information base for policy making in democracies. Examines theoretical and practical issues associated with information processing in the public sector. Considers role of new technologies in collecting, analyzing, and disseminating information with special attention to the relationship between these technologies and effective government service, public participation, and organizational accountability.

**PB AF 582 News Media and Public Policy (3)** Explores impacts of news coverage on public policy. Exposure to journalists' approaches to coverage of public affairs, as well as to strategies used by leaders of public/non-profit agencies to attract favorable coverage and minimize damaging coverage. Students learn techniques for assessing impacts of news coverage.

**PB AF 583 Seminar in Science and Public Policy (3)** Issues and problems relating to the interaction of science and scientists with the public policy-making process. Science versus the nature and values of political processes, and the continuing tensions between the two. The evolving interaction between scientific and technical knowledge and political power; scientific versus ethical judgments. Role of science in the establishment of national goals. Plans and proposals for increasing governmental competence to deal with public policy issues involving science and technology.

**PB AF 586 International Science and Technology Policy (3)** Seminar is designed: first, to analyze the relationships between research and development policy, capabilities, and national technological strategies for advanced industrial and less-developed countries; second, to deal with the international implications of particular technologies as countries try to make policy for them in regional and global organizations. Examples of specific technologies are chosen from such fields as space telecommunication, weather and climate modification, airline transportation, nuclear energy, and seabed exploitation.

**PB AF 590 Environmental Policy Processes (3)** Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with CFR 592.

**PB AF 591 Seminar in Resource Policy and Management (1)** Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with CFR 591.

**PB AF 592 Policy Analysis Design (5)** Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Considers implications for both policy and management. Students develop a study design for course project. Offered: jointly with F M 571.

**PB AF 594 Environmental Policy Analysis: Risks and Values (3)** Emphasizes institutions involved in environmental policy including the government, environmental organizations, and private business. Examines ways in which the nature of these institutions affects the substance and ultimate effect of the environmental policy implemented.

**PB AF 595 Topics in Environmental Policy and Management (1-3, max. 12)** Examines various topics of public importance in environmental policy and management. Integrates the political, managerial, and economic dimensions of these issues.

**PB AF 596 Ethics and Values in Environmental and Natural Resource Policy (3)** *Zerbe* Explores environmental values and ethics and their relationship to the policy process. Includes content on value foundation of economic efficiency and its relationship to fairness, legal entitlements, duty to other creatures, and incommensurabilities in valuing goods. Current policy controversies are addressed.

**PB AF 598 Administrative and Policy Skills Workshop (1-3, max. 3)** Teaches practical administrative, leadership, and analytic skills commonly required of managers and analysts in the public and non-profit sectors. The workshops emphasize hands-on problem resolution, simulations, and actual practice.

**PB AF 599 Special Topics (1-6, max. 6)** Study and analysis of special topics in public affairs. Topics vary each quarter depending on curricular needs and interests of students and faculty. Prerequisite: permission of instructor.

**PB AF 600 Independent Study or Research (\*)**

**PB AF 605- Degree Project ([1-6]-, max. 6)**

# School of Public Health and Community Medicine

## Dean

Patricia W. Wahl  
F350 Health Sciences



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/School\\_Public\\_Hlt.html](http://www.washington.edu/students/genecat/academic/School_Public_Hlt.html)



School Web page:  
[depts.washington.edu/sphcm/](http://depts.washington.edu/sphcm/)

The School of Public Health and Community Medicine is composed of five departments: Biostatistics, Environmental Health, Epidemiology, Health Services, and Pathobiology. The School offers graduate programs leading to the degrees of Master of Public Health, Master of Science, and Doctor of Philosophy. Admission requirements vary by degree and field and are described in the sections of each department.

## Graduate Programs

**Master of Public Health Degree:** The M.P.H., a professional degree offered in biostatistics, environmental health, epidemiology, and health services, prepares public health practitioners. Students earning the M.P.H. may emphasize biostatistics, community medicine, epidemiology, maternal and child health, environmental/occupational medicine, public health genetics, social and behavioral sciences, international health, or nutritional sciences. The M.P.H. in public health genetics is offered through the Department of Epidemiology but is highly interdisciplinary and involves faculty from throughout the University.

The M.P.H. degree provides broad training in public health. Each track or program provides additional training in a particular area. Graduates often work in public health practice settings, academia, or research.

**Master of Science and Doctor of Philosophy Degrees:** M.S. and Ph.D. programs in biostatistics, environmental health, epidemiology, and pathobiology prepare students for academic or research careers. M.S. and Ph.D. programs in public health genetics through the Department of Epidemiology are being planned. Health Services offers the M.S., Ph.D., and a special doctoral program in conjunction with other departments at the University. The M.S. and Ph.D. programs in nutritional sciences are administered in the School, although the degrees are awarded through the Graduate School's interdisciplinary group structure.

The M.S. programs in biostatistics, environmental health, epidemiology, health services, and pathobiology, and the interdisciplinary M.S. program in nutritional sciences offer focused research training in specific disciplines. Graduates of these programs often assume positions as senior technical staff in laboratories or other organizations, as research project coordinators, or pursue further graduate training. The M.S. program differs from the Ph.D. programs in that more of the courses emphasize the concepts underlying methodological approaches rather than the ability to independently design a major research program.

The doctoral programs in biostatistics, environmental health, epidemiology, health services, and pathobiology, and the interdisciplinary Ph.D. program in nutritional sciences train future academicians, as highly qualified independent investigators and teachers, and as well-trained practitioners. The doctoral programs are distinct from the M.S. programs by the addition of advanced coursework and the nature and scope of the dissertation research project.

**Special and Conjoint Programs:** The Extended M.P.H. Program allows mid-career public health professionals to pursue the M.P.H. degree in health services or health education while continuing their employment.

The School, together with the School of Business Administration and the Graduate School of Public Affairs, offers the Master of Health Administration (M.H.A.) degree in both day and evening programs. A conjoint program with the School of Business Administration leads to concurrent M.H.A.-M.B.A. degrees. The purpose of the M.H.A. curriculum is to integrate the knowledge, skills, and experience that encompass health services management, planning, and policy analysis. Students develop knowledge and skills to understand the environment and manage change, analyze information and make decisions, manage organizations and the people in them, and integrate and apply knowledge and skills in order to develop professionally and grow as leaders.

A special program offered by the School of Public Health and Community Medicine and the Henry M. Jackson School of International Studies offers students the opportunity to earn concurrent M.P.H.-M.A.I.S. degrees. Conjoint with the School of Social Work, students may earn concurrent M.S.W.-M.P.H. degrees in maternal and child health and human services. Graduate students in the School of Nursing may pursue concurrent M.N.-M.P.H. degrees in community health care or in parent and child nursing. Medical students may earn concurrent M.D.-M.P.H. degrees.

The Department of Health Services offers a Certificate Program in Health Information Administration (HIA), a Certificate Program in Medical Management, and a Graduate Certificate Program in Public Health. A Certificate Program in Public Health Genetics is offered by the Department of Epidemiology.

**Residency Programs:** The School offers residencies in preventive medicine and occupational medicine. Physicians also are welcome to apply to any of the School's graduate programs.

## Biostatistics



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Biostatistics.html](http://www.washington.edu/students/genecat/academic/Biostatistics.html)



Department Web page:  
[www.biostat.washington.edu](http://www.biostat.washington.edu)

Graduate Program Coordinator  
F664 Health Sciences, Box 357232  
(206) 543-1044  
[ssc@biostat.washington.edu](mailto:ssc@biostat.washington.edu)

The Department of Biostatistics offers Master of Science, Master of Public Health, and Doctor of Philosophy degrees in quantitative methods applied to the medical and biological sciences. Biology, medicine, and health services are undergoing major changes in their development as quantitative sciences. As technological advances find expression in new research tools, new theoretical concepts are being employed in the analysis of quantitative data. The techniques and viewpoints of mathematics and statistics, traditionally peripheral to biology and medicine, are now woven into the fabric of the life sciences, thereby providing exciting new opportunities in research and teaching.

Many universities have instituted programs relating mathematics or statistics to one particular biological field. The goal of the biostatistics graduate program is to equip students to develop and apply the quantitative techniques of mathematics, statistics, and computing appropriate to medicine, biology, and health services.

Because of the quality of the faculty and their involvement in a diversity of statistical applications, as well as the quality of the students, students receive an excellent education. Students are recruited from undergraduate programs in mathematics, statistics, and biology and are selected on the basis of outstanding quantitative ability.

## Admission Requirements

Students may enter the program from an undergraduate major in mathematics, statistics, or a biological field. Applicants from other fields with the prerequisites will also be considered. An applicant must have completed or be in the process of completing two years of calculus (to include one year of advanced calculus), one course in linear algebra, and one course in probability theory.

In addition to fulfilling graduate admission requirements, an applicant must submit three letters of recommendation from persons competent to evaluate the applicant's abilities, a narrative statement concerning the applicant's purpose and interest in entering the program, and an official Graduate Record Examination score report. Recommendation for selection of candidates is made by a faculty admissions committee, with review of applicants beginning in January for autumn-quarter admission.

Early application for financial aid is advantageous; support is offered throughout the process and may not be available for late applicants. The application deadline for financial aid is February 1. The final application deadline is April 15.

## Master of Science

Students working for the Master of Science degree must complete required course work, demonstrate proficiency in a computer language, write a thesis, take a consulting class, and pass the first-year theory examination. This examination is offered at the conclusion of a student's first year, and, if a student does not pass, it can be retaken the next year. A Ph.D. student may receive a non-thesis Master of Science degree by successfully passing the first- and second-year qualifying examinations and all of the second-year course work.

Students completing an M.S. in Biostatistics will have learned a variety of statistical methods and applications useful to a career as a data analyst in biomedical or public health research or practice. The degree also provides preparation for individuals who plan doctoral work in a biomedical field but who want more methodological training.

## Master of Public Health

The M.P.H. program provides quantitative research training to persons holding a doctoral-level degree in another field (M.D., Ph.D. J.D.). Program requirements include credits from Biostatistics, Epidemiology, Pathobiology, Health Services, and Environmental Health courses to provide both breadth and depth. Additional requirements include a consulting class, a practicum experience, and a thesis.

Students obtaining an M.P.H. in Biostatistics will receive broad training in public health with specific training in biostatistics, learning a range of statistical methods and applications. The degree is designed for individuals who have a doctorate in another field who seek more methodological training.

## Doctor of Philosophy

Students earning the Ph.D. degree develop statistical theory and applications particular to the health sciences.

Students in the Ph.D. program must complete required course work, write a dissertation, complete a consulting class, and demonstrate proficiency in a computer language. Students must also pass the Ph.D. statistical theory and applied theory qualifying examinations, a biology project, and pass the General and Final Examinations.

A graduate of the Biostatistics doctoral program will be able to use appropriate statistical techniques to analyze a wide variety of data, provide rigorous proofs characterizing the properties of standard statistical methods, develop expertise in an area of biostatistical methodology, read and provide critical summaries of biomedical literature, and design and carry out biostatistical research studies that propose new biostatistical methods or provide new information about the properties of existing methods. This program trains future academicians, highly qualified as independent investigators and teachers, and well-trained practitioners of biostatistics.

## Faculty

### Chair

Thomas Richard Fleming

### Professors

Barlow, William E. \* 1989, (Research); MS, 1982, PhD, 1986, University of Washington; survival analysis, residuals, and evaluation of screening programs.

Breslow, Norman E. \* 1967; PhD, 1967, Stanford University; statistical methods in epidemiology, generalized linear models, childhood cancer.

Conquest, Loveday L. \* 1976, (Adjunct); PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Crowley, John Jr. \* 1982; MS, 1970, PhD, 1973, University of Washington; survival analysis, cancer clinical trials.

Davis, Kathryn A. B. \* 1974, (Affiliate); MS, 1966, University of Michigan; PhD, 1974, University of Washington; density estimation, cardiovascular data analysis, clinical trials.

De Rouen, Timothy \* 1975; PhD, 1971, Virginia Polytechnic Institute and State University; applications of biostatistics to clinical epidemiology of oral and infectious diseases.

Diehr, Paula K. \* 1970; MS, 1967, PhD, 1970, University of California (Los Angeles); health services, small area analysis, health status.

Emerson, Scott S. \* 1995; MD, 1981, University of Virginia; PhD, 1988, University of Washington; clinical trials, sequential testing, survival analysis, categorical data, computer intensive models.

Feigl, Polly \* 1969, (Emeritus); MA, 1957, PhD, 1961, University of Minnesota; application of statistics to cancer control and prevention research.

Fisher, Lloyd D. \* 1966, (Emeritus); MA, 1965, PhD, 1966, Dartmouth College; sequential/clinical trial analysis, new drugs/biologics in humans, clinical trial methodology.

Fleming, Thomas Richard \* 1984; MA, 1974, PhD, 1976, University of Maryland; survival analysis, cancer clinical trials, AIDS research, sequential analysis.

Green, Stephanie J. \* 1984, (Affiliate); MA, 1973, Indiana University; PhD, 1979, University of Wisconsin; censored survival, data analysis, clinical trials, cancer research.

Hallstrom, Alfred \* 1975; MSc, 1961, PhD, 1968, Brown University; clinical trial methodologies in cardiovascular research and emergency medical services applications.

Kopecky, Kenneth J. \* 1978, (Affiliate); MS, 1975, PhD, 1977, Oregon State University; clinical trials design and survival data analysis, epidemiologic methodology, radiation epidemiology.

Kronmal, Richard A. \* 1964; PhD, 1964, University of California (Los Angeles); nonparametric density estimation, computer algorithms, cardiovascular data analysis, clinical trials.

Lin, Danyu \* 1990; MS, 1986, PhD, 1989, University of Michigan; analysis of failure time data, designs and analysis of clinical and epidemiologic studies.

McKnight, Barbara \* 1981; PhD, 1981, University of Wisconsin; statistical methods in epidemiology, human genetics, and animal carcinogenicity testing.

Moolgavkar, Suresh H. \* 1984, (Adjunct); MBBS, 1965, Bombay University (India); PhD, 1973, Johns Hopkins University; cancer epidemiology, development of quantitative methodology.

Pepe, Margaret \* 1982, (Affiliate); MS, 1984, PhD, 1986, University of Washington; medical diagnostic testing, screening, longitudinal data, standardization, cystic fibrosis.

Peterson, Arthur V. \* 1975; MS, 1971, PhD, 1975, Stanford University; survival data methodology, competing risks, design and analysis of disease prevention trials.

Prentice, Ross L. \* 1974; MSc, 1968, PhD, 1970, University of Toronto (Canada); failure time analysis, disease prevention trials, epidemiologic methods, dietary factors and disease.

Self, Steven G. \* 1984; MS, 1977, California State University, Long Beach; PhD, 1981, University of Washington; longitudinal data analysis, survival time models, cancer prevention, HIV vaccine evaluation.

Storer, Barry E. \* 1996, (Affiliate); PhD, 1984, University of Washington; design and analysis of Phase I and II clinical trials and statistical methods for epidemiology.

Thompson, Elizabeth A. \* 1985; PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, statistics of conservation.

Van Belle, Gerald \* 1974; MA, 1964, PhD, 1967, University of Toronto (Canada); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication.

Wahl, Patricia W. \* 1971; PhD, 1971, University of Washington; multivariate statistical techniques, especially regression analysis applied to cardiovascular data.

Wellner, Jon A. \* 1983; PhD, 1975, University of Washington; large-sample theory, asymptotic efficiency, empirical processes, semiparametric models.

Wijsman, Ellen M. \* 1987, (Research); PhD, 1981, University of Wisconsin; human quantitative and population genetics.

### Associate Professors

Anderson, Garnet L. \* 1983, (Affiliate); MA, 1983, State University of New York (Binghamton); PhD, 1989, University of Washington; clinical trial methodology, survival analysis, women's health, ovarian cancer screening.

Benedetti, Jacqueline K. \* 1980; PhD, 1974, University of Washington; statistical methodology in infectious disease research, cancer clinical trials.

Etzioni, Ruth B. \* 1991, (Affiliate); MS, 1987, PhD, 1990, Carnegie Mellon University; statistical methods in cancer screening, Bayesian methods in biostatistics, design issues.

Feng, Ziding \* 1990, (Affiliate); MS, 1985, PhD, 1990, Cornell University; correlated data methods, mixture models, cancer prevention.

Heagerty, Patrick J. \* 1995; MS, 1991, State University of New York (Albany); PhD, 1995, Johns Hopkins University; dependent data regression technique, longitudinal data methods, categorical time series.

Hughes, James P. \* 1981, (Research); MS, 1980, PhD, 1993, University of Washington; statistical methods for infectious disease research, Markov models, environmental statistics.

Kooperberg, Charles L. \* 1991, (Affiliate); PhD, 1991, University of California (Berkeley); splines, density estimation, image reconstruction, spatial statistics, function estimation.

Le Blanc, Michael \* 1987, (Research); MA, 1984, University of Waterloo (Canada); PhD, 1989, University of Washington; tree-based models, survival analysis, clinical trials, adaptive statistical methods.

Leroux, Brian \* 1991; MSc, 1985, PhD, 1989, University of British Columbia (Canada); biostatistical methodology and its application to clinical trials and epidemiology.

Polissar, Nayak Lincoln \* 1980, (Affiliate); PhD, 1974, Princeton University; statistical consulting, community surveys, clinical trials, demography, epidemiology, environment.

Thompson, Mary Lou \* 1989, (Research); PhD, 1979, Georg-August Universität (Germany); filtered point processes, diagnostic methods, longitudinal reference ranges, maternal/child health.

Thorndquist, Mark Daniel \* 1985, (Affiliate); MS, 1982, PhD, 1985, University of Wisconsin; ordinal/categorical response, repeated measures data, chemoprevention, group-randomized trials.

Wakefield, Jonathan Clive \* 1999; PhD, 1992, Nottingham University (United Kingdom); Bayesian data analysis, statistical methods in epidemiology, spatial epidemiology.

Zhao, Lue-Ping \* 1985, (Affiliate); PhD, 1989, University of Washington; quantitative genetics, genetic epidemiology, estimating equations, correlated data analysis/sampling.

### Assistant Professors

Brumback, Babette 1999; MA, 1992, PhD, 1996, University of California (Berkeley); functional data analysis, causal inference, epidemiology, statistical applications.

Emond, Mary Jane \* 1987, (Research); MS, 1989, PhD, 1993, University of Washington; semiparametric models, design and analysis of experiments to elucidate genetic changes in neoplasia.

Gooley, Theodore A. \* 1993, (Affiliate); PhD, 1990, University of Arizona; design and analysis of clinical trials in bone marrow transplantation.

Hsu, Li \* 1996, (Affiliate); MS, 1991, PhD, 1994, University of Washington; multivariate survival analysis, design and analysis of genetic epidemiologic studies.

Huang, Yijian 1997, (Affiliate); MS, 1994, PhD, 1997, University of Minnesota; survival analysis, HIV/AIDS clinical trials and epidemiological studies.

Lumley, Thomas S. \* 1995; PhD, 1998, University of Washington; correlated data regression, clinical trials, statistical computing and graphics.

Mancil, Lloyd A. \* 1986, (Adjunct Research); MS, 1988, PhD, 1992, University of Washington; statistical methodology in periodontal disease and TMD research.

McIntosh, Martin \* 1996, (Research); PhD, 1996, Harvard University; causal inference for observational studies, Bayes theory, meta-analysis.

Monks, Stephanie 1999; MS, 1996, PhD, 1999, North Carolina State University; statistical genetics, permutation tests, sampling design of genetic studies.

Richardson, Barbara Ann \* 1993, (Research); MS, 1989, PhD, 1993, University of California (Los Angeles); statistical methods for data from AIDS/STD clinical trials.

Rossini, Anthony J. \* 1998, (Research); ScD, 1994, Harvard University; statistical computing, statistical issues in HIV/AIDS research, and the analysis of graphs.

Rutter, Carolyn \* 1996, (Affiliate); MS, 1988, PhD, 1991, University of California (Los Angeles); evaluation of diagnostic tests, ROC curve analysis and correlated data problems.

Sheppard, Lianne \* 1989, (Research); MSc, 1985, Johns Hopkins University; PhD, 1992, University of Washington; observational study methods, grouping, environmental and occupational exposures.

Wang, Ching-Yun \* 1993, (Affiliate); MS, 1985, National Taiwan University; PhD, 1993, Texas A&M University; case control studies, missing data, measurement error, kernel smoothing.

Yanez, Norbert David III \* 1993; MS, 1989, PhD, 1993, Arizona State University; generalized linear models, overdispersion, measurement error models.

Yao, Qing \* 1996, (Research); MSc, 1991, PhD, 1994, University of Toronto (Canada); statistical methods in design and analysis of clinical trials.

Yasui, Yutaka \* 1996, (Affiliate); PhD, 1994, Johns Hopkins University; statistical methods in cancer epidemiology, spatial regression models, cancer prevention research.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**BIOST 111 Lectures in Applied Statistics (1) NW** Weekly lectures illustrating the importance of statisticians in a variety of fields, including medicine and the biological, physical, and social sciences. Contact instructor for information on which fields of applications emphasized. Credit/no credit only. Offered: jointly with STAT 111; Sp.

**BIOST 290 Introduction to Biomedical Research: Study Design and Interpretation (3) NW** Biostatistical concepts necessary for the interpretation, evaluation, and communication of biomedical research are introduced. Course topics include biomedical study design, randomization, graphical data displays, control of bias, variability, confounding, interaction, and ethics of human experimentation. Students participate in group and individual projects, group discussions, and oral presentations.

**BIOST 499 Undergraduate Research (\*)** Supervised reading programs; library and field research; special projects. Credit/no credit only.

## Courses for Graduates Only

**BIOST 502 Introduction to Statistics in Health Sciences (4)** Description and examples of common concepts in biostatistics. Probability, point and confidence interval estimation, hypothesis testing including two-sample and paired t and chi-square tests, introduction to simple linear regression. Examples in health sciences stressed. Offered: S.

**BIOST 503 Application of Statistics to Health Sciences (4)** Standard statistical techniques presented with examples drawn from the health sciences literature. Critical interpretation of research results, and introduction to the computer for data processing and statistical analysis. Prerequisite: BIOST 502 or equivalent. Offered: S.

**BIOST 509 Special Emphases in Biostatistics (3-5, max. 5)** Introduction to concepts and methods of descriptive and inferential statistics, with applications in specific disciplines emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, nonparametric methods, linear regression and correlation. Different sections target specific student populations.

**BIOST 510 Biostatistics in Dentistry (3)** Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or Permission of instructor. Offered: jointly with DPHS 568.

**BIOST 511 Medical Biometry I (4)** Presentation of the principles and methods of data description and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedical literature, and real data sets are analyzed by the students after a brief introduction to the use of standard statistical computer packages. Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation. Offered: AS.

**BIOST 512 Medical Biometry II (4)** Multiple regression, analysis of covariance, and an introduction to one-way and two-way analyses of variance: including assumptions, transformations, outlier detection, dummy variables, and variable selection procedures. Examples drawn from the biomedical literature with computer assignments using standard statistical computer packages. Prerequisite: BIOST 511 or equivalent. Offered: W.

**BIOST 513 Medical Biometry III (4)** Analysis of categorical data including two sample methods, sets of 2 x 2 tables, R x C tables, and logistic regression. Classification and discrimination techniques. Survival analysis including product limit estimates and the Cox proportional hazards model. Prerequisite: BIOST 512 or permission of instructor. Offered: Sp.

**BIOST 514 Biostatistics I (4)** Mathematically sophisticated presentation of principles and methods of data description; graphics; point, confidence interval estimation; hypothesis testing; relative risk; odds ratio; Mantel-Haenszel; chi-square test (matrix algebra required). Examples drawn from biomedical literature; real-data sets analyzed using statistical computer packages. Prerequisite: biostatistics majors or permission of instructor. Offered: A.

**BIOST 515 Biostatistics II (4)** Mathematically sophisticated introduction to linear models; multiple regression, correlation; residual analysis; dummy variables; analysis of covariance; one-, two-way analysis of variance; randomized blocks; fixed, random effects (repeated measure, factorial designs); multiple comparisons (matrix algebra required). Real biomedical data sets analyzed. Prerequisite: BIOST 514, biostatistics major, or permission of instructor. Offered: W.

**BIOST 519 Topics in Epidemiologic Methods (3)** *Davis* Introduces advanced methodologic issues faced by epidemiologist, including development and validation of clinical prediction rules, recursive partitioning, studies using correlated or repeated measures or group allocation, case-crossover designs, confounding by indication, and two stage sampling. Prerequisite: EPI 512; EPI 513; BIOST 536. Offered: jointly with EPI 515. Sp.

**BIOST 521 Biostatistics for Experimentalists (4)** Statistical aspects of design, data analytic models appropriate to classes of experiments most commonly employed in biomedical sciences. One-, two-way analyses of variance; factorial, crossed, nested, repeated measures designs. Clean, messy real-data sets analyzed using standard statistical computer packages. Prerequisite: BIOST 511, BIOST 512, or equivalent. Offered: alternate years; Sp.

**BIOST 524 Design of Medical Studies (3)** Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations,

stratification, and ethics. Suitable for graduate students in biostatistics and for research-oriented graduate students in other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of BIOST 513, STAT 421, STAT 423, STAT 512, or EPI 512; or permission of instructor. Offered: jointly with STAT 524; Sp.

**BIOST 529 Sample Survey Techniques (3)** Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: BIOST 421, BIOST 423, QMETH 500 or BIOST 511 or equivalent; or permission of instructor. Offered: jointly with STAT 529.

**BIOST 532 Statistical Methods in Medical Genetics (2)** *Wijman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Prerequisite: knowledge of genetics or permission of instructor. Offered: jointly with MED 532 and PHG 532; Sp.

**BIOST 533 Classical Theory of Linear Models (3)** Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: BIOST 513, STAT 421 or STAT 423; and STAT 513; and a course in matrix algebra. Offered: jointly with STAT 533; Sp.

**BIOST 534 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 534; A.

**BIOST 535 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 535; W.

**BIOST 538 Statistical Computing (3)** Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 538; Sp.

**BIOST 536 Categorical Data Analysis in Epidemiology (4)** Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: BIOST 515; or BIOST 513 and EPI 514; or permission of instructor. Offered: jointly with EPI 536; A.

**BIOST 537 Survival Data Analysis in Epidemiology (4)** Introduction to multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses

appearing in the literature. Prerequisite: BIOST 536 or permission of instructor. Offered: jointly with EPI 537; W.

**BIOST 550 Statistical Genetics I: Mendelian Traits (3)** *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power; latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with STAT 550; A.

**BIOST 551 Statistical Genetics II: Quantitative Traits (3)** *Monks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BIOST 515; or permission of instructor. Offered: jointly with STAT 551; W.

**BIOST 552 Statistical Genetics III: Medical Genetics Studies (3)** *Wijsman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with STAT 552; Sp.

**BIOST 570 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 512, 513; BIOST/STAT 533 or STAT 421 and STAT 423, and a course in matrix algebra. Offered: jointly with STAT 570.

**BIOST 571 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BIOST 570. Offered: jointly with STAT 571.

**BIOST 572 Advanced Applied Statistics and Linear Models (3)** Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BIOST 571. Offered: jointly with STAT 572.

**BIOST 573 Statistical Methods for Categorical Data (3)** Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasiliikelihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: BIOST 571 and STAT 582. Offered: jointly with STAT 573, alternate years; Sp.

**BIOST 574 Multivariate Statistical Methods (3)** Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: BIOST 570 or permission of instructor. Offered: jointly with STAT 574, alternate years.

**BIOST 576 Statistical Methods for Survival Data (3)** Statistical methods for censored survival data arising from follow-up studies on human or animal

populations. Parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either BIOST 513, STAT 473, or equivalent. Offered: jointly with STAT 576.

**BIOST 577 Advanced Design and Analysis of Experiments (3)** Concepts important in experimental design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Graeco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response surface experiments. Prerequisite: BIOST 570 or STAT 421 (minimum 3.0) or permission of instructor. Offered: jointly with STAT 577.

**BIOST 578 Special Topics in Advanced Biostatistics (\* max. 3)** Advanced-level topics in biostatistics offered by regular and visiting faculty. Prerequisite: permission of instructor. Offered: jointly with STAT 578; AWSpS.

**BIOST 580 Seminar in Biostatistics (\* max. 9)** Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Offered: AWSpS.

**BIOST 586 Martingales: Survival Analysis (3)** *Fleming* Theory of counting processes and martingales to provide unified study of survival analysis methods. Focus on survival distribution estimators, censored data rank statistics, regression methods with censored survival data. Development of small samples moments, asymptotic distributions, and efficiencies. Prerequisite: STAT 521 or STAT 583 or permission of instructor; recommended: STAT 576. Offered: jointly with STAT 586; alternate years; W.

**BIOST 590 Biostatistical Consulting (\*)** Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Prerequisite: permission of instructor. Offered: AWSpS.

**BIOST 593 Cancer Prevention Research Laboratory (3)** *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Offered: jointly with EPI 593; AWSpS.

**BIOST 595 Biostatistics Master's Practicum (1-12, max. 12)** Supervised practice experience providing students an opportunity to learn how biostatistics is applied in a public health setting and in the formation of public health policy. Prerequisite: 514; 515; 536; 537.

**BIOST 598 Techniques of Statistical Consulting (1)** Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with STAT 598; ASp.

**BIOST 600 Independent Study or Research (\*)** Offered: AWSpS.

**BIOST 700 Master's Thesis (\*)** Offered: AWSpS.

**BIOST 800 Doctoral Dissertation (\*)** Offered: AWSpS.

## Environmental Health



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Environmental\\_Hlth.html](http://www.washington.edu/students/genocat/academic/Environmental_Hlth.html)



Department Web page:  
[depts.washington.edu/envhlth/](http://depts.washington.edu/envhlth/)

## Graduate Program

Graduate Program Coordinator  
F461 Health Sciences, Box 357234  
(206) 543-3199

The Department of Environmental Health offers three graduate degrees: Master of Science, Master of Public Health, and Doctor of Philosophy. The areas of emphasis in the graduate programs are industrial hygiene and safety, toxicology, environmental health technology, and occupational and preventive medicine (M.P.H.).

*The Industrial Hygiene and Safety Program* (M.S., Ph.D.) focuses on technical and administrative aspects of preventing or controlling occupational illness and injury. Research opportunities include laboratory and field investigations of exposure to health and safety hazards such as toxic chemicals, radiation, and biomechanical stress. Students may elect one of two program options: industrial hygiene, emphasizing recognition, evaluation, and control of exposure to chemical and physical agents; or safety/ergonomics, emphasizing design and assessment of the worker-machine interface.

Students who are interested in the radiological sciences should inquire about the radiological health option in the industrial hygiene program.

*The Toxicology Program* (M.S., Ph.D.) focuses on research and application of basic scientific principles toward a better understanding of the health effects of toxic substances in the workplace and general environment. Students who select the toxicology option participate in laboratory research on molecular and biochemical processes involved in chemically induced toxic responses such as soft-tissue (e.g., brain, lung, kidney, and liver) damage, birth defects, cancer, and nervous-system impairment.

*The Environmental Health Technology Program* (M.S.) focuses on community problems associated with toxic substances or biological hazards and their control, hazardous-waste disposal, and traditional areas of environmental health, such as water and wastewater treatment, food protection, and ambient air quality. Students conduct research on the monitoring and control of hazardous substances and biological agents contaminating surface and ground waters, on human-exposure assessment, or on hazardous-waste management. This involves field and laboratory activities.

*The M.P.H. Program* is for individuals with an earned doctorate. The goal of the program is to provide training in public-health sciences with a focus on occupational and environmental health. The program provides didactic instruction and participation in field studies. Research efforts focus on the etiology and prevention of occupational disease. Physicians have the option of also applying for a residency in occupational or preventive medicine.

The Department of Environmental Health cooperates with the Department of Health Services in a three-year, part-time Extended Master of Public Health degree program designed for mid-career public- and community-health professionals. Students continue their employment, are required to attend one-month summer sessions for three years, and must meet at the University for five weekends during the academic year.

## Admission Requirements

Prerequisites for admission to the M.S. graduate programs in industrial hygiene and safety, toxicology, and environmental health technology include a Bachelor of Science or equivalent degree in environmental health, a physical science, a biological science, or engineering, and submission of Graduate Record Examination scores.

Prerequisite for admission to the M.P.H. program is a doctoral degree.

Prerequisites for admission into the Ph.D. program in environmental and occupational health sciences include a Bachelor of Science degree in science or engineering with adequate preparation in physics, chemistry, mathematics, and biology. Selection of an applicant will also be based upon an honors-level GPA, a statement of personal goals consistent with the program, supportive letters of reference, and high scores on the Graduate Record Examination.

## Graduation Requirements

The M.S. and M.P.H. graduate programs are designed for seven quarters of study, including field applications and research, and require completion of departmental and program-specific courses, and submission of an acceptable thesis.

The Ph.D. program has a strong research focus, and requires completion of departmental and program-specific courses. A dissertation of original research suitable for publication in an appropriate peer-reviewed journal is required. For an entering student with a Bachelor of Science or engineering degree, the program of study can be expected to take approximately four to five years. A student entering with a Master of Science degree in a relevant area may complete the degree in less time.

## Financial Aid

Support is available for many students in the form of traineeships or research assistantships, which include tuition. This support comes from federal and private sources awarded to the department or School.

## Research Facilities

Specialized laboratories exist for research in industrial hygiene chemistry, optical remote sensing of chemicals, industrial ventilation, ergonomics, trace organics and heavy metals, environmental microbiology, electron microscopy, controlled exposure to environmental factors, and toxicology. Field research is facilitated through an extensive consultation-service program conducted by this department for labor and industry in Washington state.

## Faculty

### Interim Chair

David A. Kalman

### Professors

Altman, Leonard \* 1974, (Clinical); MD, 1969, Harvard University; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins.

Checkoway, Harvey \* 1987; MPH, 1975, Yale University; PhD, 1978, University of North Carolina; occupational and environmental epidemiology.

Costa, Lucio Guido \* 1983; PharmD, 1977, University of Milan (Italy); neurotoxicology; developmental and molecular mechanisms/biological markers of neurotoxicity.

Covert, David S. \* 1975, (Adjunct Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry, aerosol instrumentation, aerosol physics, chemistry, optics.

De Walle, Foppe B. \* 1988, (Affiliate); PhD, 2000, University of Washington; environmental health technology, hazardous waste, drinking water treatment, toxics reduction.

Eaton, David L. \* 1979; PhD, 1978, University of Kansas; biochemical and environmental toxicology, aflatoxin carcinogenesis, metabolism of toxic chemicals.

Fantel, Alan G. \* 1973, (Adjunct Research); PhD, 1974, University of Washington; embryology, teratology.

Faustman, Elaine M. \* 1981; PhD, 1980, Michigan State University; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds.

Fenske, Richard A. \* 1990; MA, 1976, MPH, 1978, PhD, 1984, University of California (Berkeley); human exposure and health risk assessment, pesticide exposure.

Franklin, Gary M. \* 1988, (Research); MD, 1969, George Washington University; MPH, 1982, University of California (Berkeley); occupational injury, neurological epidemiology, public health nutrition.

Kalman, David A. \* 1978; PhD, 1978, University of Washington; environmental chemistry, detection and fate of chemical hazards in natural and manmade environments.

Karr, James \* 1991, (Adjunct); PhD, 1970, University of Illinois; ecology and conservation biology, water resources, environmental sciences, natural resources.

Koenig, Jane Q. \* 1974; MS, 1961, PhD, 1963, University of Washington; respiratory physiology, health effects of air pollutants, lung response of susceptible groups.

Larson, Timothy \* 1970, (Adjunct); PhD, 1976, University of Washington; airborne particles, air quality modeling, and instrument development.

Luchtel, Daniel L. \* 1972; PhD, 1969, University of Washington; electron microscopy and cell biology, lung anatomy/pathophysiology, fiber toxicology.

Morgan, Michael S. \* 1974; DSc, 1972, Massachusetts Institute of Technology; applied respiratory, physiological and inhalation toxicology.

Omenn, Gilbert S. \* 1981, (Affiliate); MD, 1965, Harvard University; PhD, 1972, University of Washington; genetic predisposition to environmental and occupational hazards.

Omiecinski, Curtis J. \* 1983; PhD, 1980, University of Washington; molecular toxicology, genetic regulation/expression of drug/chemical metabolizing enzymes.

Rosenstock, Linda \* 1981; MD, 1977, Johns Hopkins University; occupational/general internal medicine.

Sever, Lowell E. \* 1991, (Affiliate); PhD, 1973, University of Washington; perinatal epidemiology, particularly reproductive effects of occupational/environmental exposures.

van Belle, Gerald \* 1974; MA, 1964, PhD, 1967, University of Toronto (Canada); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication.

Woods, James S. \* 1982, (Research); PhD, 1970, University of Washington; MPH, 1978, University of North Carolina; biochemical toxicology of trace metals; biological markers of metal exposure.

### Associate Professors

Barnhart, Scott \* 1979; MD, 1979, George Washington University; occupationally related lung disease.

Brodin, Carl \* 1989; MD, 1983, University of Colorado (Denver); hepatic effects of occupational solvent exposure; ventilatory decline in asbestos-exposed workers.

Burbacher, Thomas M. \* 1974; PhD, 1983, University of Washington; neurotoxicology, specializing in the behavioral effects of agents on the central nervous system.

Daniell, William E. \* 1984; MD, 1979, Tufts University; MPH, 1986, University of Washington; health effects of occupational chemical exposures, multiple chemical sensitivity syndrome.

Gilbert, Steven G. \* 1990, (Affiliate); PhD, 1986, University of Rochester; primate neurobehavioral toxicology and teratology, developmental effects of heavy metals.

Grossmann, Angelika \* 1985, (Affiliate); DVM, 1978, PhD, 1982, Freie University of Berlin (Germany); immunosenescence in humans and mice; immunotoxicology; transmembrane signaling in T-lymphocytes.

Guffey, Steven E. \* 1987; MSIE, 1973, North Carolina State University; PhD, 1987, University of North Carolina; industrial ventilation design, modeling of pressure and flow relationships, hood design research.

Kaufman, Joel D. \* 1988; MD, 1986, University of Michigan; MPH, 1990, University of Washington; epidemiology of occupational/environmental factors in respiratory, skin and cardiovascular disease.

Kavanagh, Terrance J. \* 1985; MS, 1980, PhD, 1985, Michigan State University; free radical toxicology, glutathione metabolism, toxicology and aging.

Keifer, Matthew C. \* 1982; MD, 1982, University of Illinois; the human health effects of pesticide exposure.

Kissel, John C. \* 1990; MS, 1974, Harvard University; PhD, 1985, Stanford University; solid and hazardous waste management practice, human exposure assessment.

Leroux, Brian \* 1991, (Adjunct); MSc, 1985, PhD, 1989, University of British Columbia (Canada); biostatistical methodology and its application to clinical trials and epidemiology.

Martin, Thomas G. 1996, (Adjunct); MD, 1977, Pennsylvania State University; general internal medicine.

Seixas, Noah S. \* 1992; MS, 1982, Harvard University; PhD, 1990, University of Michigan; exposure assessment methods for occupational/epidemiologic studies; small industrial plants.

Yost, Michael G. \* 1993; MS, 1984, PhD, 1989, University of California (Berkeley); worker exposures to physical agents, electromagnetic fields, noise and vibration.

Zarbl, Helmut 1996, (Affiliate); PhD, 1983, McGill University (Canada); toxicology, cancer biology, environmental carcinogenesis.

### Assistant Professors

Liu, Lee-Jane Sally \* 1998; MS, 1991, ScD, 1994, Harvard University; air pollution, exposure assessment, environmental epidemiology.

Samadpour, Mansour \* 1987; MS, 1987, PhD, 1990, University of Washington; molecular epidemiology of microbial pathogens, bacterial population genetics and pathogenesis.

Sheppard, Lianne \* 1989, (Research); MSc, 1985, Johns Hopkins University; PhD, 1992, University of Washington; observational study methods, grouping, environmental and occupational exposures.

Xia, Zhengui \* 1987; MS, 1985, Wuhan University (China); PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

### Senior Lecturers

Morris, Sharon L. 1982; BA, 1965, Reed College; occupational safety and health policy, continuing education.

Treser, Charles D. \* 1980; MPH, 1976, University of Michigan; administrative law and process in environmental health; housing; vector control.

### Lecturer

Camp, Janice E. 1982; MS, 1984, MN, 1984, University of Washington; workplace exposure assessment, evaluation of exposure, controls, program evaluation.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

**ENV H 405 Toxic Chemicals in the Environment (3)** *Kavanagh* Basic principles governing the behavior and effects of toxic chemicals released into the environment; sources, distribution, and fate of toxic chemicals in the environment; chemicals and cancer; chemicals and birth defects; government regulation of chemical hazards. Focus on human health impacts of chemicals found in the workplace and general environment. Prerequisite: 2.0 in BIOL 203; either 2.0 in CHEM 242 or 2.0 in CHEM 347. Offered: Sp.

**ENV H 415 Nuclear Instruments (3)** Principles, measurements, and detection of various types of radiation encountered in nuclear energy systems. Use of Geiger, proportional, and scintillation detectors; ionization chambers; analog-digital data-logging equipment; multichannel analyzers. Offered: W.

**ENV H 417 Non-ionizing Radiation and Electrical Safety (2)** *Yost* Introduction to health hazards from UV, optical laser hazards, infrared radiation, radio-frequency radiation, heat stress, electrical shock, electric and magnetic fields. Application of current standards for these physical agents. Emphasis on occupational hazards with additional discussion of environmental exposures where appropriate. Offered: odd years; W.

**ENV H 430 Methods in Environmental Sampling and Analysis (3)** *Samadpour* Field sampling methods studied and selected laboratory analyses of food, drinking water, and waste waters conducted. Official methods for characterizing physical and chemical quality of water and wastes demonstrated. Microbiological criteria emphasized for student participation, including: enumeration of subgroups in populations, selective inhibitor, characteristics of normal flora, rationale of "indicator" organisms. Prerequisite: 2.0 in MICROM 302. Offered: A.

**ENV H 431 Environmental Health Sampling and Analysis II (3)** *Samadpour* Methods for collection and analyses of environmental samples are examined or demonstrated, including official analytical procedures of FDA, USDA, EPA, and AOAC, as well as cutting edge developments. Criteria for wholesomeness, safety, and inhibition of spoilage of food and food products are examined. Prerequisite: ENV H 430. Offered: W.

**ENV H 440 Water and Waste Sanitation (4)** *Lenning* Study of health problems associated with drinking water and wastewaters and minimization of problems. Focus on drinking water quality and quantity requirements; water pollutants and impacts on environment; individual drinking water, onsite sewage facilities, related site selection criteria/regulations, regulatory agency activities. Field performance of environmental health specialist emphasized. Prerequisite: 2.0 in BIOL 203. Offered: A.

**ENV H 441 Food Protection (3)** *Easterberg* Study of identification and characteristics of chemicals and biological agents implicated in foodborne disease outbreaks and conditions or circumstances by which food contamination occurs. Examination of food protection activities conducted by local and state government at the retail level. Prerequisite: either 2.0 in CHEM 155 or 2.0 in both CHEM 160 and CHEM 161, or 2.0 in CHEM 162; 2.0 in MICROM 302. Offered: W.

**ENV H 442 Vector Control (3)** *Treser* Study of the impact and control of rodents and arthropod vectors of disease, including consideration of economic poisons used, their regulation, and safety measures. Prerequisite: 2.0 in BIOL 203. Offered: Sp.

**ENV H 445 Solid Waste Management (3)** *Turnberg* Examination of the public health, environmental, economic, and materials conservation aspects of solid wastes management; amounts and sources of solid wastes, waste reduction and recycling, methods of storage, transportation and disposal, integrated waste management, identification of present problems and future needs. Prerequisite: 2.0 in CHEM 155, 2.0 in CHEM 160, or 2.0 in CHEM 162; either 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 134, or 2.0 in MATH 144; recommended: PHYS 115. Offered: Sp.

**ENV H 446 Hazardous Waste Management (3)** *Kissel* Characterization of hazardous wastes and introduction to pertinent federal and state regulations. Discussion of exposure pathways and description of management options at pre-generation, pre-release, and post-release stages. Emphasis on public health significance. Supplemented with case studies. Prerequisite: either 2.0 in CHEM 155, 2.0 in CHEM 160, 2.0 in CHEM 162; either 2.0 in MATH 112, 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 234, or 2.0 in MATH 144; recommended: MATH 125, CHEM 224, PHYS 115. Offered: W.

**ENV H 449 Respiratory Effects of Air Pollution (2)** *Koenig* Structure and function of the respiratory system and the changes that may be produced by specific air pollutants, such as ozone, SO<sub>2</sub>. Air quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Offered: odd years; Sp.

**ENV H 453 Exposure Assessment for Occupational and Environmental Health (3)** *Morgan* Introduction to principles and scientific foundations of human exposure assessment in workplace and community environments. Exposure assessments are essential for determining disease etiology and for characterizing health risks within a risk assessment framework. Special emphasis on workplace hazard evaluation and control. Prerequisite: 2.0 in BIOL 202; either 2.0 in CHEM 224, 2.0 in CHEM 239, or 2.0 in CHEM 337; either 2.0 in PHYS 116 or 2.0 in PHYS 123. Offered: A.

**ENV H 454 Industrial Hygiene Measurements (3)** *Guffey, Monteith* Series of lectures and laboratory demonstrations illustrate the use of a wide spectrum of industrial hygiene sampling equipment. Included are airflow calibration, chemical calibration, detector tubes, personnel sampling devices, both continuous and direct reading instruments. Instrumentation for noise and electromagnetic radiation. Prerequisite: 2.5 in ENV H 453. Offered: Sp.

**ENV H 457 Industrial and Environmental Noise (3)** *Yost* Survey of industrial and community noise problems, including sources, effects, measurement, control, and legislation. Prerequisite: 2.0 in PHYS 115. Offered: Sp.

**ENV H 461 Air Pollution Control (4)** *Morgan, Pilat* Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with CEE 490; A.

**ENV H 470 Environmental Health Practice: Administration and Management (2)** *Osaki, Treser* Explores selected aspects of the management of environmental health programs in the community, including organization theory and practice, budgeting, personnel management, program planning and evaluation, and community relations. Prerequisite: ENV H 482. Offered: A.

**ENV H 471 Environmental Health Regulation (3)** *Treser* Introduction to administrative regulation and process. Authority, jurisdiction, and structure of environmental control programs and agencies; the regulatory process; agency acquisition and retention of information; administrative actions; enforcement of environmental health laws; major statutes and cases affecting programs. Prerequisite: ENV H 482. Offered: W.

**ENV H 472 Environmental Risk and Society (3)** *Fenske* Examines scientific determinations of environmental risks and explores how such determinations are evaluated by affected communities and society. Employs risk analysis to integrate technical knowledge in hazard identification and exposure assessment to provide a more rational basis for environmental policies. Role of public participation in risk-based decision making discussed. Offered: W.

**ENV H 480 Environmental Health Problems (\* max. 6)** *Treser* Individual projects involving library, laboratory, or field study of a specific environmental health problem. Offered: AWSpS.

**ENV H 482 Environmental Health Internship (2-15, max. 15)** *Treser* Assignment to an environmental health or environmental protection agency for supervised observation and experience in environmental health technology, program planning and utilization of community resources. Prerequisite: 2.5 in ENV H 311. Credit/no credit only. Offered: AWSpS.

**ENV H 497 Environmental Health Special Electives (\*)** Offered: AWSpS.

**ENV H 499 Undergraduate Research (\*)** Individual research on a specific topic in environmental health upon which specific conclusions, judgments, or evaluation can be made or upon which facts can be presented. Offered: AWSpS.

## Courses for Graduates Only

**ENV H 511 Environmental and Occupational Health (3)** Effects of exposure to chemical, physical, and biological agents, embracing the community and workplace environments. Current issues, using specific cases from recent literature as basis for classroom discussion and written assignments. Offered: W.

**ENV H 512 Hazardous Waste Management Technology (3)** *De Walle* Lecture and field study covering the role, design concepts, and capabilities of environmental technologies used in waste management, industrial, and related facilities. Lecture sessions, field site visits with site visit technical reports, and class paper addressing relevant topic in detail. Offered: S.

**ENV H 513 Biotechnology, Bioinformatics, and Ecogenetics (3)** *Eaton, Rose, Thummel* Methodologies currently used for characterization, storage, and retrieval of genetic information relevant to gene-environment interactions that contribute to diseases of public health importance. Working knowledge of molecular genotyping and phenotyping, genomics, and bioinformatics related to genetic testing provided. Prerequisite: GENET 372 or equivalent. Offered: jointly with PABIO/PEUT/PHG 513; A.

**ENV H 514 Environmental and Occupational Toxicology I (3)** *Omiecinski* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: A.

**ENV H 515 Environmental and Occupational Toxicology II (3)** *Luchtel* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by

which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: W.

**ENV H 516 Environmental and Occupational Toxicology III (3)** *Costa* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: Sp.

**ENV H 524 Radioactive and Chemical Wastes (3)** Fate and effects of mixed radioactive and hazardous waste in the environment are discussed. Topics are: the generation, storage, disposal, environmental transport, pathways to humans, and evaluation of health effects of mixed wastes. Also includes: waste disposal at sea, and the current status and future trends in mixed waste disposal. Offered: Sp.

**ENV H 527 Radiation Hazards Analysis and Control (1)** *Addison* Emphasizes methods and procedures rather than facility or equipment design. Offered: Sp.

**ENV H 528 Physical Aspects of Medical Imaging (4)** *Stewart* Quantitative physical principles of medical imaging are presented for electromagnetic and ultrasonic radiation. Methods of radiation generation and image formation are discussed for conventional projection radiography, Computed Radiography, CT B-mode and Doppler Ultrasound, Nuclear Medicine, SPECT, PET, and Magnetic Resonance Imaging. Offered: jointly with RADGY/BIOEN 508; W.

**ENV H 531 Neurotoxicology (3)** *Costa* Advanced discussions of the principles and methodological approaches to neurotoxicology (including behavioral toxicology), classes of neurotoxic agents, types and mechanisms of neurotoxic effects, as well as the role of neurotoxicology in toxicology and public health. Prerequisite: ENV H 514, ENV H 515, ENV H 516 or ENV H 405 or permission of instructor. Offered: even years; W.

**ENV H 532 Reproductive and Developmental Toxicology (2)** *Faustman* Investigates chemicals that can induce adverse reproductive and developmental outcomes. Discussion topics include identification and characterization of specific classes of toxic agents, mechanisms of action of these agents at the molecular and cellular level, and risk assessment and regulatory issues. Prerequisite: ENV H 514 and ENV H 515 or ENV H 405 or permission of instructor. Offered: even years; S.

**ENV H 533 Molecular Toxicology (2)** *Kavanagh, Omiecinski* Advanced discussion of molecular mechanisms whereby chemical, physical, and biological agents produce their harmful effects on biological tissues. Prerequisite: permission of instructor. Offered: jointly with PHCOL 533; even years; Sp.

**ENV H 535 Inhalation Toxicology (3)** *Koenig, Luchtel* Advanced course on the toxicology of air pollutants and the response of the respiratory system to inhaled gaseous and particulate toxicants. Issues and concepts covered include biology of the respiratory system, exposure technology, experimental design and methodological issues, health effects of air pollutants, and regulatory aspects. Prerequisite: ENV H 514-516, or ENV H 405 or permission of instructor. Offered: even years; A.

**ENV H 545 Drinking Water and Health (3)** *Samadpour* Principles, requirements of public water supply for protection of public health. Includes essential characteristics of water quality and sources, water treatment and distribution systems with associated health hazards; public health engineering,

epidemiology, risk assessment; surveillance, regulatory needs to assure safe public water supplies. Prerequisite: ENV H 440 or CEE 351 or permission of instructor. Offered: A.

**ENV H 546 Pesticides and Public Health (3)** *Fenske, Keifer* Examines health risks and benefits associated with pesticide use in the United States and internationally; reviews exposure, toxicity, epidemiology, and regulation of pesticides, focusing on populations such as workers and children; discusses benefits derived from vector control, food production, and food preservation. Offered: W; odd years.

**ENV H 550 Microscopy: Image Acquisition and Analysis (2)** *Luchtel* Sample preparation methods, principles and practical aspects of light microscopy (bright-field, phase, differential interference, polarizing, and confocal), electron microscopy (transmission, scanning, electron diffraction, and energy dispersive x-ray analysis), photographic and digital imaging, computerized image analysis techniques. Student research project required. Prerequisite: permission of instructor. Offered: Sp.

**ENV H 552 Environmental Chemistry of Pollution (3)** *Kalman* Chemical and physical processes determining distribution and fate of chemical hazards, detection of low levels of hazardous compounds, and environmental evaluation and prediction. Fundamental chemical concepts and measurable properties of individual compounds to interpret and relate measurements. Prerequisite: admission to graduate program or permission of instructor. Offered: W.

**ENV H 553 Instrumental Methods for Industrial Hygiene Measurement: Lecture (3)** *Morgan* Strategy, methods, instrumentation, and theory of atmospheric sampling and analysis, emphasizing evaluation of potential occupational hazards and exposures to chemical agents. Prerequisite: ENV H 453 or permission of instructor. Offered: W.

**ENV H 555 Instrumental Methods for Industrial Hygiene Measurement: Laboratory (3)** *Monteith, Yost* Utilizes typical instrumental techniques and analytical methods for the evaluation of potential occupational exposures. Prerequisite: ENV H 453 and ENV H 553 or permission of instructor. Offered: Sp.

**ENV H 556 Quantitative Occupational Exposure Analysis (3)** *Morgan, Seixas* Exploration of industrial hygiene data to understand nature of airborne exposures in the occupational environment, and their interpretation for human health. Focus on reading and discussion of primary exposure assessment literature and statistical analysis of real dataset. Prerequisite: one quarter of statistics or biostatistics and basic industrial hygiene. Offered: Sp.

**ENV H 557 Industrial Ventilation I (4)** *Guffey* Principles of exhaust ventilation systems, design for contaminant control in industry. Offered: W.

**ENV H 558 Industrial Ventilation II (3)** *Guffey* Troubleshooting and redesign of existing exhaust ventilation systems for contaminant control. Includes measurement laboratories. Prerequisite: ENV H 557 or permission of instructor. Offered: Sp.

**ENV H 559 Applied Industrial Hygiene (3)** *Camp* Application of occupational safety and health principles through a combination of field investigations and classroom discussions. Teams conduct walkthrough evaluations, environmental sampling, exposure assessment, review of current health and safety programs, and development of control strategies to eliminate or reduce hazards at a local worksite. Prerequisite: ENV H 564 or equivalent. Offered: W.

**ENV H 560 Organizing and Administering Industrial Safety and Health Programs (4)** Explores industrial organization and methods of integrating safety and industrial hygiene programs with industrial operations. Philosophic issues related to industrial safety and health such as responsibility for safety, dependency on safe practice, and hierarchy of prevention are investigated. Contains numerous case problems and student involvement opportunities. Offered: A.

**ENV H 562 Technical Aspects of Safety and Health (3)** Explores specific hazards associated with major industries, as well as hazards common to all industries. Machine guarding, electrical safety, systems safety analysis, materials handling, and working at heights are among the subjects covered. Offered: W.

**ENV H 564 Recognition of Health and Safety Problems in Industry (4)** *Camp, Seixas* Develops skills in occupational health and safety hazard recognition in a variety of important northwest industries. Focuses on process understanding and hazard recognition skills during walk-through inspections of several local facilities, stressing a multidisciplinary approach. Offered: A.

**ENV H 566 Introduction to Ergonomics (3)** Basic principles of ergonomics in work environment applied to problems of worker and management. Topics include measurement of physical work capacity, problems of fatigue and heat stress, applied biomechanics, worker-machine interactions and communication, design of displays and controls. Prerequisite: basic human physiology or permission of instructor. Offered: Sp.

**ENV H 567 Mechanisms of Carcinogenesis (3)** *Xia* Lectures/presentations of biochemical and molecular basis of carcinogenesis induced by environmental agents, including approaches to identification of carcinogens. Role of cell proliferation and cell death (apoptosis) in cancer formation and cancer treatment. Molecular mechanisms that regulate proliferation and apoptosis. Prerequisite: ENV H 516, ENV H 405, or permission of instructor. Offered: A.

**ENV H 568 Molecular Epidemiology of Infectious Diseases (2)** Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: ENV H 511 or ENV H 512 or permission of instructor. Offered: jointly with EPI 568/PABIO 568; W.

**ENV H 569 Occupational Biomechanics (4)** Lectures and laboratories address human occupational biomechanical and physiological limits and measurement, analysis, and modeling techniques that are used by ergonomists for design of safe, healthful, and productive physical work. Prerequisite: ENV H 566 or permission of instructor. Offered: jointly with IND E 569; Sp.

**ENV H 570 Occupational and Environmental Epidemiology (3)** *Checkoway, Daniell* Research in occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with EPI 570; Sp.

**ENV H 571 Neuroepidemiology and Environmental Risk Factors (3)** Focus on neurologic diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: 511 or equivalent. Offered: jointly with EPI 571; odd years, W.

**ENV H 572 Clinical Occupational Medicine (3)** *Brodkin* For clinicians in training, comprehensive overview of occupational disease principles, occupational history-taking, and the provider's role in workers' compensation. Epidemiologic evidence and pathophysiologic basis for occupational diseases reviewed, emphasizing organ system approach to diagnosis and management. Prerequisite: occupational medicine or preventive medicine residents/fellows, nursing students, or permission of instructor. Offered: S.

**ENV H 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3)** Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with EPI 573; W.

**ENV H 574 Quantitative Methods for Environmental Exposure Assessment (3)** *Kissel* Examination of methods used to predict human exposure to environmental contaminants. Emphasis on application to waste management strategies, site remediation, and land use. Development and use of probabilistic methods, comparison to deterministic approaches. Offered: Sp.

**ENV H 577 Risk Assessment for Environmental Health Hazards (3/4)** *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Prerequisite: ENV H 515 and BOST 511 or permission of instructor. Offered: jointly with CEE 560/PB AF 577; A.

**ENV H 580 Environmental Health Seminar (1, max. 6)** Presentation of current environmental health research and environmental and public health issues. Credit/no credit only. Offered: AWSp.

**ENV H 581 Environmental Health Reading I (1)** *Koenig, Xia* Critical reading of selected basic and applied research publications on environmental health problems and programs. Offered: A.

**ENV H 582 Environmental Health Reading II (1)** *Burbacher, Xia* Discussion of controversial and current issues facing public health and the environmental health professional. Offered: W.

**ENV H 583 Environmental Health Reading III (1)** *Burbacher, Koenig* Preparation and presentation of master's thesis proposal. Offered: Sp.

**ENV H 584 Occupational Health and Safety: Policy and Politics (3)** *Camp, Morris* Designed to provide a better understanding of the historical, political, and policy issues in occupational health and safety through selected readings and discussion with experts in the field. Particular emphasis on the Occupational Safety and Health Act. Students present testimony in a mock congressional hearing on a health and safety issue. Offered: Sp.

**ENV H 590 Selected Topics (1-6, max. 6)** In-depth study of a current environmental health topic. For more information and permission, consult department program adviser. Offered: AWSpS.

**ENV H 591 Current Topics in Toxicology (1, max. 6)** *Kavanagh* Provides in-depth examination of current topics in environmental and occupational toxicology taken from recently published journal articles. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Assigned weekly readings given according to the schedule of speakers and topics. Credit/no credit only. Offered: AWSp.

**ENV H 593 Current Topics in Risk Assessment (1, max. 6)** *Faustman, Gilbert* Examines current topics in risk assessment and risk communication with a focus on issues in environmental health. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Credit/no credit only. Offered: AWSp.

**ENV H 594 Current Topics in Environmental Health Technology (1, max. 2)** Critical review and discussion of current scientific literature of particular relevance to the Environmental Health Technology program. Primary presentations rotate among faculty and students. Credit/no credit only. Offered: W.

**ENV H 595 Research Rotation (3, max. 9)** Research laboratory rotation for predoctoral graduate students. Students commit to a laboratory research project aimed at introducing the student to current methods in laboratory research, and to familiarize the student with specific faculty research interests. Prerequisite: graduate standing and permission of program director. Offered: AWSpS.

**ENV H 596 Current Issues in Occupational and Environmental Medicine (2, max. 12)** *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with NURS 580; AWSp.

**ENV H 599 Field Studies (2-6, max. 6)** Assignment to an environmental research or service program to develop field research and evaluation skills. Credit/no credit only. Offered: AWSpS.

**ENV H 600 Independent Study or Research (\*)** Prerequisite: permission of departmental adviser. Offered: AWSpS.

**ENV H 700 Master's Thesis (\*)** Prerequisite: permission of departmental adviser. Offered: AWSpS.

**ENV H 800 Doctoral Dissertation (\*)** Credit/no credit only. Prerequisite: permission of departmental adviser. Offered: AWSpS.

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## Epidemiology



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/Epidemiology.html](http://www.washington.edu/students/genocat/academic/Epidemiology.html)



Department Web page:  
[depts.washington.edu/epidem/](http://depts.washington.edu/epidem/)

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## Graduate Program

Graduate Program Coordinator  
F342 Health Sciences, Box 357236  
(206) 616-1766  
epi@u.washington.edu

The Department of Epidemiology offers three graduate degrees in the field of epidemiology for individuals intending to become academicians, highly qualified research specialists, or well-trained public health practitioners. The Master of Public Health degree requires course work in health services and environmental health in addition to epidemiology course work, thesis research, and a practicum. The Master of Science degree requires concentration on courses and research in epidemiology as preparation for technical specialization or as a prelude to the Doctor of Philosophy program. The Ph.D. course requirements differ from the M.S. program requirements primarily in the scope and complexity of research for the dissertation. Course work includes a basic series in epidemiology, biostatistics, and electives in chronic disease, infec-

tious disease, and methodology. The department also offers postdoctoral research training and a two-year residency in general preventive medicine with emphasis on epidemiology for physicians.

## Special Requirements

M.P.H. applicants who hold an M.D., D.V.M., D.D.S., or Ph.D.; possess a bachelor's degree and a health-related background; or seek a combined M.D./M.P.H. are considered. M.S. applications are welcomed from outstanding bachelor-level graduates, physicians, and other health professionals. Ph.D. applicants must have prior master's- or doctoral-level training in a health-related field, equivalent postbaccalaureate experience, or anticipate earning a joint M.D./Ph.D.

## Financial Aid

Research training stipends are available on a limited basis. Opportunities for work on various research projects or as a teaching assistant may provide partial assistance.

## Research Facilities

University facilities include well-equipped laboratories, an excellent library system, and access to computers. Various opportunities for field research are provided in Seattle and elsewhere in the state, including the Fred Hutchinson Cancer Research Center, Group Health Cooperative's Center for Health Studies, the Harborview Injury Prevention and Research Center, Public Health of Seattle-King County, and several other local hospitals and health institutions.

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## Faculty

### Interim Chair

James L. Gale

### Professors

Alexander, E. Russell \* 1990, (Emeritus); MD, 1953, University of Chicago; infectious disease epidemiology, disease prevention, maternal-neonatal infection, STDs.

Austin, Melissa A. \* 1988; PhD, 1985, University of California (Berkeley); genetic and cardiovascular disease epidemiology, quantitative methods.

Becker, Thomas \* 1995, (Affiliate); MA, 1976, University of New Mexico; MD, 1981, Case Western Reserve University; PhD, 1986, University of New Mexico; cancer, infectious disease, and cancer epidemiology among minority populations.

Beresford, Shirley A. \* 1987; PhD, 1981, University of London (UK); nutritional and cancer epidemiology, health promotion.

Checkoway, Harvey \* 1987; MPH, 1975, Yale University; PhD, 1978, University of North Carolina; occupational and environmental epidemiology.

Connell, Frederick A. \* 1978, (Adjunct); MD, 1972, New York University; maternal and child care, health services.

Daling, Janet R. \* 1979; PhD, 1977, University of Washington; breast cancer, reproductive health, viruses, genital cancer.

Davis, Scott \* 1980; PhD, 1980, University of Washington; epidemiology radiation and cancer; hematopoietic cancers, disease clustering, and aggregation.

Di Giacomo, Ronald F. \* 1974, (Adjunct); VMD, 1965, University of Pennsylvania; MPH, 1974, University of Washington; epidemiology and zoonoses.

Drewnowski, Adam \* 1998; PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.

- Eisenberg, Mickey \* 1978, (Adjunct); MD, 1971, Case Western Reserve University; PhD, 1978, University of Washington; sudden cardiac arrest and acute myocardial infarction.
- Emanuel, Irvin \* 1966; MA, 1956, University of Arizona; MD, 1960, University of Rochester; MS, 1966, University of Washington; epidemiology of maternal and child health problems, childhood factors in adult diseases.
- Foy, Hjordis \* 1967, (Emeritus); MD, 1953, Karolinska Institute (Sweden); PhD, 1968, University of Washington; epidemiology and control of infectious disease.
- Gale, James L. \* 1969; MD, 1961, Columbia University; MS, 1969, University of Washington; epidemiology and control of infectious disease, vaccine safety, public health practice.
- Gates, George A. 1993, (Adjunct); MD, 1959, University of Michigan; otology/neurotology, cochlear implantation.
- Grayston, J. Thomas \* 1960; MD, 1948, MS, 1952, University of Chicago; epidemiology and control of infectious disease, especially respiratory infections.
- Handsfield, Hunter 1979, (Adjunct); MD, 1968, Columbia University; infectious diseases.
- Henderson, Maureen M. \* 1975, (Emeritus); MBBS, 1949, DPH, 1956, University of Durham (UK); application of epidemiology to disease prevention, dietary prevention of disease.
- Holmes, King K. \* 1967, (Adjunct); MD, 1963, Cornell University; PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.
- King, Mary-Claire \* 1995, (Adjunct); PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.
- Koepsell, Thomas D. \* 1979; MD, 1972, Harvard University; MPH, 1979, University of Washington; injury, cardiovascular epidemiology, neuroepidemiology, methods, application to health services.
- Koutsky, Laura A. \* 1981; PhD, 1987, University of Washington; sexually transmitted diseases, HIV-AIDS, HPV, etiology and natural history of cervical neoplasia.
- Kristal, Alan R. \* 1987; DPH, 1983, Columbia University; nutritional epidemiology, relationship between diet and cancer.
- Kukull, Walter A. \* 1981; PhD, 1984, University of Washington; genetic, environmental, and clinical epidemiology of Alzheimer's disease.
- Lacroix, Andrea Z. \* 1989; PhD, 1984, University of North Carolina; older women's health, osteoporosis, cardiovascular disease and injury prevention.
- Longstreth, W. T. Jr. \* 1981, (Adjunct); MD, 1975, University of Pennsylvania; MPH, 1982, University of Washington; neurology.
- Marcuse, Edgar K. 1971, (Adjunct); MD, 1967, Stanford University; MPH, 1973, University of Washington; general pediatrics.
- Martin, Diane P. \* 1978, (Adjunct); MA, 1972, Temple University; PhD, 1979, University of Washington; health services use and cost, alternative delivery systems and insurance.
- Moolgavkar, Suresh H. \* 1984; MBBS, 1965, Bombay University (India); PhD, 1973, Johns Hopkins University; cancer epidemiology, development of quantitative methodology.
- Mueller, Beth A. \* 1984; DPH, 1984, Tulane University; epidemiology of perinatal and reproductive diseases, cancer, and injury research, methods.
- Oberle, Mark W. 1988, (Adjunct); MD, 1974, Johns Hopkins University; public health policy.
- Patrick, Donald L. \* 1987, (Adjunct); MS, 1968, PhD, 1972, Columbia University; aging, disablement, and health-related quality of life.
- Perine, Peter L. \* 1981; MD, 1966, University of Kansas; MPH, 1973, University of Washington; international health, sexually transmitted diseases.
- Potter, John D. \* 1995; MBBS, 1971, PhD, 1984, University of Queensland (Australia); cancer, nutritional and molecular epidemiology, cancer prevention.
- Psaty, Bruce M. \* 1984; PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, and pharmacoepidemiology.
- Rivara, Frederick P. \* 1984, (Adjunct); MD, 1974, University of Pennsylvania; pediatric epidemiology and injury prevention and research.
- Sever, Lowell E. \* 1991, (Affiliate); PhD, 1973, University of Washington; perinatal epidemiology, particularly reproductive effects of occupational/environmental exposures.
- Shy, Kirkwood K. \* 1979, (Adjunct); MD, 1973, Wayne State University; epidemiologic applications to problems in obstetrics and gynecology.
- Siscovick, David S. \* 1987; MD, 1976, University of Maryland; epidemiology and prevention of cardiovascular disease.
- Stamm, Walter E. \* 1979, (Adjunct); MD, 1971, Harvard University; infectious disease.
- Stanford, Janet L. \* 1986, (Research); PhD, 1985, Johns Hopkins University; chronic disease epidemiology including cancer and cardiovascular disorders; biochemical epidemiology.
- Thomas, David B. \* 1979; MD, 1963, University of Washington; DPH, 1972, Johns Hopkins University; breast and gynecologic cancer epidemiology and prevention.
- Vaughan, Thomas L. \* 1982; MD, 1978, University of Illinois; MPH, 1983, University of Washington; environmental and genetic factors in etiology of esophageal, nasopharyngeal and lung cancer.
- Weiss, Noel S. \* 1975; MD, 1967, Stanford University; DPH, 1971, Harvard University; chronic disease epidemiology and prevention, epidemiologic methods, clinical epidemiology.
- White, J. Emily \* 1982; PhD, 1982, University of Washington; cancer epidemiology and prevention, epidemiologic methods.

### Associate Professors

- Alderman, Beth W. \* 1989, (Research); MD, 1981, University of Chicago; MPH, 1984, University of Washington; reproductive, birth defect, clinical, and environmental epidemiology.
- Astley, Susan J. \* 1980; PhD, 1990, University of Washington; etiology, diagnosis, prevention of fetal alcohol syndrome.
- Chu, Joseph \* 1982, (Affiliate); MD, 1975, Georgetown University.
- Critchlow, Cathy W. \* 1979; PhD, 1993, University of Washington; epidemiology of sexually transmitted diseases, virus-associated cancers, epidemiologic methods.
- Cummings, Peter \* 1992; MD, 1970, Case Western Reserve University; MPH, 1993, University of Washington; injury and clinical epidemiology, emergency medicine research.
- Davis, Robert L. \* 1991; MD, 1983, University of California (San Diego); MPH, 1993, University of Washington; childhood immunization, including adverse events; perinatal and pediatric epidemiology.
- Elmore, Joann G. 1996, (Adjunct); MD, 1987, Stanford University; MPH, 1992, Yale University; clinical epidemiology.
- Farrow, Diana C. \* 1991; MA, 1985, PhD, 1989, University of Washington; cancer etiology of gastrointestinal cancers and precursor lesions.

- Gloyd, Stephen S. \* 1985, (Adjunct); MD, 1973, University of Chicago; MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.
- Goldbaum, Gary M. \* 1989; MD, 1978, University of Colorado (Denver); MPH, 1989, University of Washington; behavioral factors in HIV/AIDS, preventive medicine.
- Haselkorn, Jodie K. \* 1985, (Adjunct); MD, 1985, Louisiana State University; health services for the disabled; diagnostic accuracy of tests, effectiveness of interventions.
- Heckbert, Susan R. \* 1990; MD, 1981, Case Western Reserve University; MPH, 1987, PhD, 1990, University of Washington; clinical epidemiology, cardiovascular epidemiology, pharmacoepidemiology.
- Helgerson, Steven D. \* 1990, (Clinical); MD, 1973, MPH, 1976, University of Washington; Native American health issues.
- Holt, Victoria L. \* 1989; MPH, 1987, PhD, 1990, University of Washington; women's reproductive health, prenatal and perinatal care, domestic violence.
- Kaufman, Joel D. \* 1988, (Adjunct); MD, 1986, University of Michigan; MPH, 1990, University of Washington; epidemiology of occupational/environmental factors in respiratory, skin and cardiovascular disease.
- Kestin, Mark \* 1990, (Affiliate); PhD, 1989, Flinders University (Australia); MPH, 1990, Harvard University; relationship between nutrition, cancer and cardiovascular disease.
- Kimball, Ann M. \* 1992; MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.
- McTiernan, Anne \* 1989, (Research); PhD, 1982, University of Washington; breast and colon cancer, women's health, exercise and obesity.
- Moore, Donald E. 1977, (Adjunct); MD, 1967, Case Western Reserve University; reproductive endocrinology.
- Patterson, Ruth E. \* 1994, (Research); PhD, 1992, University of North Carolina; dietary assessment in adult populations, vitamin supplements in cancer prevention.
- Pendergrass, Thomas W. 1978, (Adjunct); MD, 1971, University of Tennessee; MPH, 1979, University of Washington; hematology, oncology.
- Reiber, Gayle \* 1991; MPH, 1975, Johns Hopkins University; PhD, 1989, University of Washington; epidemiology and health services research on preventing complications of diabetes.
- Rossing, Mary Anne \* 1988, (Research); DVM, 1980, University of Illinois; PhD, 1993, University of Washington; cancer epidemiology, reproductive health.
- Schwartz, Stephen Marc \* 1989; PhD, 1990, University of Washington; interaction of genetic and environmental factors in cancer and cardiovascular disease.
- Stehr-Green, Paul 1995; DPH, 1982, University of Pittsburgh; chronic, infectious, vaccine-preventable diseases, environmental health, health-care delivery.
- Stevens, Nancy G. \* 1982, (Adjunct); MD, 1979, MPH, 1982, University of Washington; family medicine.
- Weigler, Benjamin J. \* 1997, (Adjunct); DVM, 1986, Colorado State University; MPH, 1988, University of California (Berkeley); PhD, 1991, University of California (Davis); infectious disease epidemiology in laboratory animal medicine and management.
- Williams, Michelle A. \* 1991; ScD, 1991, Harvard University; reproductive and perinatal epidemiology, perinatal screening.

**Assistant Professors**

Anderson, Laurie M. 1999, (Affiliate); PhD, 1994, University of California (Los Angeles); disease control and prevention.

Ballard, Jane E. 1993, (Affiliate); MS, 1971, University of Minnesota; PhD, 1989, University of Washington; epidemiology.

Buskin, Susan E. 1993, (Affiliate); PhD, 1992, University of Washington; epidemiology.

Bynum, Christian 1991; PhD, 1996, University of Washington; child abuse; injury, occupational epidemiology; reproductive health; epidemiologic methods.

Cheney, Carrie L. \* 1990; PhD, 1989, University of Washington; role of nutrition in cancer prognosis and secondary prevention.

Edwards, Karen L. \* 1991; PhD, 1996, University of Washington; genetic epidemiology.

Hitti, Jane 1993, (Adjunct); MD, 1989, University of Vermont; MPH, 1995, University of Washington; perinatal medicine, HIV and pregnancy.

Jackson, Lisa A. \* 1988; MD, 1988, University of Virginia; MPH, 1996, University of Washington; infectious disease epidemiology, vaccine efficacy, cost-benefit analysis.

Jarvik, Gail P. \* 1991, (Adjunct); PhD, 1986, University of Michigan; MD, 1987, University of Iowa; quantitative genetics and genetic epidemiology, focusing on common diseases.

Lampe, Johanna W. \* 1998, (Research); MS, 1982, PhD, 1990, University of Minnesota; dietary modulation of chronic disease: biomarkers of intake and risk.

Maden, Christopher 1994, (Affiliate); PhD, 1990, University of Washington; epidemiology.

Malone, Kathleen E. \* 1994, (Research); PhD, 1993, University of Washington; breast cancer, etiology prognosis and genetics.

McGrath, Barbara B. \* 1987, (Adjunct Research); PhD, 1993, University of Washington; medical anthropology, illness knowledge and practice, US Pacific Islander populations, HIV/AIDS.

Mock, Charles N. \* 1992; MD, 1980, Brown University; injury: epidemiology, prevention, treatment, especially in less developed countries.

Tsu, Vivian D. \* 1992, (Affiliate); PhD, 1991, University of Washington.

Tsuang, Debby W. 1992, (Adjunct); MD, 1988, University of Iowa.

Wald, Anna \* 1989; MD, 1985, Mt Sinai School of Medicine; MPH, 1994, University of Washington; epidemiology, natural history, and therapeutics of HSV and other herpes viruses infections.

Wolf, Marsha E. \* 1983; PhD, 1988, University of Washington; injury epidemiology and older adults and women, domestic violence.

**Instructor**

Lavreys, Ludo J. D. 1995, (Acting); MD, 1986, Catholic University of Leuven (Belgium); research in AIDS, STD and primary health care.

**Course Descriptions**

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscaf/](http://www.washington.edu/students/crscaf/).

**Epidemiology**

**EPI 420 Introduction to Epidemiology (3) NW** For the undergraduate student wishing to devote only one quarter to a course in epidemiologic methods.

Description of ways in which variation in disease occurrence is documented and how that variation is studied to understand causes of disease. Offered: A.

**EPI 497 Epidemiology Special Electives (\*)** Off-campus course for medical students. Offered: AWSpS.

**EPI 499 Undergraduate Research (\*)** Offered: AWSpS.

**Courses for Graduates Only**

**EPI 501 Public Health Practice at the Local Level (3)** *Gale, Thompson* Basic overview of state and local public health practice with leaders in the field and case studies focusing on rural and urban public health challenges. Offers preparation for practice in public health agencies. Prerequisite: HSERV 511 or permission of instructor. Offered: jointly with HSERV 501.

**EPI 503 Public Health Surveillance: Epidemiology and Health Policy (3)** Covers collection and use of public health surveillance data in formulating policy and managing programs through lectures and real-world interactive exercises. Discusses surveillance for birth defects, environmental exposures, and hospital-acquired infections, and use of tools such as small area analysis and geographic information systems. Offered: jointly with HSERV 503; W, even years.

**EPI 510 Epidemiologic Data Analysis (2)** *Critchlow* Intended for students planning to take 514. Introduces skills and concepts to effectively analyze large data sets for case-control and cohort studies. A beyond-theory approach provides students hands-on experience in using epidemiologic data sets for stratified or multivariate analyses with SAS. Credit/no credit only. Prerequisite: EPI 511 or EPI 512. Offered: W.

**EPI 511 Introduction to Epidemiology (3-4)** *Kukull* For the graduate student wishing to devote only one quarter to a course in epidemiologic methods. Description of ways in which variation in disease occurrence is documented, and how that variation is studied to understand causes of disease. Prerequisite: graduate standing. Offered: A.

**EPI 512 Epidemiologic Methods I (4)** *Koepsell, Weiss* Principles and methods of epidemiology. Covers measures of disease frequency, measures of effect, causal inferences, descriptive epidemiology, study types, misclassification, and effect modification. Designed for students who want to take 513. Prerequisite: prior or concurrent enrollment in BIOST 511 or equivalent. Offered: A.

**EPI 513 Epidemiologic Methods II (4)** *Koepsell, Weiss* Continuation of 512. Considers how designs of epidemiologic studies may be constructed to maximize etiologic inferences. Covers confounding, randomized trials, cohort studies, case-control studies, and selected topics. Prerequisite: EPI 512. Offered: W.

**EPI 514 Application of Epidemiologic Methods (4)** *Critchlow, Mueller* Practical experience in analysis of data. Students analyze data sets currently on file using contemporary epidemiologic methods as taught in 512 and 513. Prerequisite: EPI 510 or experience in programming; EPI 512, EPI 513 and epidemiology major. Offered: Sp.

**EPI 515 Topics in Epidemiologic Methods (3)** *Davis* Introduces advanced methodologic issues faced by epidemiologists, including development and validation of clinical prediction rules, recursive partitioning, studies using correlated or repeated measures or group allocation, case-crossover designs, confounding by indication, and two-stage sampling. Prerequisite: EPI 512; EPI 513; BIOST 536. Offered: jointly with BIOST 519. Sp.

**EPI 517 Genetic Epidemiology (3)** *Austin* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BIOST 511, and GENET 371, or equivalent. Offered: jointly with PHG 511; Sp.

**EPI 518 Computer Demonstrations in Genetic Epidemiology (2)** *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Prerequisite: EPI 517/PHG 511. Offered: jointly with PHG 518; Sp.

**EPI 519 Epidemiology of Cardiovascular Disease (3)** *Psaty, Siscorick* Principles, methods, and issues in the epidemiology of cardiovascular disease. Focuses on coronary heart disease and its major risk factors; also covers other topics such as stroke and sudden death. The format includes informal lectures and discussions of the current literature. Prerequisite: EPI 511 or EPI 512, EPI 513. Offered: A.

**EPI 520 Epidemiology of Infectious Diseases (3)** *Jackson* Infectious diseases from a public health perspective. Topics include analytic methods, study design, outbreak investigations, surveillance, vaccine evaluations, global eradication, screening, modeling, and infectious causes of chronic diseases. Homework and discussion based on current examples from the published literature. Prerequisite: EPI 511, EPI 512, or permission of instructor. Offered: W.

**EPI 521 Epidemiology of Maternal and Child Health Problems (4)** *Emanuel, Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical, or dental school standing and EPI 511 or EPI 512 or permission of instructor. Offered: jointly with HSERV 542; W.

**EPI 522 Reproductive Epidemiology (3)** *Holt* Focus on conditions and diseases of the female reproductive system, as well as pregnancy outcomes other than birth. Presentation of current epidemiologic knowledge and discussion of issues on topics including contraception; infertility; spontaneous abortion; induced abortion; breast, uterine, and ovarian disease; and menopause. Prerequisite: EPI 511 or EPI 512-513. Offered: A.

**EPI 523 Injury Epidemiology (3)** *Cummings* Discussion of research methods which are useful in studying the causes of injury and outcomes after injury. Information regarding the impact of injuries on health and known or suspected risk factors for some injuries. Assigned readings from literature in the field. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: W.

**EPI 524 Epidemiologic Studies of Cancer Etiology and Prevention (3)** *Farrow* Current knowledge of the role that chemicals, radiation, viruses, familial factors, immunodeficiencies, and benign diseases play in the etiology of various cancers, as determined from studies in human populations; the epidemiologic characteristics of most major types of cancer; applications of epidemiologic principles to planning and evaluating programs of primary, secondary, and tertiary cancer prevention. Prerequisite: EPI 511 or EPI 513. Offered: A.

**EPI 525 Topics in Preventive Medicine (2)** *Goldbaum* Examine current scientific knowledge and state of the art of preventive medical interventions. Discuss and consider options for current practice. Prerequisite: MD, OD, NP or permission of instructor. Offered: jointly with HSERV 505.

**EPI 526 Zoonotic Diseases (3)** *DiGiacomo, Rausch* Explores the public health aspects of zoonotic diseases, their epidemiology and current approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans in North America. Prerequisite: EPI 511, EPI 512, or EPI 520 or permission of instructor. Offered: jointly with C MED 526; Sp.

**EPI 527 Practical Issues in the Conduct of Epidemiologic Studies (2)** *Wolf* Seminar format focusing on practical aspects of conducting epidemiologic studies. Topics include selection of a research topic, grant sources and data collection tools, selection of study subjects, human subjects review, grant writing and budget development, and the peer review process. Credit/no credit only. Prerequisite: graduate standing or permission of instructor. Offered: odd years; S.

**EPI 528 Exposure Measurement in Epidemiology (3)** *White* Principles and methods of measuring exposures and covariates in epidemiological studies. Validity and reliability of measures, questionnaire design, effects of measurement error, maximizing response rates, quality-control procedures, measurement of specific exposures. Prerequisite: EPI 513. Offered: Sp.

**EPI 529 Emerging Infections of International Public Health Importance (3)** *Kimball* Overview of current emerging infections worldwide and contributing factors. Design of a surveillance and prevention strategy required. Offered: jointly with HSERV 536; in residence, odd years; by arrangement, even years.

**EPI 530 AIDS: A Multidisciplinary Approach (2)** *Koutsky, Kreiss* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of HIV infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Offered: jointly with MED 530.

**EPI 531 Problems in International Health (4)** *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with HSERV 531; S.

**EPI 532 Epidemiology of Infectious Diseases of Third-World Importance (3)** *John, Kreiss* A review of major infectious disease problems of the developing world, including AIDS, malaria, tuberculosis, measles, and diarrhea, with an emphasis on public health control strategies. Offered: odd years; Sp.

**EPI 533 Pharmacoepidemiology (3)** *Gardner, Heckbert, Gardner* Overview of pharmacoepidemiology including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: Graduate student or with permission. Offered: jointly with PHARM 533.

**EPI 536 Categorical Data Analysis in Epidemiology (4)** Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: EPI 514 and BOST 513; or BOST 515; or permission of instructor. Offered: jointly with BOST 536.

**EPI 537 Survival Data Analysis in Epidemiology (4)** Introduction to the multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses appearing in the literature. Prerequisite: EPI 536 or permission of instructor. Offered: jointly with BOST 537.

**EPI 538 Nutritional Epidemiology (3)** *Beresford, Drownowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with NUTR 538; A.

**EPI 539 Research Methods in Developing Countries (3/4)** *Gale, Gloyd* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with HSERV 539; A.

**EPI 542 Clinical Epidemiology (2)** *Weiss* Principles and methods involved in studying outcome of illness. Prerequisite: EPI 511, or EPI 512 and EPI 513. Offered: S.

**EPI 568 Molecular Epidemiology of Infectious Diseases (2)** *DiGiacomo, Samadpour, Roberts* Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with ENV H 568/PABIO 568. Offered: W.

**EPI 570 Occupational and Environmental Epidemiology (3)** *Checkoway* Research methods for studying occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with ENV H 570. Offered: Sp.

**EPI 571 Neuroepidemiology and Environmental Risk Factors (3)** *Kukull* Focus on neurologic diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: 511 or equivalent. Offered: jointly with ENV H 571; odd years, W.

**EPI 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3)** *Schwartz* Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with ENV H 573; W.

**EPI 583 Epidemiology Seminar (1, max. 3)** Presentation of current epidemiologic research and application of epidemiologic research in the practice of public health. Offered: AWSpS.

**EPI 589 Epidemiologic Research in Aging Populations (3)** *LaCroix* Emphasizes application of epidemiologic methods to the study of older populations. Topics include: compression of morbidity; successful aging; methodological challenges in studying older populations; physical, cognitive and social function as epidemiological endpoints; chronic conditions of the aging (heart disease, cancer, Alzheimer's disease, dementia, osteoporosis, fractures); health promotion strategies. Prerequisite: EPI 511 or EPI 513. Offered: jointly with HSERV 589; even years; W.

**EPI 590 Selected Topics in Epidemiology or International Health (1-6, max. 6)** Tutorials are arranged for a small number of students for in-depth examination of an area of epidemiology or international health, usually of current nature. Seminar format. Prerequisite: EPI 511. Also a special summer format presenting introductory material. May be taken with ENV H 590 and/or HSERV 590. For more information and permission, consult the department program adviser. Offered: AWSpS.

**EPI 591 Current Literature in Epidemiology (1)** Articles pertaining to epidemiology and related subjects selected from the current literature to be distributed and read by all participants. Faculty members and enrolled students alternate being responsible for conducting sessions and choosing articles to read. Prerequisite: EPI 513. Offered: AWSpS.

**EPI 592 Program Seminars (1-6)** Graduate seminars organized to address specific educational needs of students in various specialized programs within the Department of Epidemiology (i.e., Maternal and Child Health). Prerequisite: permission of instructor. Offered: HSERV 592.

**EPI 593 Cancer Prevention Research Laboratory (3)** *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Offered: jointly with BOST 593; AWSpS.

**EPI 595 Epidemiology Master's Practicum (1-12, max. 12)** Supervised practice experience providing students an opportunity to learn how epidemiology is applied in a public health setting and in the formulation and application of public health policy. Credit/no credit only. Prerequisite: EPI 512 and BOST 511 or equivalent and permission of instructor; recommended: EPI 501.

**EPI 600 Independent Study or Research (\*)** Credit/no credit only. Prerequisite: permission of departmental adviser and independent study supervisor. Offered: AWSpS.

**EPI 700 Master's Thesis (\*)** Credit/no credit only. Prerequisite: permission of departmental adviser. Offered: AWSpS.

**EPI 800 Doctoral Dissertation (\*)** Credit/no credit only. Offered: AWSpS.

## Public Health Genetics

### Courses for Graduates Only

**PHG 509 Multidisciplinary Communication in Public Health Genetics (1)** *Madden* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with HSERV 509. Offered: Sp.

**PHG 510 Genetic Principles for Public Health (4)** *Austin, Leboeuf, Rose* Basic principles of human genetics in a public health context; the molecular components of life, organization of the genome, gene expression, recombinant DNA technology, gene

regulation, Mendelian inheritance, quantitative genetics, nutrition and gene expression, mitochondrial inheritance, gene mapping, gene-environment interactions, Human Genome Project, and genetic service in public health. Offered: A

**PHG 511 Genetic Epidemiology (3)** *Austin, Edwards* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BLOST 511, and GENET 371, or equivalent. Offered: jointly with EPI 517; W.

**PHG 512 Legal, Ethical, and Social Issues in Public Health Genetics (3)** *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with LAW E 562/MHE 514; Sp.

**PHG 513 Biotechnology, Bioinformatics, and Ecogenetics (3)** *Eaton, Rose, Thummel* Methodologies currently used for characterization, storage, and retrieval of genetic information relevant to gene-environment interactions that contribute to diseases of public health importance. Working knowledge of molecular genotyping and phenotyping, genomics, and bioinformatics related to genetic testing provided. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H/PABIO/PCEUT 513; A.

**PHG 514 Animal Models and Public Health Genetics (2)** *LeBoeuf* Contributions of animal models to studies of human diseases. Concepts of multigenic diseases, chromosomal mapping, quantitative traits with emphasis on diseases of major public health impact. Interaction between inheritance and nutrition. Focus on mouse genetics. Prerequisite: GENET 371, PHG 513, or permission of instructor. Offered: jointly with NUTR 514 and PABIO 514; Sp.

**PHG 518 Computer Demonstrations in Genetic Epidemiology (2)** *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Prerequisite: EPI 517/PHG 511. Offered: jointly with EPI 518; Sp.

**PHG 521 Socio-Cultural Perspectives of Public Health Genetics (2)** *McGrath* Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with ANTH 574/NURS 582; Sp.

**PHG 522 Ethical Frameworks for Public Health Genetics (2)** *Mastroianni* Case-based application of ethical principles in genetic medicine to range of problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with MHE 516; W.

**PHG 523 Genetics and the Law (2)** *Kuszler* Considers the legal issues arising from new genetic technologies and information. Statutes, regulations, and cases used to demonstrate the constitutional, contract, and tort law complications resulting from dissemination of these technological advances. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with LAW E 564; A.

**PHG 532 Statistical Methods in Medical Genetics (2)** *Wijsman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications with stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Offered: jointly with BLOST 532 and MED 532; Sp.

**PHG 580 Interactive Seminar (1, max. 6)** *Mastroianni, McGrath* Seminar series on topics related to public health genetics, including current bioethical, legal, medical, biotechnology, and public policy issues. Offered: AWSp.

**PHG 590 Selected Topics in Public Health Genetics (1-6, max. 6)** Tutorials are arranged for a small number of students for in-depth examination of an area of public health genetics, usually of a current nature. Offered: AWSp.

**PHG 595 Master's Practicum (1-12, max. 12)** Supervised practice experience providing students an opportunity to learn how genetics is applied in a public health setting and in the formulation and application of public health policy. Prerequisite: EPI 517/PHG 511, LAW E 562/MHE 514/PHG 512, ENV H/PABIO/PCEUT/PHG 513, or permission of instructor. Offered: AWSp.

**PHG 600 Independent Study or Research (\*)** Credit/no credit only. Offered: AWSp.

**PHG 700 Master's Thesis (\*)** Credit/no credit only. Offered: AWSp

## Health Services



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Health\\_Svcs.html](http://www.washington.edu/students/genecat/academic/Health_Svcs.html)



Department Web page:  
[depts.washington.edu/mhap/](http://depts.washington.edu/mhap/)

## Graduate Program

Graduate Program Coordinator  
H660 Health Sciences, Box 357660  
(206) 616-2926

The Department of Health Services offers a two-year graduate program in health services leading to the Master of Public Health or Master of Science degrees and maintains primary responsibility for the graduate program in Health Services Administration (an interdisciplinary degree-granting program of the Graduate School described in the Interdisciplinary Graduate Degree Programs section of this catalog). An evening M.H.A. degree for clinical health-care professionals was established winter quarter of 1998. The M.H.A. degree provides full academic preparation for careers in management and policy positions in health systems, hospitals, medical groups, health plans, and other types of health care organizations. The department also offers a three-year extended degree program in community-health management leading to the M.P.H. degree for employed professionals working full-time. In addition, the department offers a Ph.D. in health services and participates in the training of doctoral students from other departments on campus by offering a specialization in health services under the Doctoral Studies Program.

## Master of Public Health and Master of Science

The M.P.H. and M.S. programs in health services give priority to individuals who have completed their professional health training such as physicians, dentists, and nurses. Others who have had substantial experience in the health field are also considered. The M.P.H. pro-

gram provides broad-based public health skills, while the M.S. provides more focused health services research skills. These programs offer a general curriculum that includes introduction to health systems, epidemiology, current issues regarding the provision of medical care, and methodological training for research and program evaluation. In addition, the M.P.H. program requires a practicum experience, an introductory course in environmental health, and a social and behavioral science course. Examples of areas of concentration include studies of patient and provider behaviors; evaluation of local, state, and federal health programs; and the impact of technology on medical-care costs and benefits. The programs are organized into four tracks: community medicine, international health, maternal and child health, and social and behavioral sciences. International health, and maternal and child health, are offered jointly with the department of Epidemiology.

The *Community Medicine* option provides a generalist approach to public health. Students take the core courses for the M.P.H., then tailor their programs to their own career goals. Because there are fewer specific course requirements for this track, applicants must have well-defined goals that are compatible with those of the faculty. This track is best suited for fellows and scholars pursuing studies after receiving an M.D., R.N., or other health degree.

The *Maternal and Child Health* option presents an interdisciplinary examination of the issues that influence the health and health care of children, women, and families. It combines practical and classroom experience to give students (1) an in-depth understanding of the behavioral, biological, social, and environmental factors that influence the health and well-being of maternal and child populations; (2) competency in public-health research and analytic methods; and (3) supervised experience in applying science and management tools to the planning, development, and evaluation of health programs and policy.

The academic option in *International Health* is an interdisciplinary graduate program leading to the Master of Public Health degree in health services or in epidemiology. The IHP graduate will have a basic understanding of the determinants of population health, and the planning, implementation, and evaluation skills necessary to develop and manage programs for the improvement of health in developing countries and other marginalized populations. The program's goal is to balance teaching, research, and service to contribute to improvements in health at home and worldwide. The program focuses on community health and primary health-care systems, bringing epidemiological and qualitative research skills to bear. The curriculum addresses understanding the social, political, economic, environmental, geographic, and health-systems factors that have an impact on health. Requirements include the completion of core M.P.H. courses, a series of international-health courses, a public-health practicum, and a thesis project on a topic related to health in developing countries. Students are encouraged to carry out their thesis projects in an international setting. Previous developing-country health-related experience is helpful for admission.

The *Social and Behavioral Sciences* academic option is available to students enrolled in an M.P.H. degree program in the School of Public Health and Community Medicine. The program focus is on research and application of knowledge concerning the relationships among (1) social, cultural, and behavioral processes; (2) health and illness; and (3) what society does and can do to promote health and prevent illness. Students receive training in the general theories and methods of the social and behavioral sciences applied to public-health interventions for well persons and people with disabilities. Students may choose to plan a course of study concentrating in a particular area of inquiry. Those areas supported within the department are (1) health education, health promotion, and disease prevention, (2) chronic illness and disability, and (3) health services research.

If deemed appropriate by their advisers, students may take courses in other departments of the University. Community agencies and resources are used extensively. Students with a background in medicine may qualify to receive concurrent credit for residency training in preventive medicine.

### Doctor of Philosophy

The goal of the Department of Health Service Ph.D. program is to train health services researchers to investigate complex issues in health care. The student-oriented approach to education emphasizes curricular flexibility, student-faculty collaboration, multi-disciplinary research, and interdepartmental cooperation. The program combines course work and seminars with participation in a variety of applied research projects. Upon completion of the program, students are capable independent researchers and teachers who pursue careers as academicians or health services researchers in research organizations in the health care industry, or government agencies.

### Admission Requirements

In addition to completing Graduate School admission requirements, applicants to the M.P.H. and M.S. programs must submit at least three letters of recommendation, Graduate Record Examination scores, and a goal statement. At least three years of medical or health-care experience are usually required. In general, applicants are accepted only for summer and autumn quarters of each year. The application deadline is January 15.

### Doctoral Studies Program

Doctoral study in health services is available to qualified students on campus who are enrolled in the doctoral programs of other departments (e.g., anthropology, biostatistics, economics, epidemiology, geography, medicine, nursing, operations research, organizational theory, political science, psychology, social work, or sociology). Students in the Doctoral Studies Program take four courses in health services and focus their dissertation on original research that relates the basic discipline to a specific health-services issue (e.g., health behavior, health-care organizations, costs, or quality and utilization of health-care services).

### Financial Aid

Every attempt is made to ensure that students admitted are not prevented from pursuing graduate studies due to inadequate finances. A limited number of fellowships, assistantships, scholarships, and loans are available each year. However, students should be prepared to use their own resources to finance their graduate education.

### Research Facilities

In addition to using University facilities, the program has extensive links with community health-care delivery systems and agencies for research and training.

### Extended M.P.H.

Graduate Program Coordinator  
H685 Health Sciences, Box 357660  
(206) 685-7580

The Extended M.P.H. degree program is a three-year, part-time program delivered through a combination of intensive four-week summer sessions on the University campus, directed independent study, and intensive weekend (Friday-Saturday) seminars during the academic year. Designed for mid-career public and community health professionals with three or more years of experience in the health-care field, the program provides knowledge and skills required at mid- and upper-level practice and management positions for health professionals. In addition to the core courses in epidemiology, biostatistics, and environmental health, the prescribed course work includes a broad exposure to

the health-care system plus specific management training in accounting, finance, personnel management, economics, organization theory, and program planning and evaluation. Additional course work is also available in maternal and child health and in health education.

The Extended M.P.H. degree program provides training in developing skills in the scientific base of public health, analytic methods, management and communication, and policy and advocacy, as well as training in cross-cutting issues. Graduates apply their skills directly to their careers.

### Admission Requirements

In addition to Graduate School admission requirements, applicants must submit a program application, at least three letters of recommendation, Graduate Record Examination scores, a statistics self-test, and a goal statement. A minimum of three years' work experience in the health-care field is required. Applicants are accepted to begin in the program summer quarter. The deadline for priority consideration is December 1. Applications will be accepted through February 15 and considered on a space-available basis. Because the program is self-sustaining, the tuition rate differs from the usual on-campus programs.

## Faculty

### Chair

William L. Dowling

### Professors

Berkowitz, Bobbie \* 1988, (Adjunct); PhD, 1990, Case Western Reserve University; administration, leadership and policy development within public health and nursing.

Boyko, Edward J. \* 1989, (Adjunct); MD, 1979, University of Pittsburgh; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus.

Chapko, Michael K. \* 1978, (Research); MA, 1970, Hunter College; PhD, 1972, City University of New York; diffusion of health technologies, cost-effectiveness in health care.

Chrisman, Noel J. \* 1973, (Adjunct); PhD, 1966, University of California (Berkeley); community partnership research, clinical cultural competence, ethnic health beliefs and practices.

Connell, Frederick A. \* 1978; MD, 1972, New York University; maternal and child care, health services.

Conrad, Douglas A. \* 1977; MHA, 1973, University of Washington; MBA, 1977, PhD, 1978, University of Chicago; managed care, corporate finance in managed care.

Curry, Susan J. \* 1981; MA, 1979, PhD, 1981, University of New Hampshire; health behavior change.

Day, Robert W. \* 1968; MD, 1956, University of Chicago; MPH, 1958, PhD, 1962, University of California (Berkeley); health-information systems.

Deyo, Richard A. \* 1986; MD, 1975, Pennsylvania State University; health status measurement and evaluation of common medical practices.

Diehr, Paula K. \* 1970; MS, 1967, PhD, 1970, University of California (Los Angeles); health services, small area analysis, health status.

Dowling, William L. \* 1982; MBA, 1961, University of Chicago; MA, 1970, PhD, 1971, University of Michigan; strategic management of health-care organizations, managed care.

Fihn, Stephan \* 1982; MD, 1977, St Louis University; MPH, 1981, University of Washington; internal medicine.

Gale, James L. \* 1969, (Adjunct); MD, 1961, Columbia University; MS, 1969, University of Washington; epidemiology and control of infectious disease, vaccine safety, public health practice.

Gilson, Betty S. \* 1969, (Emeritus); MD, 1943, University of Minnesota; health-status measurement.

Grembowski, David \* 1981; MA, 1975, Washington State University; PhD, 1982, University of Washington; dental care demand, fluoridation, dental health services research.

Hale, Christiane B. \* 1990, (Affiliate); PhD, 1978, University of Cincinnati; quantitative analyses of small area health outcomes.

Hart, Lawrence G. 1982, (Adjunct); PhD, 1985, University of Washington; rural health policy, medical geography.

Hedrick, Susan \* 1983; MA, 1975, PhD, 1982, Michigan State University; long term care, health services.

Hegyvary, Sue T. \* 1986, (Adjunct); PhD, 1974, Vanderbilt University; administration and productivity of health care and nursing services.

Katon, Wayne J. \* 1976, (Adjunct); MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.

Klasterin, Theodore \* 1974, (Adjunct); PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Koepsell, Thomas D. \* 1979; MD, 1972, Harvard University; MPH, 1979, University of Washington; injury, cardiovascular epidemiology, neuroepidemiology, methods, application to health services.

Kukull, Walter A. \* 1981, (Adjunct); PhD, 1984, University of Washington; genetic, environmental, and clinical epidemiology of Alzheimer's disease.

Larson, Eric B. \* 1977, (Adjunct); MD, 1973, Harvard University; internal medicine.

Logerfo Sr., James P. \* 1974; MD, 1968, University of Rochester; MPH, 1974, University of Washington; quality-of-care assessment.

Madden, Carolyn Watts \* 1984; MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

Martin, Diane P. \* 1978; MA, 1972, Temple University; PhD, 1979, University of Washington; health services use and cost, alternative delivery systems and insurance.

Mayer, Jonathan D. \* 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, clinical applications, philosophy, human-environment relations.

Milgrom, Peter M. \* 1974, (Adjunct); DDS, 1972, University of California (San Francisco); management of fearful and phobic dental patients, quality of dental care.

Mitchell, Pamela H. \* 1971, (Adjunct); MS, 1965, University of California (San Francisco); PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.

Monsen, Elaine R. \* 1969; MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.

Novack, Alvin H. 1979, (Adjunct Emeritus); MD, 1958, Temple University; general pediatrics.

Oberle, Mark W. 1988; MD, 1974, Johns Hopkins University; MPH, 1979, University of California (Berkeley); public health policy.

Patrick, Donald L. \* 1987; MS, 1968, PhD, 1972, Columbia University; aging, disablement, and health-related quality of life.

Pearlman, Robert A. \* 1981, (Adjunct); MD, 1975, Boston University; gerontology.

Perkin, Gordon W. 1987, (Affiliate); MD, 1959, University of Toronto.

Perrin, Edward \* 1975, (Emeritus); MA, 1956, Columbia University; PhD, 1961, Stanford University; health information services, research methodology.

Psaty, Bruce M. \* 1984, (Adjunct); PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, and pharmacoepidemiology.

Rosenblatt, Roger A. \* 1977, (Adjunct); MD, 1971, MPH, 1971, Harvard University; research into the organization and delivery of health services, rural health policy.

Ross, Austin Jr. 1982, (Emeritus); MPH, 1955, University of California (Berkeley); ambulatory care, health care delivery systems.

Thompson, Engelberta 1989; MA, 1978, PhD, 1981, Western Michigan University; smoking cessation.

Von Korff, Michael 1986, (Affiliate); ScD, 1978, Johns Hopkins University.

Wagner, Edward H. \* 1984; MD, 1965, State University of New York (Buffalo); MPH, 1972, University of North Carolina; clinical epidemiology and health services research, health promotion and disease prevention.

Wickizer, Thomas M. \* 1988; MSW, 1974, University of Washington; MPH, 1979, MA, 1987, PhD, 1989, University of Michigan; health promotion evaluation, workmen compensation health issues.

Wing, Kenneth \* 1990; JD, 1971, MPH, 1972, Harvard University; law; politics and policy; financing health care.

Wolf, Fredric M. \* 1997, (Adjunct); MEd, 1977, PhD, 1980, Kent State University; clinical decision making/judgment, evaluation/dissemination of new technology.

Zuckerman, Howard S. \* 1997; MBA, 1968, Xavier University; PhD, 1976, University of Michigan; health management research, health administration.

#### Associate Professors

Altamore, Rita A. \* 1981, (Clinical); MD, 1977, Boston University; information systems in health services, quality of health care.

Beery, William L. 1986, (Affiliate); MPH, 1973, University of North Carolina.

Belcher, Donald W. \* 1976, (Adjunct); MD, 1962, University of Pennsylvania; ambulatory medicine.

Bell, Michelle \* 1984; MSW, 1967, PhD, 1984, University of Washington; maternal and child health, and adolescent health.

Bowen, Deborah J. \* 1986; PhD, 1986, Uniformed Service U. of The Health Sc; health psychology.

Cheadle, Allen D. \* 1987, (Research); PhD, 1987, University of California (Berkeley); community-based research and program evaluation.

Every, Nathan R. 1988, (Adjunct); MD, 1988, Emory University; MPH, 1993, University of Washington; cardiology.

Fuller, Sherrilynne S. \* 1988, (Adjunct); PhD, 1984, University of Southern California; library and information management, biomedical and health informatics.

Gloyd, Stephen S. \* 1985; MD, 1973, University of Chicago; MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Goldbaum, Gary M. \* 1989, (Adjunct); MD, 1978, University of Colorado (Denver); MPH, 1989, University of Washington; behavioral factors in HIV/AIDS, preventive medicine.

Goldberg, Harold I. 1986, (Adjunct); MD, 1977, Stanford University; internal medicine.

Grossman, David C. 1988, (Adjunct); MD, 1982, University of California (Los Angeles); MPH, 1990, University of Washington; general pediatrics.

Helgerson, Steven D. \* 1990, (Clinical); MD, 1973, MPH, 1976, University of Washington; Native American health issues.

Holt, Victoria L. \* 1989, (Adjunct); MPH, 1987, PhD, 1990, University of Washington; women's reproductive health, prenatal and perinatal care, domestic violence.

Kienast, Philip K. \* 1970, (Adjunct); PhD, 1972, Michigan State University; human resources management.

Kimball, Ann M. \* 1992; MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.

Kopjar, Branko 1997; PhD, 1996, University of Oslo (Norway); statistics and epidemiological studies.

Kuszler, Patricia Carol \* 1994, (Adjunct); MD, 1978, Mayo Medical School/graduate School; JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Lalonde, Bernadette \* 1986, (Research); PhD, 1980, University of Toronto (Canada); public health program evaluations including process and outcomes, evaluation research.

Maynard, Charles C. \* 1975, (Research); PhD, 1986, University of Washington; health services research; influence of race and gender on the use of cardiovascular procedures.

McCann, Barbara S. \* 1986, (Adjunct); MS, 1982, PhD, 1984, Rutgers University; behavior change, adult ADHD, psychological stress, cardiovascular disease, diabetes, obesity.

McNees, Michael P. 1993, (Affiliate); PhD, 1978, Kansas State University.

Meischke, Hendrika W. \* 1991; MPH, 1987, PhD, 1992, University of Michigan; health communication, with an emphasis on mass media and health.

Moinspour, Carol A. 1993, (Affiliate); PhD, 1973, University of Washington.

O'Carroll, Patrick W. 1995, (Affiliate); MD, 1983, MPH, 1983, Johns Hopkins University.

Plough, Alonzo L. \* 1995; MA, 1975, Cornell University; MPH, 1977, Yale University; PhD, 1978, Cornell University; anthropology, sociology, or social welfare and public affairs/policy.

Reiber, Gayle \* 1991; MPH, 1975, Johns Hopkins University; PhD, 1989, University of Washington; epidemiology and health services research on preventing complications of diabetes.

Rhodes, Lorna A. \* 1983, (Adjunct); PhD, 1973, Cornell University; medical anthropology, anthropology of institutions, religion, psychiatry.

Richardson, Mary L. \* 1977; MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.

Spigner, Clarence \* 1994; MPH, 1982, DPH, 1987, University of California (Berkeley); health of the disadvantaged, race/ethnic relations, societal behavior, popular culture.

Sullivan, Sean \* 1992; PhD, 1992, University of California (Berkeley); pharmacoconomics.

Urban, Nicole D. \* 1988; MS, 1973, DSc, 1978, Harvard University; analysis of the cost-effectiveness of disease prevention trials and interventions.

Wood, Robert W. 1977, (Adjunct); MD, 1970, University of Rochester; internal medicine.

#### Assistant Professors

Andersen, Marin Robyn 1999, (Affiliate); PhD, 1994, State University of New York (Stony Brook); MPH, 1996, University of Washington.

Braddock, Clarence H. \* 1993, (Adjunct); MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.

Bradley, Katharine A. 1990, (Adjunct); MD, 1987, Stanford University; MPH, 1993, University of Washington; general internal medicine.

Crittenden, Robert A. 1981, (Adjunct); MD, 1976, MPH, 1987, University of Washington; health plans/policies.

Curtis, Jared R. 1988, (Adjunct); MD, 1988, Johns Hopkins University; MPH, 1994, University of Washington; pulmonary diseases and critical care medicine.

Ensign, B. Josephine \* 1994, (Adjunct); MS, 1986, Virginia College of Medicine; MPH, 1992, DPH, 1994, Johns Hopkins University; community-based health service for adolescents.

Gray, Darryl 1997; MPH, 1981, University of Washington; MD, 1984, Case Western Reserve University; ScD, 1992, Harvard University; clinical and cost effectiveness analysis of diagnostic/surgical procedures, clinical epidemiology.

Huebner, Colleen Ellen \* 1982; PhD, 1991, MPH, 1994, University of Washington; social bases of developmental problems in early childhood.

Jarvik, Jeffrey G. 1993, (Adjunct); MD, 1987, University of California (San Diego); neuroradiology, outcomes research.

Kitahata, Mari M. 1991, (Adjunct); MD, 1987, University of Pennsylvania; MPH, 1995, University of Washington; allergy and infectious diseases.

Lafferty, William E. \* 1988; MD, 1978, University of Kansas; STD, HIV/AIDS, surveillance and epidemiology of STD, managed care.

Maciejewski, Matthew L. \* 1999; PhD, 1998, University of Minnesota; managed care, outcomes research methods, health economics, diabetes.

Mastroianni, Anna C. \* 1996, (Adjunct); JD, 1986, University of Pennsylvania; MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

Melzer, Sanford M. 1990, (Adjunct); MD, 1982, Mt Sinai School of Medicine; general pediatrics.

Mercer, Mary A. \* 1996; MPH, 1981, DrPhil, 1987, Johns Hopkins University; international health, maternal and child health.

Pearson, David C. 1991, (Affiliate); PhD, 1979, Washington State University.

Ramsey, Scott D. \* 1990; MD, 1990, University of Iowa; PhD, 1994, University of Pennsylvania; cost effectiveness analysis and health care economics.

Sales, Anne \* 1997; MSN, 1989, University of North Carolina; PhD, 1998, University of Minnesota; health economics, health care, nursing labor markets.

Senturia, Kirsten D. \* 1997, (Clinical); MSN, 1989, University of North Carolina; PhD, 1998, University of Minnesota.

Stout, James W. \* 1986, (Adjunct); MAT, 1981, Duke University; MD, 1986, Wake Forest University; childhood asthma, health services and epidemiology.

Taylor, Victoria M. \* 1989, (Research); MD, 1978, University of Nottingham (UK); MPH, 1989, University of Washington; cancer control (breast and cervical screening) in minority populations.

Tinker, Lesley F. 1995, (Affiliate); PhD, 1992, University of California (Davis).

Ward, M. Elizabeth 1991, (Affiliate); MN, 1968, University of Washington.

Weaver, Marcia R. \* 1991, (Research); MA, 1981, PhD, 1986, University of Chicago; economic aspects of health-care reform, cost-effectiveness of community-based health interventions.

## Senior Lecturers

Downer, Ann E. \* 1989; MS, 1984, University of Washington; EdD, 1996, Seattle University; education and training, educational program design and development, health communication.

Gish, Oscar \* 1989; MSS, 1967, Institute of Social Studies (Netherlands); MPhil, 1969, University of Sussex (UK); socio-economic dimensions of health and health services: third world development focus.

Hanken, Mary A. 1991; MEd, 1974, Seattle University; PhD, 1989, University of Washington; health information systems.

Katz, Aaron 1988; CPH, 1975, University of Toronto (Canada); health policy analysis.

Royer, Charles T. 1994; LLD, 1983, Antioch College; urban policies, health policy.

Thompson, John R. 1989; MSW, 1976, University of Washington; public health practice, health policy analysis.

## Lecturers

Dahl, Janis Lee 1995; MA, 1974, United States International University; public health practice.

Gonzales, Virginia 1993; MSW, 1971, MPH, 1974, University of California (Berkeley); EdD, 1988, Harvard University.

Murphy, Gretchen C. 1992; MEd, 1973, University of Washington; health information administration.

Shiu-Thornton, Sharyne 1988; MA, 1980, University of Washington.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crsctat/](http://www.washington.edu/students/crsctat/).

## Health Services

**HSERV 475 Perspectives in Medical Anthropology (5)** *Rhodes* Introduction to medical anthropology. Explores the relationship among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with ANTH 475.

**HSERV 480 Issues in Public Health (1, max. 6)** *Bezruchka, Sappington, Wing* Problems and issues in epidemiology, health services delivery and administration, environmental health, pathobiology, biostatistics, and related fields.

**HSERV 499 Independent Study in Health Services (1-12, max. 12)** Individual library or field study project selected in consultation with a faculty adviser.

## Courses for Graduates Only

**HSERV 501 Public Health Practice at the Local Level (3)** *Gale, Thompson* Basic overview of state and local public health practice with leaders in the field and case studies focusing on rural and urban public health challenges. Offers preparation for practice in public health agencies. Prerequisite: HSERV 511 or permission of instructor. Offered: jointly with EPI 501.

**HSERV 503 Public Health Surveillance: Epidemiology and Health Policy (3)** Covers collection and use of public health surveillance data in formulating policy and managing programs through lectures and real-world interactive exercises. Discusses surveillance for birth defects, environmental exposures, and hospital-acquired infections, and use of tools such as small area analysis and geographic information systems. Offered: jointly with EPI 503.

**HSERV 504 Health Communication (3)** *Downer* Overview of health communication methods in public health. Offers rationale for improving skills of public health professionals involved in designing communication campaigns. Includes theoretical approaches to persuasion and behavior change; practical suggestions on design, implementation, evaluation of media interventions.

**HSERV 505 Topics in Preventive Medicine (2)** *Goldbaum* Examine current scientific knowledge and state of the art of preventive medical interventions. Discuss and consider options for current practice. Prerequisite: MD, OD, NP or permission of instructor. Offered: jointly with EPI 525.

**HSERV 507 Mass Media, Health, and Society (3)** *Meischke* Provides students with a broader understanding of how the mass media affects the health of individuals and communities; introduces students to theoretical perspectives on mass communication and persuasion; teaches students how to plan, design, implement, and evaluate media interventions.

**HSERV 508 Dynamics of Community Health Practice (3-5, max. 5)** *Chrisman* Examination of and experience with basic principles of clinical practice in community settings. Includes family as community constituent, populations at risk, community assessment, and community development. Prerequisite: Graduate standing or permission of course faculty. Offered: jointly with NURS 560.

**HSERV 509 Multidisciplinary Communication in Public Health Genetics (1)** *Madden* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with PHG 509. Offered: Sp.

**HSERV 510 Society and Health (3)** *Spigner* Analysis of social inequalities in health and service use by class, gender, and the social construction of race. Examines biological, cultural, social, political, and economic determinants which consistently put certain minority groups within Eurocentric societies at higher risk for inequitable health status and provision. Prerequisite: HSERV 511 or equivalent or permission of instructor.

**HSERV 511 Introduction to Health Services and Public Health (3-4)** *Dowling* History, organization, and effectiveness of United States health care and public health systems. Determinants of health, need, and utilization. Public and private financing. Supply and provision of personal and public health services. Managed care. Government and private sector roles. Prerequisite: graduate standing or permission of instructor.

**HSERV 516 Introduction to Health Services—Extended Degree(4)** *Wickizer* Provides overview of health care system, exposes students to current issues and developments affecting organization and delivery of health services, helps students develop ability to frame and analyze questions and issues related to health services. Prerequisite: registration in Extended Degree program. Offered: A.

**HSERV 517 Provision of Health Services—Extended Degree (2)** *Baesler* Builds on material covered in 516 and provides students with tools used to evaluate alternative health delivery systems; exposes students to various international health delivery systems; encourages students to decide how to organize such a system. Prerequisite: HSERV 516, registration in Extended M.P.H. Degree program. Offered: W.

**HSERV 518 Social and Ethical Issues (2-4, max. 4)** *Mastroianni* Presents introduction to ethical issues in public health policy and practice. Additional one credit option focuses on health administration/man-

aged care. Coursework designed to train students in basic skills of ethical analysis and increase competency in recognizing, researching, and analyzing issues arising in public health and health services delivery.

**HSERV 520- Methods in Applied Community Research (2-)** *Astley* Skills/knowledge necessary to conduct orderly investigation of specific problems in preparation for M.P.H. thesis or project. Includes problem identification, posing research questions, literature review, consideration of theoretical/practical context, choosing study design, data collection, protection of human subjects, and recognizing potential errors. Prerequisite: registration in Extended M.P.H. Degree program.

**HSERV 521 Health Services Research Methods (3)** *Diehr, Reiber* Introduces a range of research design, measurement, and data analysis issues from health services research on contemporary issues. Emphasis on methodologies of special importance in health services research. Students conduct data analyses using data from health services. Prerequisite: HSERV 511, BOST 511, and EPI 511 or EPI 512, or permission of instructor.

**HSERV 522- Health Program Evaluation (3-)** *Grembowski* Politics, theory, methods of evaluation, from simple feedback mechanisms to evaluation of large-scale ongoing programs and experiments. Emphasis on applications of experimental and quasi-experimental designs to estimate impacts, as well as evaluation of program implementation. Case studies from health field illustrate various types of evaluation. Prerequisite: background in quantitative methods.

**HSERV 523 Community Health Assessment (3)** *Connell* Survey of approaches and tools to measure health status and health-care problems in defined communities. Topics include: uses and limitations of available data; community surveys; public health surveillance; problem identification and needs assessment; measurement of community health indices; analytic methods; and presentation techniques for program and policy planning.

**HSERV 526 Qualitative Research Methods for Public Health (4)** *Bezruchka* Covers a range of qualitative, ethnographic tools for practical applications in public health. Methods include direct observation, key informant interviews, focus groups, free lists, and pile sorts. Rapid Assessment Procedures and Participatory Action Research also covered. Student teams investigate research questions using field work techniques introduced in class.

**HSERV 531 Problems in International Health (4)** *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with EPI 531; A.

**HSERV 533 Population, Health, and Development (2)** *Povey* Provides students with an introduction to demographic conditions in Third World countries and an understanding of the consequences of rapid population growth on health and the environment. The context and effectiveness of family planning programs is a major focus.

**HSERV 534 Comparative International Health Systems (3)** *Belcher* Assesses the effects of local culture, politics, resource constraints on health policy and organization, health status utilization, and financing. Interprets information and feasibility of alternatives. Required paper. Prerequisite: graduate standing or permission of instructor.

**HSERV 536 Emerging Infections of International Public Health Importance (3)** *Kimball* Overview of current emerging infections worldwide and contributing factors. Design of a surveillance and prevention strategy required. Offered: jointly with EPI 529; in residence, even years; by arrangement, odd years.

**HSERV 537 Economic Development and Health (1, max. 3)** *Gish* Discusses issues of broad interest in the areas of economics, development, and health. Offered: AWSp.

**HSERV 539 Research Methods in Developing Countries (3/4)** *Gloyd, Mock* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with EPI 539; W.

**HSERV 541- Topics in Maternal and Child Health I (3-)** *Bell* Historic, legislative, organizational, and financial basis of health and social services for families and children in United States. Effects of changing family structure and norms; factors affecting health care needs of specific populations, including racially and ethnically diverse groups; impact of policies/programs on health and well-being of families and children.

**HSERV 542 Epidemiology of Maternal and Child Health Problems (4)** *Emanuel, Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical, or dental school standing and 511 or 512 or permission of instructor. Offered: jointly with EPI 521.

**HSERV 543 Topics in Maternal and Child Health III (3)** *Huebner* Examines the major health and developmental problems of infants, children, adolescents in the United States. The etiology and epidemiology of each problem are discussed in light of their implications for health policy and broad based preventive intervention. Prerequisite: graduate standing; permission of instructor. Offered: Sp.

**HSERV 544 Maternal and Child Health in Developing Countries (3)** *Mercer* Emphasizes critical health problems of women and children in developing countries in social, economic, and cultural contexts. Practical approaches to developing MCH programs shared via lecture/discussions, exercises, and small group work. Students acquire skills in baseline assessment, setting objectives, planning and evaluating interventions, and involving communities. Offered: jointly with EPI 544; Sp.

**HSERV 550 Policy and Economics: Fundamentals and Applications (3)** *Katz, Madden* Explores how values drive the structure of societies, economic systems, public policies, and ultimately, allocation and distribution of resources. Explores how science and community values intertwine in the development of health policy, and how ideology, culture, and history influence structure and change a nation's health system. Offered: W.

**HSERV 551 Health Law (3)** *Wing* Analysis of law, the legal system and current legal problems as they relate to the financing and delivery of health care services. Offered: Sp.

**HSERV 552 Health Policy Development (3)** *Katz, Madden* Focuses on how public policy in the health sector is developed and the relationship between these collective decisions and the market place. Examines how science and community values inter-

twine in the development of health policy and how context (i.e., ideology, culture, history) influences the structure of a nation's health system.

**HSERV 553 Politics of Health Care (3)** *Hagens* Understanding of health policy making within the context of American politics. Health policy making is examined in light of political leadership, the legislature, the initiative process, rule making, interest groups, and lobbying. Prerequisite: HSERV 551, a basic understanding of the American health care system, or permission of instructor.

**HSERV 554 Health Legislation Seminar (1)** *Hagens, Katz, Thompson* Discussion of current state health policy topics with legislative staff and others involved with state health policy. In addition to two sessions on campus, course meets once during the quarter in Olympia.

**HSERV 561- Application of Learning Theory to Health Education (3)** *Downer* Designed to help students apply Popular Education theory and practice to preparation, presentation, and evaluation of health education. Students design, teach, and evaluate four separate teaching sessions (one between each seminar) using theory and principles of Popular Education learned to date. Prerequisite: registration in Extended Degree Program.

**HSERV 570 Seminar on Issues in Social Medicine (3)** *Rhodes* Qualitative research organized around selected works in sociology, anthropology, and public health. Readings and discussion of literature, individual class presentations. Addresses fellowship programs and student research projects.

**HSERV 572 Community Development for Health (4)** *Hagopian, House* Structured overview of community development in the health field. Discusses power and leadership; ethical, legal, administrative, and financial issues; organizing special groups; evaluation; community assessments; and approaches and tools for community development. Offered: W.

**HSERV 580 Society, Chronic Illness, and Disability (3)** *Hedrick* Definition and assessment of chronic illness, disability, and health status. Analysis of chronic illness and disability using frameworks from social sciences and public health. Dimensions of disablement as they affect provision of health services. Research on effectiveness of services and approaches to improvement. Offered: jointly with SOC 561.

**HSERV 581 Health Promotion and Disease Prevention (4)** *Bowen* Health promotion planning, implementation, and evaluation models studies regarding strengths, weaknesses, and effectiveness. Students critique strategies to modify behavioral factors that influence lifestyle of individuals, including decisions influencing their reciprocal relationship with environmental factors that affect the health of individuals, organizations, and communities. Prerequisite: HSERV 511.

**HSERV 582- Health Behavior and Preventive Medicine ([3-4]-)** *Meischke* Overview of theoretical aspects of health behavior change at the individual as well as the community level. Focuses on increasing understanding of the many frameworks and the application and integration of theories for research in the area of health behavior change. Prerequisite: registration in Extended Degree Program.

**HSERV 583 Evaluating Cost and Outcomes in Health and Medicine 1 (3)** *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis., pharmacoconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with PHARM 534.

**HSERV 584 Evaluating Cost and Outcomes in Health and Medicine 2 (3)** *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis., pharmacoconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with PHARM 535.

**HSERV 586 Medical Geography (3)** *Mayer* Geography of disease, consideration to health systems planning. Distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services, distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research, health-related issues. Offered: jointly with GEOG 580.

**HSERV 587 Health Policy Economics (3)** *Madden* Applies economic theory to selected topics in health care, including information, risk and insurance, industry organization, government regulation, and public health issues. Emphasizes policy implications of these applications.

**HSERV 588 Community Approaches to Health Promotion (3)** *Thompson* Provides opportunities to critically examine community-based health promotion interventions and the design, evaluation, and implementation issues they raise. A wide range of disciplinary perspectives is presented. Case studies and class projects are designed to give students the skills needed to critically assess community projects around health promotion.

**HSERV 589 Epidemiologic Research in Aging Populations (3)** *LaCroix* Emphasizes application of epidemiologic methods to the study of older populations. Topics include: compression of morbidity; successful aging; methodological challenges in studying older populations; physical, cognitive and social function as epidemiological endpoints; chronic conditions of the aging (heart disease, cancer, Alzheimer's disease, dementia, osteoporosis, fractures); health promotion strategies. Prerequisite: EPI 511 or EPI 513. Offered: jointly with EPI 589.

**HSERV 590- Selected Topics in Health Services (\*-)** By individual arrangement, the student and faculty member(s) develop a program of reading and conference appropriate to the topic selected by the student. The topic chosen will be within the special competence of the faculty participating in the course, in the areas of health-care delivery and health-care administration. Also special summer format presenting introductory material may be taken with ENV H 590 and/or EPI 590. For more information and permission, consult department program adviser.

**HSERV 592 Program Seminars (1-6, max. 6)** Graduate seminars organized to address specific educational needs of students in various fellowships, residencies, and other specialized programs within the Department of Health Sciences (i.e., maternal and child health, international health, preventive medicine, social and behavioral sciences). Prerequisite: permission of instructor.

**HSERV 595 Practicum/Field Work in Community Medicine (1-12, max. 12)** Experience in variable time blocks in community health activities in agencies delivering and planning health services. Sites include neighborhood clinics, health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite: master's student in health services and permission of instructor.

**HSERV 598 Extended Degree Program Project Option (\* max. 9)** Supervised project work on a selected topic related to student's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclu-

sions. Prerequisite: registration in extended MPH degree program and satisfactory completion of the first summer's course work.

**HSERV 600 Independent Study or Research (\*)**  
Prerequisite: permission of instructor.

**HSERV 700 Master's Thesis (\*)** Prerequisite: permission of instructor.

## Health Services Management

### Courses for Graduates Only

**HSMGMT 500 Seminar in Managed Care (2)**  
*Dowling* Examination of the organization and management of managed-care health plans and delivery systems. Focuses on features that influence the effectiveness of such organizations. Goals, functions, organization structure, and technology of the internal systems common to managed care are discussed with executives from health plans and delivery systems. Credit/no credit only. Offered: Sp.

**HSMGMT 502 Evidence-Based Health Care Planning (3-4)**  
*Kopjar, Richardson* Applies the techniques of statistics, epidemiology, and critical evidence appraisal to the design and evaluation of population-based health care programs. It is the third course in a three-course sequence. Offered: Sp.

**HSMGMT 512 Introduction to Management in Health Services (3)**  
*Dowling* Overview of managerial roles, such as supervising and motivating, approaches to organizational and environmental assessment and change, and development of systems analysis skills. For students pursuing careers in research and teaching who are likely to have management responsibilities.

**HSMGMT 513 Allocating Health Care Resources: A Population Based Perspective (4)**  
*Conrad* Analysis of health services financing in the United States, with comparison to systems of other developed countries. Develops analytic and normative frameworks for examining public and private health insurance. Study of pricing, underwriting, benefit design, and delivery system; financing integration issues. Prerequisite: HSERV 511 or equivalent or permission of instructor. Offered: Sp.

**HSMGMT 514 Health Economics (3)**  
*Wickizer* Uses economic concepts and tools to examine range of issues pertaining to health care, delivery of health care services. Includes demand analysis, production of health services, expenditure growth, markets for hospital and physician services, externalities. Emphasis on using economics to examine issues and solve problems. Prior economics courses not required. Offered: W.

**HSMGMT 522 Applied Data Analysis (3)**  
*Cheadle, Connell* Practical experience in quantitative research, using a data set of their choosing to formulate a research question, clean and edit the data, and do the analysis. For second-year students in the School of Public Health who plan to do quantitative analysis for their thesis or project. Credit/no credit only. Offered: W.

**HSMGMT 526 Selected Topics in Health Informatics (1-3, max. 12)**  
*Masuda* Computers and information technology are improving and changing healthcare education, research, and clinical practice. Informatics faculty and researchers from the UW and affiliated institutions present their research findings as well as discuss their views of national developments in their respective disciplines. Credit/no credit only. Offered: jointly with MEDED 590; AWSp.

**HSMGMT 543 Social and Behavioral Strategies for Improving Health (3)**  
*Slova* Explores social dimensions of health and medical care. Learn to identify key social and cultural principles that guide appropriateness in health care. Introduced to tools used

to influence social expectations and personal behavior in relation to illness, health, and demand for medical treatments. Offered: S.

**HSMGMT 544 Redesigning Health Care (4)**  
*Richardson, Ross* Focuses on the integrating of health care delivery systems. While hospital and ambulatory care services provide a focal point for the course, the objective is to examine system linkages between providers, including public health, group practices, and community based health care delivery programs. Prerequisite: HSERV 511 or permission of instructor.

**HSMGMT 545 Capstone Integrative Seminar (4)**  
*Scott* Designed to assist students in the transition from theory to practice. Emphasis on sharpening analytical and intuitive leadership practices through the use of interactive case studies and team building exercises and field projects. Prerequisite: second year MHA students. Offered: Sp.

**HSMGMT 546 Long-Term Care (3)**  
*Hawley* Learning experience for graduate students in health services administration, planning, other graduate students to increase their ability to identify and solve problems related to long-term care they confront in their employment. Students are exposed to available knowledge in the field; effective problem-solving attitudes and techniques for organizing information and/or developing strategies, and agencies in the field. Prerequisite: HSERV 511 or permission of instructor.

**HSMGMT 560 Management Practice in Health Care and Public Health Organization (3)**  
*Richardson, Sappington* Introduction to leadership and management, focusing on effective strategies for creating a productive work environment. Organizational structure and strategy introduced. Case studies and other problem-solving methods, using health services applications are utilized in order to apply theoretical material. Prerequisite: graduate student. Offered: Sp.

**HSMGMT 561 Health Planning: The Management of Change (3-4)**  
*Erbstoeszser* Designing realistic implementation strategies at beginning of planning process to optimize impact of planning on real problems. Discussion of ways in which change is brought about and decisions are made and implemented. Includes managing planning process, work plans, stakeholders, negotiation, and working with groups. Prerequisite: HSERV 511 or permission of instructor. Offered: A.

**HSMGMT 562 Strategic Management of Health Care Organizations (3-4, max. 4)**  
*Dowling* Management of goals, strategy, and structure in health care organizations. Design of external relationships and internal structures., strategy-formulation, decision-making, and change. Integration of professional, social, and organizational values. Theory, student and practitioner experience, and case studies used to enhance repertoire of management approaches and skills. Prerequisite: HSERV 511 and HSMGMT 560 or equivalent.

**HSMGMT 563 Personnel Management for Health Professionals (3)**  
*Kienast* Designed for midcareer health services professionals developing strategies and skills in human resource management. Focuses on policy and practice issues important to handling day-to-day personnel problems-selection, promotion, performance appraisal, discipline, grievances. Prerequisite: registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

**HSMGMT 565 Quantitative Decision Making for Health Services Management (3)**  
*Pilcher* Applications of various quantitative techniques for problem solving, monitoring, controlling, decision making in health services. Identifying problem area, communications with consultant, evaluation to the quality and applicability of analyst's work. Statistical, mathemati-

cal, operations research, industrial engineering techniques. Prerequisite: QMETH 500 or BOST 509 or permission of instructor.

**HSMGMT 566 Decision Support Models for Health Services (3)**  
*Pilcher* Management science and approaches developed as applied to problems in public health. Emphasizes conceptual understanding of processes/application of systematic, and rational approach to managerial problem solving, including cost-benefit, cost effectiveness analysis. Prerequisite: BOST 502 and 503, or BOST 511; registration in Extended M.P.H. Degree program; non-business majors.

**HSMGMT 571 Health Care Financial Management (3)**  
*Huebner, Tiscornia* Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and program policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survey and health services research project reports. Prerequisite: HSERV 511 and ACCTG 500 or ACCTG 501 or permission of instructor.

**HSMGMT 572 Financial Management for Health Professionals (3)** Intensive review of basic accounting principles/terminology and an introduction to financial management/managerial accounting, including budgeting for managerial control, planning, cost accounting, financing health programs. Managerial accounting, program costing, rate setting, budget preparation. Prerequisite: BOST 502 and BOST 503, or BOST 511; registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

**HSMGMT 573 Seminar in Health-Care Finance (3)**  
*Conrad* Practical applications of corporate finance principles in health-care field. Applies theoretical framework to health-care financial problems of varying complexity, including capital investment analysis, leasing vs. borrow-to-buy decision, debt capacity analysis, bond refunding, control of capital, joint venture. Prerequisite: HSMGMT 585 or equivalent, ACCTG 500, ACCTG 501; or permission of instructor.

**HSMGMT 574 Financial Management I (3-4)**  
*Stillman* Prepares clinical professionals for participating intelligently in, and contributing to, financial decisions of health care organizations. Learn the language and fundamental concepts of accounting and finance, and become comfortable with what is required in formal financial analysis. Offered: A.

**HSMGMT 575 Financial Management II (4)**  
*Conrad, Stillman* Second in a two part series, the emphasis of this financial management course is on preparing medical executives for managerial and leadership roles in health care organizations. Focus is on tools and analytic frameworks that health care managers use to make forward-looking decisions, including capital budgeting and risk analysis. Offered: W.

**HSMGMT 590 Select Topics (1-6, max. 12)** By arrangement, students and faculty members develop a program of reading and conference appropriate to the selected topic. The topic chosen is within the special competence of the faculty member participating in the course in the area of health services management.

**HSMGMT 592 Health Management Program Seminar (1-6, max. 6)**

## Pathobiology



General Catalog Web page:  
[www.washington.edu/students/genecat/academic/Pathobiology.html](http://www.washington.edu/students/genecat/academic/Pathobiology.html)



Department Web page:  
[depts.washington.edu/pathobio](http://depts.washington.edu/pathobio)

## Graduate Program

Graduate Program Coordinator  
 F161F Health Sciences, Box 357238  
 (206) 543-0317  
[pathobio@u.washington.edu](mailto:pathobio@u.washington.edu)

The Department of Pathobiology offers a research training program leading to the Master of Science and Doctor of Philosophy degrees. Pathobiology is the study of pathogenic biological agents and their interaction with their hosts, primarily humans. As a discipline, pathobiology ties together the fundamental concepts of biology and clinical medicine. The Department of Pathobiology applies a multidisciplinary approach as well as the latest research technologies to the study of public-health problems such as cancer, HIV, and other infectious agents. Members of the department have diverse research interests including the molecular biology of cancer, molecular investigation of pathogenesis, drug resistance and host responses, diagnosis of diseases, development of vaccines and therapeutics, and fundamental biology of infectious agents. Course work provides the foundation for interfacing molecular and cellular biology with public-health issues.

## Admission Requirements

Students from a variety of academic backgrounds are accepted for graduate study in pathobiology. It is highly desirable that applicants have completed course work in biology, microbiology, organic chemistry, and biochemistry or molecular and cellular biology. Persons holding professional doctorates (medicine, dentistry, veterinary medicine) are also encouraged to enter the graduate program.

## Financial Aid

Some financial aid may be available in the form of research assistantships funded primarily through federal research grants held by faculty members.

## Research Facilities

In addition to the research facilities at the University of Washington, opportunities for training also exist at the Fred Hutchinson Cancer Research Center, the Pacific Northwest Research Institute, the Seattle Biomedical Research Institute, and other biotech facilities.

## Faculty

### Chair

Kenneth Daniel Stuart

### Professors

Campbell, Lee Ann \* 1985; PhD, 1982, Pennsylvania State University; molecular biology and pathogenic mechanisms of chlamydiae.

Carter, William G. \* 1981; PhD, 1974, University of California (Davis); elucidation of components in cell attachment and cell spreading in normal cells.

Grabstein, Kenneth 1998, (Affiliate); PhD, 1982, University of California (Berkeley).

Grayston, J. Thomas \* 1960, (Adjunct); MD, 1948, MS, 1952, University of Chicago; epidemiology and control of infectious disease, especially respiratory infections.

Hakomori, Sen-itiroh \* 1967; MD, 1951, DMedSc, 1956, Tohoku University (Japan); role of glycosphingolipids in defining antigenicity, cellular interaction, and signal transduction.

Kenny, George E. \* 1961; PhD, 1961, University of Minnesota; human immune response to infectious diseases, detection and biology of mycoplasmas.

Klebanoff, Seymour \* 1962, (Adjunct); MD, 1951, University of Toronto (Canada); PhD, 1954, University of London (UK); infectious disease.

Kuo, Cho-Chou \* 1969; MD, 1960, National Taiwan University; PhD, 1970, University of Washington; antigenic analysis, immunology and pathogenesis of chlamydiae.

Lukehart, Sheila A. \* 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); infectious diseases.

Parkinson, Alan J. 1996, (Affiliate); PhD, 1976, Otago University (New Zealand); prevention and control of infectious diseases in Arctic populations.

Parsons, Marilyn \* 1981; PhD, 1979, Stanford University; molecular and cellular parasitology.

Perine, Peter L. \* 1981, (Adjunct); MD, 1966, University of Kansas; MPH, 1973, University of Washington; international health, sexually transmitted diseases.

Rausch, Robert L. \* 1978, (Emeritus); DVM, 1945, Ohio State University; PhD, 1949, University of Wisconsin; parasitology, helminthic zoonoses.

Reed, Stephen G. \* 1993, (Research); PhD, 1979, University of Montana; immunological response to mycobacteria infections.

Roberts, Marilyn C. \* 1981; PhD, 1978, University of Washington; antibiotic resistance genes.

Stuart, Kenneth Daniel \* 1985; PhD, 1969, University of Iowa; molecular biology of protozoan pathogens.

Todaro, George J. \* 1983; MD, 1963, New York University; growth regulation in normal and tumor cells.

Wang, San-Pin \* 1963, (Emeritus); MD, 1944, DMedSc, 1959, Keio University (Japan); classification, pathogenesis, and epidemiology of chlamydiae.

### Associate Professors

Bosch, Marnix L. \* 1994; PhD, 1987, University of Leiden (Netherlands); molecular virology of lentiviruses and herpes viruses, as well as animal models for viral diseases.

Feagin, Jean E. \* 1993; PhD, 1982, Stanford University; molecular parasitology, emphasizing organelle gene organization and expression in protozoans.

Haigwood, Nancy L. \* 1994; PhD, 1980, University of North Carolina; host immunity in the control and prevention of AIDS.

Hill, Walter E. \* 1992, (Affiliate); PhD, 1972, University of Washington; genetic methods for detecting and characterizing foodborne microbial pathogens.

Kahn, Michael \* 1992, (Research); PhD, 1983, Yale University; molecular recognition, protein structure-function relationships, peptidomimetics, signal transduction.

Kurath, Gael \* 1994, (Affiliate); PhD, 1984, Oregon State University; molecular biology and evolution of RNA viruses that infect fish.

Leboeuf, Renee C. \* 1977; State University of New York (Buffalo); genetic and nutritional regulation of proteins involved in lipid transport.

Myler, Peter J. \* 1993, (Research); PhD, 1982, University of Queensland (Australia); regulation of gene expression in protozoan parasites.

Riley, Donald E. \* 1982, (Research); PhD, 1976, University of Washington; pathogenic research and diagnosis involving DNA sequences.

Rose, Timothy M. \* 1991; PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.

Rosenfeld, Michael E. \* 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

Swindle, John \* 1996; PhD, 1985, University of Utah; molecular pathogenesis of trypanosomes.

Thouless, Margaret E. \* 1980; PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.

Van Voorhis, Wesley C. \* 1986, (Adjunct); PhD, 1983, Rockefeller University; MD, 1984, Cornell University; infectious diseases.

### Assistant Professors

Bartelmez, Stephen Hollis \* 1988; PhD, 1979, University of Glasgow (UK); stem cell biology.

Cangelosi, Gerard A. \* 1985; PhD, 1984, University of California (Davis); molecular biology, environmental monitoring, clinical detection of pathogenic mycobacteria.

Kahn, Stuart J. 1985, (Adjunct); MD, 1985, University of Medicine and Dentistry of New Jersey; rheumatology.

Lampe, Paul D. \* 1996, (Research); PhD, 1984, University of Minnesota; regulation of intercellular communication via gap junctions.

Lee, Ming Sang 1994, (Affiliate); PhD, 1988, Columbia University; chemical and biological structure determination by NMR.

Lingappa, Jaisri \* 1999; PhD, 1985, Harvard University; MD, 1987, University of Massachusetts; cell biology of virus assembly, host proteins involved in assembly of HIV and other viruses.

Nakanishi, Hiroshi 1994, (Affiliate); PhD, 1986, Marquette University.

Sherman, David R. \* 1998; PhD, 1987, Vanderbilt University; molecular genetics, microbiology and biochemistry of pathogenic mycobacteria.

Wang, Jun 1999, (Affiliate); PhD, 1994, Kobe University (Japan); G protein signaling and regulation of transcription factors.

White, Theodore C. \* 1996; PhD, 1984, University of Michigan; molecular mechanisms of virulence and drug resistance in pathogenic yeasts.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### PABIO 201 Newly Emerging Diseases in Public Health (2) NW

*Kenny* Newly recognized and emerging disease pose a major problem for public health. AIDS, hantavirus infections, Ebola virus infections, and the role of bacterial infection in the causation of stomach ulcers are examples of problems to be studied. Other timely diseases are presented in this lecture discussion course. Offered: W.

### PABIO 301 Prevention of Infectious Diseases (3) NW

*Kenny* Consideration of means of prevention of major classes of infectious diseases from the public-health view point. Classes of diseases are defined by site of infection (e.g. respiratory) or common mechanisms of spreading. Respiratory, sexually transmitted, water-borne, and tropical diseases. Prerequisite: either MICROM 301 or BIOL 201. Offered: Sp.

### UCONJ 420 Biological Safety Practices (1) *Kenny*

See University Conjoint courses.

**PABIO 445 Medical Virology (2) NW** *Thouless, Wong* An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined. Prerequisite: BIOL 201. Offered: jointly with MICROM 445; Sp.

**PABIO 498 Undergraduate Thesis (\*)**

**PABIO 499 Undergraduate Research (\*)**

## Courses for Graduates Only

**PABIO 500 Introduction to Pathobiology Research (3-9, max. 9)** Rotation through research laboratory. Credit/no credit only.

**PABIO 511 Pathobiological Frontiers (2)** *Kenny* Molecular and immunological concepts of infectious and noninfectious diseases presented in format suitable for graduate students knowledgeable in health-related areas who are not in biology-oriented programs. Allergy, immune responses, nature of infectious agents, prevention of disease with emphasis on newly defined diseases and disease agents. Prerequisite: permission of instructor.

**PABIO 513 Biotechnology, Bioinformatics, and Ecogenetics (3)** *Eaton, Rose, Thummel* Methodologies currently used for characterization, storage, and retrieval of genetic information relevant to gene-environment interactions that contribute to diseases of public health importance. Working knowledge of molecular genotyping and phenotyping, genomics, and bioinformatics related to genetic testing provided. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H/PCEUT/PHG 513; A.

**PABIO 514 Animal Models and Public Health Genetics (2)** *LeBoeuf* Contributions of animal models to studies of human diseases. Concepts of multigenic diseases, chromosomal mapping, quantitative traits with emphasis on diseases of major public health impact. Interaction between inheritance and nutrition. Focus on mouse genetics. Prerequisite: GENET 371, PHG 513, or permission of instructor. Offered: jointly with NUTR 514 and PHG 514; Sp.

**PABIO 521 Cell Culture (2, max. 4)** *Kenny, Thouless* General concepts, techniques, and applications of tissue culture with emphasis on use of tissue culture for viral diagnosis and propagation. Nutrition, growth characteristics, and metabolism of animal cell cultures. Laboratory experiments give practical experience in tissue culture and virology. Prerequisite: permission of instructor.

**PABIO 522 Antigenic Analysis of Microorganisms (3)** *Kenny* Theory and techniques for antigenic analysis of complex mixtures, including microorganisms. Recent advances in separating antigens, identifying antigenic determinants, and antigenic mapping of proteins. Laboratory includes a special problem of the student's choice. Prerequisite: permission of instructor.

**PABIO 525 Cell Surface Membrane in Cell Sociology and Immunology (2)** *Carter, Hakomori* Structure and function of cell surface membranes in relation to development of various diseases, particularly infection, cancer, and inflammation. Examines how specific cell surface molecules are targets of recognition by microbes, tumor cells, and recruited inflammatory cells. Prerequisite: BIOC 440, BIOC 441, BIOC 442, and permission of instructor. Offered: jointly with MICROM 525.

**PABIO 531 Applications of Molecular Biology to Public Health (2)** *Cangelosi, Kuo* Addresses the impact of molecular biology on public health. Lectures focus on the application of biotechnology to diagnostics, pharmaceuticals, vaccines, and environmental concerns. Considerations for developing and using biotechnology products also discussed. Prerequisite: courses in genetics, biochemistry, or microbiology, or permission of instructor. Offered: A.

**PABIO 536 Bioinformatics and Gene Sequence Analysis (3)** *Rose, Yarfitz* Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Credit/no credit only. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with MEDED 536; Sp.

**PABIO 540 Antibiotic Resistance Mechanisms and Their Impact on Public Health (3)** *Roberts* Lectures covering resistance mechanisms against bacterial antibiotics, antiviral, antiparasitic, and cancer drugs. Topics also include the effects that resistant microorganisms have on therapy and cancer treatment and their impact on public health. Prerequisite: permission of instructor.

**PABIO 548 Molecular and Cellular Parasitology (3)** *Feagin* Molecular and cellular biology of parasites of health-related significance, emphasizing current research topics unique to parasites, particularly well-suited for study in parasites, and especially important to study in host-parasite systems. Prerequisite: familiarity with molecular and cellular biology and permission of instructor. Offered: even years; Sp.

**PABIO 550 Diseases of Public Health Importance and Strategies for their Control (3)** Public Health perspective of major disease of national and global importance. Discussion of origins, establishment, progression, and pathogenesis of diseases. Importance of immunological, intercellular and external factors, and strategies of disease prevention. Requires a grounding in cellular and molecular biology, microbiology, and immunology. Prerequisite: permission of instructor.

**PABIO 551 Biochemistry and Genetics of Pathogens and Their Hosts (4)** . Provides a strong foundation in biochemistry, molecular biology, and genetics for students interested in disease. Principles will be illustrated through examples focusing on pathogens, and infectious and non-infectious disease. Prerequisite: Undergraduate level course work in molecular biology or biochemistry or permission of instructor.

**PABIO 552 Cell Biology, Immunology, and Disease (4)** Cell biology and immunology explored through diseases of public health importance with examples of pathogen interaction with host cell biology and immune systems, unique aspects of the cell biology of pathogens, perturbations of these systems in non-infectious diseases and design of therapeutics and vaccines to combat diseases of public health importance. Prerequisite: Undergraduate level coursework in biology or molecular biology or permission of instructor.

**PABIO 568 Molecular Epidemiology of Infectious Diseases (2)** Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: PABIO 511 or PABIO 512 or permission of instructor. Offered: jointly with ENV H 568/EPI 568; W.

**PABIO 580 Pathobiology Seminar (1, max. 15)** Research from students, faculty members, and invited speakers is presented and discussed. Topics include immunochemistry, viruses, membranes, infectious diseases, immune response and other related topics.

**PABIO 581 Current Literature in Pathobiology (1, max. 15)** Critical evaluation of recent articles related to human disease and disease agents. Prerequisite: graduate student in pathobiology or permission of instructor.

**PABIO 590 Selected Topics (1-8, max. 8)** In-depth study of an issue relating to pathobiology. Seminar format. Small groups of students by arrangement with faculty member. Prerequisite: enrollment in pathobiology graduate degree program and permission of instructor.

**PABIO 598 Didactic Pathobiology (\* max. 12)** Supervised teaching experience in pathobiology courses for Ph.D. candidates. Prerequisite: permission of instructor.

**PABIO 600 Independent Study or Research (\*)** Credit/no credit only. Prerequisite: permission of graduate program adviser.

**PABIO 700 Master's Thesis (\*)** Credit/no credit only. Prerequisite: permission of graduate program adviser.

**PABIO 800 Doctoral Dissertation (\*)** Credit/no credit only. Prerequisite: permission of graduate program adviser.

# School of Social Work

## Dean

Nancy R. Hooyman  
210 Social Work/Speech and Hearing Sciences Building



General Catalog Web page:  
[www.washington.edu/students/genocat/academic/School\\_Soc\\_Work.html](http://www.washington.edu/students/genocat/academic/School_Soc_Work.html)



School Web page:  
[depts.washington.edu/sswweb/](http://depts.washington.edu/sswweb/)

The School of Social Work offers two professional programs, one at the undergraduate level and one at the graduate level, as well as a Ph.D. program. The undergraduate program prepares students for entry-level generalist practice; students earn the Bachelor of Arts in Social Welfare degree. The graduate professional program prepares students for advanced practice within a field of concentration; students earn a Master of Social Work degree. Both professional programs are accredited by the Council on Social Work Education. The School also offers a Doctor of Philosophy degree in social welfare that prepares students for careers in research and education. For the three programs, no credit is granted on the basis of life experience or previous employment. All three programs are housed in the Social Work/Speech and Hearing Sciences Building, 4101 Fifteenth Avenue Northeast, Seattle, WA 98105-6299.

In addition, the School offers a concurrent degree program with the School of Public Health and Community Medicine leading to the M.S.W. and M.P.H. degrees.

## Graduate Program

Graduate Program Coordinator  
Box 354900  
(206) 543-8617  
[sswstsrn@u.washington.edu](mailto:sswstsrn@u.washington.edu)

## Master of Social Work

The School of Social Work offers a Master of Social Work degree with four options for completion: a two-year full-time program; a one-year Advanced Standing program for qualified students with a degree in social work/social welfare from an accredited undergraduate program; a three-year Evening Degree program; and a three-year distance learning program that is currently located on the Olympic Peninsula.

All program options prepare students for advanced professional practice with a culturally diverse range of at-risk populations in publicly funded social services. The curriculum encompasses two distinct but interconnected areas: the beginning content or professional foundation, and opportunities for advanced content in an area of concentration.

The professional foundation provides instruction in the basic knowledge and skills required for effective, generalist social work practice, as well as socialization to the profession, its value orientation, ethics, and history.

The advanced curriculum provides in-depth knowledge and skills needed for advanced practice in a major area of the social work profession. These include four concentrations: health and mental health; children, youth, and families; multi-ethnic practice; and social welfare administration.

Students in the Evening Degree and Distance Learning options complete the children, youth, and families concentration.

## Admission Qualifications

Admission to the M.S.W. program requires formal admission to the Graduate School as well as to the School of Social Work. Applicants are required to have a bachelor's degree, a strong academic background, and social-service experience. Applicants must submit transcripts, references, application forms, Graduate Record Examination scores, and an admission essay to be considered for autumn-quarter entry. January 15 is the closing date for receipt of applications and materials. Admission is competitive and selection is based on a review of the applicant's submitted materials. Current application materials can be obtained from the School's Admissions Office, 23 Social Work/Speech and Hearing Sciences Building, or by calling 206-543-5676 in Seattle or 1-800-558-8703.

## Financial Aid

A limited number of financial-aid opportunities are available to students. Applicants to the M.S.W. program are urged to apply for assistance through the Office of Student Financial Aid by February 15. Completion of the Free Application for Federal Student Aid (FAFSA) is required for consideration for any departmental funding. Departmental funding is limited to a few resident tuition scholarships which cover only one or two quarters of tuition. Inquiries may be directed to the Chair of the Scholarship Committee, School of Social Work.

## Master of Social Work—Master of Public Health Concurrent Degree Program

The School of Social Work participates with the School of Public Health and Community Medicine in a concurrent degree program leading to the M.P.H. and M.S.W. degrees. The program offers interdisciplinary preparation in the fields of public health and social work. Historically, public health and social work have shared an interest in a preventive approach to health and social problems, a community perspective, and a focus on vulnerable populations. Both fields recognize the interrelationship of the health, social, and behavioral components of contemporary problems and the need for interventions and research that address all three components. The concurrent degree program prepares professionals to function at the interface of both fields, in practice, research, planning, administration, and policy development.

Additional information concerning the concurrent degree program may be obtained from the School of Social Work's Admissions Office.

## Ph.D. Program in Social Welfare

The Ph.D. program in social welfare prepares students to contribute to the advancement of knowledge and practice in the field of social welfare and the profession of social work. The program builds on the premise that social welfare scholarship must be scientifically based, responsive to service and practice needs, and informed of developments in related fields and disciplines.

After the first year of required courses, each student's program of study is individually designed and focuses on well-defined substantive and interventive areas of research relevant to the field of social welfare. In the basic core of required courses, which include teaching and research practice, students have an opportunity to pursue their particular interests with faculty members in the School of Social Work and in other schools and departments.

During the first two years, students are expected to define and develop the specialized areas that will be the focus of their General Examination and, typically, their subsequent dissertation research. The selected

areas must have clear significance for the development of practice, programs, or policies in social work and social welfare.

The General Examination for advancement to candidacy generally occurs at the end of the second year or early in the third year. After advancement to candidacy, students devote themselves full time to completion of their dissertation research. The last step before award of the degree is the Final Examination, which consists mainly of the defense of the dissertation. Students are strongly encouraged to remain in residence at the University until the dissertation is accepted. The Ph.D. program is designed to take approximately four years, although academic excellence in learning and performance is always the first criterion for degree progress.

## Admission

Admission is highly selective and students are admitted for autumn-quarter entry only. Applicants should have a master's degree in social work or comparable preparation in a closely related field.

The Council on Social Work Education requires that faculty who teach practice courses in accredited programs have two years of supervised post-M.S.W. practice. Thus, obtaining the post-M.S.W. experience is highly important for those who seek academic positions following graduation.

Applicants selected for admission are those whose scholastic achievements, previous experience, and aptitude for social welfare research, scholarship, and teaching indicate the greatest promise for achieving the objectives of the program. In addition, an effort is made to maintain a balanced student group reflecting the range of concerns in social welfare and faculty resources as well as the diversity goals of the University. The deadline for receipt of admission material is January 15.

## Financial Aid

Stipends, scholarships, teaching and research assistantships, and tuition waivers are available. Every effort is made to provide aid to each student who requires it, and research and teaching assistant positions are provided to all Ph.D. students for at least the first three years. It is unlikely that the financial assistance provided would be adequate to cover all educational and living expenses. Financial-aid forms required for financial assistance must be submitted by February 15 by completing the Free Application for Federal Student Aid (FAFSA).

## Faculty

### Professors

Catalano, Richard F. \* 1979; PhD, 1982, University of Washington; crime and drug abuse prevention and treatment, research methods and statistics.

Conte, Jon \* 1990; PhD, 1979, University of Washington; effects of sexual abuse on children and adult survivors, prevention of sexual abuse.

Gilchrist, Lewayne D. \* 1981; PhD, 1981, University of Washington; health promotion and disease prevention in community settings, women's health, research methods.

Gillmore, Mary Louise 1977; MS, 1970, University of Michigan; MA, 1977, PhD, 1983, University of Washington; adolescent sexuality and substance abuse.

Hawkins, John D. \* 1976; PhD, 1975, Northwestern University; crime and delinquency, substance abuse, social development, research, prevention.

Hooyman, Nancy \* 1979; PhD, 1974, University of Michigan; aging, caregivers of dependents, feminist practice, community organization development.

Jaffee, Ben-Joshua \* 1967, (Emeritus); DSW, 1972, Columbia University; loss, grief, mourning and social work practice; ethnic minority perspectives on loss and grief.

Lazzari, Marceline \* 1998, (Adjunct); PhD, 1990, University of Denver; women, human diversities, and teaching/learning collaboration.

Levy, Rona L. \* 1975; PhD, 1974, University of Michigan; research methodology, single-case evaluation, health care, behavioral medicine, biofeedback.

Longres, John F. \* 1993; PhD, 1970, University of Michigan; race and ethnicity; children, youth, and families.

Maier, Henry W. \* 1959, (Emeritus); PhD, 1959, University of Minnesota; child development, group child care; direct practice with individuals, families, and groups.

Morrison, Diane M. \* 1980, (Research); PhD, 1982, University of Washington; sexual decision-making, attitudes and behavior, teen pregnancy.

Nurius, Paula S. \* 1984; PhD, 1984, University of Michigan; social cognition, violence against women, research/computer supports for practice, critical thinking.

Parsons, Jack R. 1978, (Emeritus); MA, 1940, University of the Pacific; MS, 1943, Columbia University; PhD, 1958, University of Chicago; social work.

Pecora, Peter \* 1990; PhD, 1982, University of Washington; child welfare practice, foster care, family preservation services, personnel management.

Plotnick, Robert D. \* 1984, (Adjunct); MA, 1973, PhD, 1976, University of California (Berkeley); poverty, labor and social welfare policy, economic policy analysis.

Resnick, Herman \* 1967, (Emeritus); PhD, 1970, Bryn Mawr College; group process, organizational development, mediation, multimedia practice, international social work.

Richey, Cheryl A. \* 1973; DSW, 1974, University of California (Berkeley); cultural and gender issues, intervention design and research.

Roffman, Roger Alan \* 1972; DSW, 1983, University of California (Berkeley); alcoholism and drug abuse, AIDS prevention, domestic violence, research methodology.

Stier, Florence E. \* 1964, (Emeritus); MS, 1941, University of Pittsburgh; social welfare planning and program development.

Takagi, Calvin Y. 1961, (Emeritus); MSW, 1952, PhD, 1958, University of Minnesota; mental health services, child development, services to minority populations.

Weatherley, Richard A. \* 1975; PhD, 1975, Massachusetts Institute of Technology; social welfare policy and administration, poverty and inequality.

Whittaker, James \* 1970; PhD, 1970, University of Minnesota; child welfare, in-home foster family care and residential services, social support networks.

### Associate Professors

Anderson, James R. \* 1968, (Emeritus); MA, 1954, Indiana University; social work and health care; growth and development, particularly Black Americans.

Arthur, Michael \* 1991, (Research); PhD, 1990, University of Virginia; Project Director—Community Youth Activity, Six State Prevention Needs and Assessment.

Balassone, Mary Lou \* 1986; DSW, 1987, University of California (Berkeley); health care policy and delivery systems, maternal and child health.

Berleman, William C. \* 1965, (Emeritus); MSW, 1960, University of Washington; undergraduate social welfare, social welfare policy.

Dear, Ronald Bruce \* 1970; DSW, 1972, Columbia University; American social welfare policy and services, poverty and inequality, legislative advocacy.

Duplica, Moya M. \* 1963; MSW, 1956, St Louis University; social welfare policy and history, women and social policy, values/ethics in social work practice.

Ellis, Jack A. N. \* 1966, (Emeritus); MSW, 1955, University of British Columbia (Canada); social welfare administration and planning, social work and the social justice system.

Era, Pauline \* 1993; PhD, 1983, Cornell University; step-families, remarriage, foster families, supervision, divorce and single-parent families.

Fredriksen, Karen Ilene \* 1993; PhD, 1993, University of California (Berkeley); gerontology, work and family dependent care, non-traditional families, social policy.

Hanneman, Carl F. 1967, (Emeritus); MA, 1951, Indiana University; aging, alcoholism, human services practice.

Harachi, Tracy \* 1987, (Research); PhD, 1991, University of Washington; child development, interventions for children and families, cultural adaptation and ethnic identity.

Herrick, James E. \* 1966, (Emeritus); DSW, 1966, University of Southern California; social policy, social work and the justice system, research methodology, social and cultural change.

Icard, Larry \* 1993; DSW, 1992, Columbia University; AIDS prevention intervention design and research, administration, race/ethnic minority group issues.

Ishisaka, Anthony H. \* 1971; DSW, 1978, University of California (Berkeley); social work practice, mental health services, services to minority communities, human development.

Kelley, Jerry Lee \* 1961, (Emeritus); MA, 1949, University of Chicago; social workers in schools, interviewing and counseling in human services.

Kruzich, Jean \* 1991; PhD, 1982, University of Washington; maternal depression and child abuse, organizational impacts on residents of long-term care agencies.

Leigh, James William \* 1967, (Emeritus); MSW, 1954, Wayne State University; social work practice with families, multiethnic and multicultural concerns, family life education.

Marcenko, Maureen \* 1997; PhD, 1988, McGill University (Canada); developing and testing interventions for families at risk.

Miller, Sidney \* 1962, (Emeritus); MS, 1953, Columbia University; children, adolescents, and their families; interviewing, crisis intervention, marital counseling.

Mundt, Lenora B. 1985, (Emeritus); MSW, 1950, University of Washington; family treatment.

Ryan, Rosemary \* 1991, (Research); PhD, 1987, University of Washington; behavioral HIV prevention research; AIDS services policy, planning and evaluation.

Semke, Jeanette \* 1988, (Research); PhD, 1991, University of Washington; mental health services research, older adults with neuropsychiatric disorders.

Sohng, Sue \* 1990; PhD, 1989, University of Pittsburgh; action research and chronic mental illness, cross-cultural social work practice.

Teather, Edward Charles \* 1966, (Emeritus); MSW, 1962, University of British Columbia (Canada); family-centered practice, group work, program development.

Uehara, Edwina \* 1990; PhD, 1987, University of Chicago; qualitative/quantitative research methods, cross-cultural mental health, human services organization.

Wells, Elizabeth A. 1982, (Research); PhD, 1984, University of Washington; clinical psychology, alcohol and drug use among adolescents.

### Assistant Professors

Ai, Amy 1999; PhD, 1996, University of Michigan; women mental health.

Allen, Allethia Lee \* 1966, (Emeritus); MSW, 1950, Boston University; PhD, 1986, Walden University; social welfare policy, multiculturalism, women's issues, social work practice.

Almgren, Gunnar R. 1986; MSW, 1979, Portland State University; PhD, 1990, University of Washington; health care policy and practice.

Cherin, David \* 1999; PhD, 1996, University of Southern California; policy issues relating to mental health.

Cook, Douglas \* 1990, (Clinical); PhD, 1990, University of Washington; parenting, health promotion and quality of life for people with mental retardation.

Emler, Charles 1999; MSW, 1979, California State University, Fresno; PhD, 1998, Case Western Reserve University; social work, aging and aids social support.

Farwell, Nancy 1998; PhD, 1998, University of California (Berkeley); mental health policy.

Herrenkohl, Todd 1995; PhD, 1998, University of Washington; youth violence.

Kemp, Susan 1994; MA, 1981, University of Auckland (New Zealand); PhD, 1994, Columbia University.

Laakso, Janice 1999, (Adjunct); PhD, 1999, University of Texas (Austin); social work; child welfare.

Nagda, Biren A. \* 1996; PhD, 1996, University of Michigan.

Scanlon, Edward \* 1998; PhD, 1998, Washington University; home ownership, low-income housing, social policy and social welfare advocacy.

Seyfried, Sherri \* 1994; MSW, 1979, Norfolk State; PhD, 1994, University of Illinois; social and academic development of minority youth.

Tajima, Emiko A. 1999; PhD, 1999, Bryn Mawr College; social policy and child welfare policy.

Tangenberg, Kathleen 1994, (Adjunct); PhD, 1998, University of Washington; women studies.

### Senior Lecturers

Amidei, Nancy 1992; MSW, 1968, University of Michigan; poverty, public policy, advocacy.

Roberts, Elizabeth A. 1982; MSW, 1975, University of Washington; Practicum Coordinator.

### Lecturers

Cahn, Katharine C. 1985; MSW, 1989, University of Washington; Director—Northwest Resource Center for Children, Youth, and Families.

De Mello, Stan 1996; MSW, 1982, MPA, 1983, Dalhousie University (Canada); cross-cultural social work practice.

Delong, James B. 1985; MSW, 1979, University of Washington; Director of Extended Degree Programs; aging, men's issues.

Haggerty, Kevin P. 1985; MSW, 1989, University of Washington; Project Director—Focus on Families, Raising Healthy Children.

Rivara, J'may B. 1985; MSS, 1975, Bryn Mawr College.

## Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at [www.washington.edu/students/crscat/](http://www.washington.edu/students/crscat/).

### Social Welfare (BASW)

**SOC WF 402 Human Behavior and Social Environment I (3) I&S** Focuses on person-in-the-environment for individuals and family development across the life span. Utilizes developmental and social systems perspectives in seeking to understand and influence human behavior across diverse backgrounds. Addresses dynamics and processes of families, small groups, organizations, and community systems.

**SOC WF 403 Human Behavior and Social Environment II (3) I&S** Focuses on person-in-the-environment for small groups, organizations, community, and society as systems. Utilizes developmental and social systems perspectives in seeking to understand and influence human behavior across diverse backgrounds. Prerequisite: SOC WF 402.

**SOC WF 404 Cultural Diversity and Justice (5) I&S** *Duplica, Sohng* History and culture of disadvantaged and oppressed groups served by Social Welfare generalist practitioners. Offered: Sp

**SOC WF 405 Fieldwork Seminar (2-4, max. 9)** *Balassone* Integrates social work practicum experiences with prior and concurrent course work in social sciences, social work, and research. Includes discussion of class presentations and simulations or practice situations that combine knowledge and skill utilization. Student logs provide a basis for individual goal identification and achievement. Required of social welfare seniors. Prerequisite: SOC WF 312. Offered: A/WSp.

**SOC WF 409 Readings in Social Welfare (1-5, max. 15)**

**SOC WF 415 Beginning Field Instruction (4-6, max. 12)** Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Credit/no credit only. Prerequisite: SOC WF 312. Offered: A/WSp.

**SOC WF 419 Adult Development and Aging (3) I&S** Introduces the field of adult development. Interdisciplinary perspective stressing the interaction of psychological, social, and physiological factors affecting the aging process. Goals are to help the student understand the processes and diversity in the aging process that can assist one's own aging and help the learner work with older adults. Offered: Sp.

**SOC WF 430 Child Care Work Practice (3)** *Whittaker* Specialized practice with emotionally disturbed and delinquent children in group-care settings with focus on providing child-care staff with specific tools for teaching alternative behavior. Major topics include: etiology and diagnosis, observing and recording children's behavior, special problems of group living, life-space interviewing, token economies, activity programming, group interventions, parental involvement, organizational requisites and community linkages. Offered: alternate years; A.

**SOC WF 442 Building Competencies for Intergroup Dialogue Facilitation (3)** Focuses on both knowledge and skills development for peer facilitators. Topics include philosophy and principles of dialogic education and dialogic communication; in-

tergroup communication; social identity development; principles of working with conflict; group dynamics, observation, and facilitation; team building among co-facilitators; and creating a support system among instructors and facilitators. Credit/no credit only.

**SOC WF 443 Practicum in Intergroup Dialogue Facilitation (2)** Practicum seminar providing instruction, consultation, and supervision of peer group facilitators. Focuses on comparison of facilitation experiences and consultations, trouble-shooting with other facilitators, co-facilitator team building, and planning for dialogues. Exploration of specific, current intergroup issues, such as affirmative action and immigration. Continuation of team-building work begun in 452. Credit/no credit only.

**SOC WF 490 Research in Social Welfare (1-3, max. 10)** Individual work with faculty member to assist with current research project (s). Students trained and supervised in some or all of the following research tasks: literature review, data analysis, record-keeping, interviewing, report writing, data entry and coding, data collection, and other tasks commonly found in research problems in social welfare. Credit/no credit only.

**SOC WF 495 Special Topics in Generalist Social Welfare (5)** Readings, lectures, and discussions pertaining to significant topics of special and current interest to social workers.

### Social Welfare

#### Courses for Graduates Only

**SOC WL 552 Analytical Perspectives on Social Welfare Policy (3)** Broad overview of the social welfare policy process, including epistemological issues, content on social problem construction and definition, policy agendas and case study methodology. Introduction to analytical tools and concepts needed to take a proactive role in policy development, advocacy, implementation, and policy research. Offered: Sp.

**SOC WL 553 Seminar in Contemporary Social Welfare Policy (3)** Critical review of contemporary American income maintenance and related social welfare policies, and the economic, political, and social factors that affect their development, implementation, and effectiveness. Evaluation of their effects on poverty, income inequality, and related social outcomes, including international comparisons. Assessment of proposals for reform. Closely linked to 552. Offered: Sp.

**SOC WL 558 Integrative Seminar (1-2, max. 2)** Topic-driven seminar that targets professional development of the first and second years (scholarship, research, teaching). Active participation expected in discussions and reflective papers. May require preparation for presentation or demonstration. Offered: A.

**SOC WL 559 Doctoral Seminar in Teaching Preparation (3)** Focus on teaching content and issues integral to being a skillful instructor. Issues and related skills generalized to range of post-graduate positions. Promote understanding of pedagogical issues and development of specific teaching skills. Credit/no credit only. Prerequisite: Doctoral student. Offered: A.

**SOC WL 578 Seminar in Special Topics for NIMH Prevention Research Trainees (1, max. 9)** Interdisciplinary overview of major concepts in promotion of mental health and prevention of mental distress with prevention science as framework. Provides conceptual foundations for advanced study in specialized aspects of mental health prevention research. Prerequisite: Enrollment in Social Welfare Predoctoral Training Program in Prevention of Mental Health Problems and Disorders. Credit/no credit only. Offered: A/WSp.

**SOC WL 579 Interdisciplinary Approaches to Prevention Science: Children and Adolescents (3)** Overview of theory, research, and practice in prevention science. Developmental perspective examining factors that promote or inhibit health development at different stages and during transitions (focus on birth through age 21). Designed for interdisciplinary dialogue, and includes guest faculty from around the University who are specialists in course topics. Credit/no credit only. Offered: A.

**SOC WL 580 Introduction to Advanced Research Method and Design (3)** Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: A.

**SOC WL 581 Introduction to Advanced Research Method and Design (3)** Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: W.

**SOC WL 582- Research Practicum (3-)** Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

**SOC WL -583 Research Practicum (-3)** Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

**SOC WL 584 Teaching Practicum (3)** Supervised teaching of a required course or teaching as a co-instructor with a faculty member. Learning contract used to target specific teaching competencies, e.g., assessing and evaluating student outcomes, identifying class session goals and objectives, tailoring instruction methods to diverse learning styles. Offered: A/WSpS.

**SOC WL 587 Fundamentals of Social Work Statistics I (4)** Descriptive and inferential statistics. Underlying logic of statistical inference. Statistical issues of special relevance in social work, including measurement, research design, and ethics in research. Prerequisite: concurrent registration in SOC WL 580. Offered: A.

**SOC WL 588 Fundamentals of Social Work Statistics II (4)** Issues in the use of descriptive and inferential statistics, especially the statistical control of extraneous variables. Applications of statistical inference in factorial design, and correlation and regression. Statistical issues of special relevance in social work. Ethics in the use of statistics. Prerequisite: concurrent registration in SOC WL 581. Offered: W.

**SOC WL 598- Research Problems and Priorities in Social Work and Social Welfare (3-)** Provides students with foundations in the definitions of theory; the socially constructed nature of theory and definition of social "problems"; conceptual and theoretical perspectives on human society, interaction, and change; and analysis of current conceptual models in social welfare literature. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: A.

**SOC WL -599 Research Problems and Priorities in Social Work and Social Welfare (-3)** Assists students in applying theory in building an original conceptual model. Emphasizes critical thinking, including ideological, political, methodological, and ethical contexts/implications of ideas, theories, and models that shape social welfare scholarship and its application to social practice. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: W.

**SOC WL 600 Independent Study or Research (\*)**

Prerequisite: approval of a well-specified plan by the instructor and program director. Includes a written product. Offered: AWSpS.

**SOC WL 800 Doctoral Dissertation (\*)** Offered: AWSpS.

**Social Work****Courses for Graduates Only****SOC W 501 Social Policy and Economic Security**

**(3)** *Dear, Duplica, Weatherley* Study of United States welfare system with emphasis on income maintenance programs. Analytical and descriptive focus on major income maintenance and social insurance programs, their strengths and weaknesses, and their historical, philosophical, and cultural foundations. Examines poverty, inequality, unemployment, and homelessness in context of emergent welfare state and related policies. Offered: A.

**SOC W 502 Human Behavior and Social Environment I, II (3)**

*Erera, Icard, Lougres, Resnick, Seyfried* Human functioning in a social context across the life span. Includes human biological, psychological, social, and cultural functioning across the range of social systems in which individuals live, i.e., cultures, institutions, communities, organizations, groups, and families. Credit/no credit only. Offered: A.

**SOC W 503 Human Behavior and Social Environment I, II (3)**

*Erera, Icard, Lougres, Resnick, Seyfried* Human functioning in a social context across the life span. Includes human biological, psychological, social, and cultural functioning across the range of social systems in which individuals live, i.e., cultures, institutions, communities, organizations, groups, and families. Credit/no credit only. Offered: W.

**SOC W 504 Cultural Diversity and Social Justice**

**(3)** *Bending, Nagda, Sohng* History, culture, and status of disadvantaged and oppressed groups served in public sector social work practice. Offered: AW.

**SOC W 505 Foundations of Social Welfare Research (3)**

*Almgren, Balassone, Erera, Roffman* Overview of research process/methods in social work, with focus on consuming and performing practice-related research and evaluating one's own practice. Emphasis on critical understanding of empirical literature, development of useful and appropriate questions about social work practice, and strategies and techniques for doing research and applying findings to practice. Offered: Sp.

**SOC W 510 Practice I: Introduction to Social Work Practice (3)**

*Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Assists students toward mastery of interviewing and relationship building skills and knowledge of cross-cultural communication and practice issues and of social work values and ethics. Provides opportunity to develop beginning level skills in assessment. Offered: ASp.

**SOC W 511 Practice II: Intermediate Direct Service Practice (3)**

*Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Course assists students toward mastery in assessment, development of treatment plans based on theory and assessment information, goalsetting skills, and selection of appropriate interventions. Offered: AW.

**SOC W 512 Practice III: Organizational Practice (3)**

*Fredriksen, Kruzich, Uehara* Focuses on ways in which management activities contribute to service effectiveness for clients and quality of conditions for staff. Various managerial roles, functions, and skills examined. Impact of agency structure, culture, and mission on staff, clients, and organizational outcomes discussed with emphasis on ways social work managers influence change. Offered: W.

**SOC W 513 Practice IV: Community Change Practice (3)**

*Dear, Weatherley* Provides frame of reference and skills for community-based social work practice. Theories of social change are examined with examples drawn from community organizing and policy advocacy. Offered: Sp.

**SOC W 514 Foundation Practice Skills (3)**

Focus on the teaching of practice skills (micro, mezzo, and/or macro) associated with key contemporary themes in social work. Possible topics include social work with American Indian communities, adult interpersonal violence, and assessment and brief intervention in substance abuse and dependence. Offered: SpS.

**SOC W 523 Introduction to Practicum (1)**

*DeLong, Hanneman, Rivara, Roberts, Wollin* Workshops for preparation for agency-based placement Interviewing and orientations occur at agencies. Credit/no credit.

**SOC W 524 Foundation Practicum (1-8, max. 12)**

*DeLong, Hanneman, Rivara, Roberts* Agency-based practicum with emphasis on development of knowledge, perspectives, and skills needed for practice with individuals, families, groups, organizations, and communities. Credit/no credit only. Prerequisite: social work major. Offered: AWSpS.

**SOC W 525 Advanced Practicum (2-10, max. 24)**

*DeLong, Hanneman, Rivara, Roberts* Agency-based advanced practicum. Credit/no credit only. Prerequisite: SOC W 515 and foundation courses. Offered: AWSpS.

**SOC W 531 Child and Family Policy and Services (3)**

*Pecora, Whittaker* Examines selected areas of child and family services policy in terms of historical antecedents, expressed values, practice implications, and potential for policy reform. Representative topical areas include: foster care; family preservation and support; residential services; services to prevent and ameliorate child maltreatment. Offered: A.

**SOC W 532 Children, Youth, and Family Practice I (3)**

*Kemp, Marcenko, Teather* Builds on foundation practice methods sequence to deepen individual, family, and community level assessment and intervention skills relevant for work with children, youth, and families. Offered: ASp.

**SOC W 533 Children, Youth, and Family Practice II (3)**

*Kemp, Marcenko, Teather* Builds on 532 and focuses on the values, knowledge, and skills used in intensive case management and intensive family preservation services. Offered: A.

**SOC W 535 Advanced Social Work Research: Children, Youth, and Families Practice (3)**

*Richey* Principles and procedures for evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Children, Youth, and Families (CYF) concentration. Offered: W.

**SOC W 536 Children, Youth, and Family Methods (3, max. 9)**

*Cook, Dear, Kemp, Marcenko, Pecora, Roffman, Teather, Whittaker* Focuses on child welfare and family services intervention methods, including social work in schools, services for early intervention, prevention and family support, child and adolescent mental health services, work with families of developmentally disabled, permanency planning, group work, family violence and child maltreatment, and intensive family preservation services. Offered: AWSp.

**SOC W 545 Advanced Social Work Research: Participatory Action Research for Multi-Ethnic Practice (1-3, max. 3)**

*Sohng* Principles and procedures for the evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Multi-Ethnic Practice (MEP) concentration. Offered: W.

**SOC W 546 Multi-Ethnic Practice Methods (1-3, max. 12)**

Focus on specialized knowledge and skills necessary for effective social work with American-Indian, African-American, Asian-American, and Latino or Hispanic individuals, groups, and communities and for work in a variety of settings and fields of practice. Offered: AWSp.

**SOC W 552 Planning and Program Development (3)**

*Fredriksen, Kruzich* Introduces the practice skills and knowledge required for specialized practice in agency management. Offered: W.

**SOC W 553 Supervisory Leadership (3)**

*Kruzich, Pecora* Presents critical skills for major phases of the personnel process including recruiting, supervising, and supporting employees. Offered: A.

**SOC W 554 Financial Management in Human Services (3)**

Focus on key budgeting concepts and techniques common to human service agencies including budget development, resource allocation, problems of fiscal control, fiscal record keeping, and cost analysis. Offered: W.

**SOC W 555 Advanced Social Work Research: Using information to Improve Agency Performance for Administration (3)**

*Uehara* Principles and procedures for the evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Administration (ADM) concentration. Offered: W.

**SOC W 556 Social Work Administration Methods (3, max. 9)**

*Fredriksen, Kruzich, Pecora, Uehara* Focus on relevant skills for social work administrators, including such topics as fundraising, grantwriting, and advocacy. Offered: WSp.

**SOC W 560 Adult Psychopathology (1)**

*Roffman* Introduction to major categories of adult psychopathology, differential diagnosis, applying diagnostic criteria to case examples, and use of DSM-IV in social work practice settings, including strengths and weaknesses of DSM-IV. Offered: A.

**SOC W 561 Health and Mental Health Policy (3)**

*Almgren* Review of trends in the development of health and mental health policies and services in the United States, the linkage between key policies and care, initiatives for reform in policy and health/mental health care models, and social work roles. Offered: A.

**SOC W 562 Chemical Dependency (2)**

*Roffman* Introduction to acute and chronic as well as physical and psychological effects of alcohol and other drugs. Current trends in alcohol and drug abuse. Addiction treatment options, outcome studies, and assessment issues in social work practice. Offered: Sp.

**SOC W 563- Advanced Health and Mental Health Practice I (3-)**

*Almgren, Conte, Levy, Rivara* Emphasizes advanced social work practice skills in health and/or mental health settings. Attention is given to key theoretical bases for assessment and intervention with clients and client systems. Offered: A.

**SOC W 564 Advanced Health and Mental Health Practice II (3)**

*Almgren, Conte, Levy, Rivara* Emphasizes advanced social work practice skills in health and/or mental health settings. Attention is given to key theoretical bases for assessment and intervention with clients and client systems. Offered: W.

**SOC W 565 Advanced Social Work Research: Health and Mental Health (3)**

*Levy* Covers methods of measurement, direct practice evaluation, ethical issues, and research methodology of special interest in health and mental health settings. Additional topics may include grant writing, community needs assessment, and management information systems. Offered: W.

**SOC W 566 Health and Mental Health Methods (3, max. 9)** *Jaffee, Roffman* Focus on a variety of specialized social work practice roles in such health and mental health fields as addiction and grief and loss. Emphasis is given to advanced skills and knowledge for specialized expertise. Offered: WSp.

**SOC W 592 Social Problems and Social Welfare (3, max. 9)** Analysis of major social problems and social welfare service systems providing a systematic approach to assessing the scope, causes, social cost, and public policy alternatives in the provision of services related to such problems. Selected social problems are studied and related to the student's field .

**SOC W 594 Advanced Human Services Practice (3, max. 9)** Integration of practice and research with an understanding of and an ability to perform practice skills such as specification of problems and goals, intervention planning, evaluation. Scientific reasoning applied to practice tasks with problems including value conflicts and ethical dilemmas.

**SOC W 595 Problem-Focused Human Development (3, max. 9)** Focus on the social and developmental determinants of specific human problems and their impact on individual development, families, and social institutions. Some time given to examining the nature of organized social responses that are designed to deal with the specified human problem.

**SOC W 597 Seminar (3, max. 6)** Seminar for special topics in social work.

**SOC W 598 Integrative Seminar (1-5, max. 12)** Integrates specialized knowledge in social work settings. Credit/no credit only. Offered: AWSp.

**SOC W 599 Readings in Social Work (\*)** Independent Studies. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

**SOC W 600 Independent Study or Research (\*)**

**SOC W 700 Master's Thesis (\*)**





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## ARCHITECTURE AND URBAN PLANNING, COLLEGE OF

ARCH	ARCHITECTURE
CM	CONSTRUCTION MANAGEMENT
L ARCH	LANDSCAPE ARCHITECTURE
URBDP	URBAN DESIGN & PLANNING

## ARTS AND SCIENCES, COLLEGE OF

AES	AMERICAN ETHNIC STUDIES
AFRAM	AFRO-AMERICAN STUDIES
AAS	ASIAN AMERICAN STUDIES
CHSTU	CHICANO STUDIES
AIS	AMERICAN INDIAN STUDIES
ANTH	ANTHROPOLOGY
ARCHY	ARCHAEOLOGY
BIO A	BIOCULTURAL ANTHROPOLOGY
AMATH	APPLIED MATHEMATICS
ART	ART
ART H	ART HISTORY
ASIAN	ASIAN LANG & LITERATURE
CHIN	CHINESE
HINDI	HINDI
INDN	INDIAN
JAPAN	JAPANESE
KOREAN	KOREAN
SNKRT	SANSKRIT
THAI	THAI
TIB	TIBETAN
VIET	VIETNAMESE
ASTR	ASTRONOMY
ATM S	ATMOSPHERIC SCIENCES
BIOL	BIOLOGY
BOTANY	BOTANY
CHEM	CHEMISTRY
CLAS	CLASSICS
CL AR	CLASSICAL ARCHAEOLOGY
CL LI	CLASSICAL LINGUISTICS
GREEK	GREEK
LATIN	LATIN
CMU	COMMUNICATIONS
C LIT	COMPARATIVE LITERATURE
DANCE	DANCE
DRAMA	DRAMA
ECON	ECONOMICS
ENGL	ENGLISH
GENET	GENETICS
GPHYS	GEOPHYSICS
GEOG	GEOGRAPHY
GEOL	GEOLOGY
GERMAN	GERMAN
HIST	HISTORY
HSTAM	ANCIENT & MEDIEVAL HISTORY
HSTAS	HISTORY OF ASIA
HSTAA	HISTORY OF THE AMERICAS
HSTEU	MODERN EUROPEAN HISTORY
HUM	CENTER FOR THE HUMANITIES
SIS	INTERNATIONAL STUDIES
SISA	INT ST: ASIAN
SISAF	INT ST: AFRICAN
SISCA	INT ST: CANADA
RELIG	INT ST: COMPARATIVE RELIGION
SISEA	INT ST: EAST ASIAN
EURO	INT ST: EUROPEAN
SISJE	INT ST: JEWISH STUDIES
SISLA	INT ST: LATIN AMERICAN
SISME	INT ST: MIDDLE EAST
SISRE	INT ST: RUSSIA, EAST EUROPE, AND CENTRAL ASIA

SISSA	INT ST: SOUTH ASIA
SISSE	INT ST: SOUTHWEST ASIA
LING	LINGUISTICS
FRLING	FRENCH LINGUISTICS
ROLING	ROMANCE LINGUISTICS
SPLING	SPANISH LINGUISTICS
MATH	MATHEMATICS
MUSIC	MUSIC
MUSAP	APPLIED MUSIC
MUSED	MUSIC EDUCATION
MUSEN	MUSIC ENSEMBLE
MUHST	MUSIC HISTORY
NEAR E	NEAR EASTERN LANG & CIVILTN
AKKAD	AKKADIAN
ARAB	ARABIC
ARAMIC	ARAMAIC
EGYPT	EGYPTIAN
HEBR	HEBREW
PRSAN	PERSIAN
TKIC	TURKIC
TKISH	TURKISH
PHIL	PHILOSOPHY
PHYS	PHYSICS
POL S	POLITICAL SCIENCE
SO JU	SOCIETY & JUSTICE
PSYCH	PSYCHOLOGY
ROMAN	ROMANCE LANGUAGES & LIT
FRENCH	FRENCH
ITAL	ITALIAN
PORT	PORTUGUESE
RMN	ROMANIAN
SPAN	SPANISH
DANISH	DANISH
ESTO	ESTONIAN
FINN	FINNISH
LATV	LATVIAN
LITH	LITHUANIAN
NORW	NORWEGIAN
SCAND	SCANDINAVIAN
SWED	SWEDISH
SLAVIC	SLAVIC LANG & LITERATURES
BULGR	BULGARIAN
CR SB	CROATIAN-SERBIAN
CZECH	CZECH
HUNGR	HUNGARIAN
POLSH	POLISH
ROMN	ROMANIAN
RUSS	RUSSIAN
SLAV	SLAVIC
UKR	UKRAINIAN
SOC	SOCIOLOGY
SP CMU	SPEECH COMMUNICATION
SPHSC	SPEECH & HEARING SCIENCE
STAT	STATISTICS
WOMEN	WOMEN STUDIES
ZOOL	ZOOLOGY

## BUSINESS ADMINISTRATION, SCHOOL OF

ACCTG	ACCOUNTING
B A	BUSINESS ADMINISTRATION
ADMIN	ADMINISTRATION
BA RM	BUSINESS ADMIN RSRCH MTHOD
B CMU	BUSINESS COMMUNICATIONS
B ECON	BUSINESS ECONOMICS
B POL	BUSINESS POLICY
FIN	FINANCE
HRMOB	HUMAN RES MNGT & ORGANIZA- TIONAL BEHAVIOR
I S	INFORMATION SYSTEMS
I BUS	INTERNATIONAL BUSINESS
MKTG	MARKETING
OPMGT	OPERATIONS MANAGEMENT
O E	ORGANIZATION & ENVIRONMENT
QMETH	QUANTITATIVE METHODS
ST MGT	STRATEGIC MANAGEMENT

## DENTISTRY, SCHOOL OF

DENT	DENTISTRY
D HYG	DENTAL HYGIENE

DPHS	DENTAL PUBLIC HLTH SCIENCES
PEDO	PEDODONTICS
ENDO	ENDODONTICS
ORALB	ORAL BIOLOGY
ORALM	ORAL MEDICINE
O S	ORAL SURGERY
ORTHO	ORTHODONTICS
PERIO	PERIODONTICS
PROS	PROSTHODONTICS
RES D	RESTORATIVE DENTISTRY

## EDUCATION, COLLEGE OF

EDUC	EDUCATION
EDC&I	CURRICULUM & INSTRUCTION
EDLPS	EDUC LEADERSHIP & POL STUDIES
EDTEP	EDUCATION (TEACHER PREP)
EDPSY	EDUCATIONAL PSYCHOLOGY
EDSPE	SPECIAL EDUCATION

## ENGINEERING, COLLEGE OF

A A	AERONAUTICS & ASTRONAUTICS
CHEM E	CHEMICAL ENGINEERING
CEE	CIVIL & ENVIRONMENTAL ENGR
CEWA	ENVIRON ENGR & SCIENCE
CESM	STRUCTURAL & GEOTECHNICAL ENGI- NEERING & MECHANICS
CETS	TRANSPORTATION, SURVEYING & CON- STRUCTION ENGR
CSE	COMPUTER SCIENCE & ENGR
E E	ELECTRICAL ENGINEERING
IND E	INDUSTRIAL ENGINEERING
M E	MECHANICAL ENGINEERING
MS E	MATERIALS SCIENCE & ENGR
CER E	CERAMIC ENGINEERING
MSE	MATERIALS SCIENCE & ENGR
MET E	METALLURGICAL ENGR
T C	TECHNICAL COMMUNICATION

## FOREST RESOURCES, COLLEGE OF

CFR	COLLEGE OF FOR RES
ESC	ECOSYSTEM SCI & CONSERVATION
EHUF	ENVIRONMENTAL HORTICULTURE & URBAN FORESTRY
F E	FOREST ENGINEERING
F M	FOREST MANAGEMENT
PSE	PAPER SCIENCE & ENGR

## INTERDISCIPLINARY GRADUATE PROGRAMS

GTTL	GLOBAL TRADE, TRANSP & LOGISTICS
MCB	MOLECULAR & CELLULAR BIOL
MUSEUM	MUSEOLOGY
NEUBEH	NEUROBIOLOGY AND BEHAVIOR
NUTR	NUTRITIONAL SCIENCES
QERM	QUANTTATIVE ECOL & RESORCS
QUAT	QUATERNARY SCIENCES

## INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOEN	BIOENGINEERING
Q SCI	QUANTITATIVE SCIENCE
UCONJ	UNIVERSITY CONJOINT

## LAW, SCHOOL OF

LAW	LAW
LAW A	LAW A
LAW B	LAW B
LAW E	LAW E
LAW T	LAW TAXATION

## LIBRARY AND INFORMATION SCIENCE, SCHOOL OF

LIS	LIBRARY & INFOSCIENCE
IMT	INFORMATION MANAGEMENT & TECH- NOLOGY
INFO	INFORMATICS

**MEDICINE, SCHOOL OF**

ANEST ANESTHESIOLOGY  
 BIOC BIOCHEMISTRY  
 B STR BIOLOGICAL STRUCTURE  
 C MED COMPARATIVE MEDICINE  
 FAMED FAMILY MEDICINE  
 HUBIO HUMAN BIOLOGY  
 IMMUN IMMUNOLOGY  
 LAB M LABORATORY MEDICINE  
 MEDED MEDICAL EDUCATION  
 MED MEDICINE  
 CONJ CONJOINT  
 MEDEX MEDEX  
 MHE MEDICAL HISTORY & ETHICS  
 MICROM MICROBIOLOGY (MEDICINE)  
 MBT MOLECULAR BIOTECHNOLOGY  
 NEUR S NEUROLOGICAL SURGERY  
 NEURL NEUROLOGY  
 OB GYN OBSTETRICS & GYNECOLOGY  
 OPTH OPTHALMOLOGY  
 ORTHP ORTHOPEDICS  
 OTOHN OTOLARYNGOLOGY, HEAD & NECK SURGERY  
 PATH PATHOLOGY  
 PEDS PEDIATRICS  
 PHCOL PHARMACOLOGY

P BIO PHYSIOLOGY & BIOPHYSICS  
 PBSCI PSYCHIATRY & BEHAVIORAL SCI  
 R ONC RADIATION ONCOLOGY  
 RADGY RADIOLOGY  
 REHAB REHABILITATION MEDICINE  
 SURG SURGERY  
 UROL UROLOGY

**NURSING, SCHOOL OF**

NURS NURSING  
 NCLIN NURSING CLINICAL  
 NMETH NURSING METHODS

**OCEAN AND FISHERY SCIENCES, COLLEGE OF**

FISH FISHERIES SCIENCE  
 OCEAN OCEANOGRAPHY  
 SMA SCHOOL OF MARINE AFFAIRS

**PHARMACY, SCHOOL OF**

MEDCH MEDICINAL CHEMISTRY  
 PCEUT PHARMACEUTICS  
 PHARM PHARMACY

**PUBLIC AFFAIRS, DANIEL J. EVANS SCHOOL OF**

PB AF PUBLIC AFFAIRS

**PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF**

BIOST BIostatISTICS  
 ENV H ENVIRONMENTAL HEALTH  
 EPI EPIDEMIOLOGY  
 PHG PUBLIC HEALTH GENETICS  
 HSERV HEALTH SERVICES  
 HSMGMT HEALTH SERVICES MANAGEMENT  
 PABIO PATHOBIOLOGY

**SOCIAL WORK, SCHOOL OF**

SOC WL SOCIAL WELFARE (GRADUATE)  
 SOC WF SOCIAL WELFARE (UNDERGRAD)  
 SOC W SOCIAL WORK





**KEY TO MAP SYMBOLS**

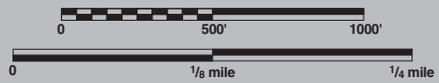
	Building		Campus Entrances
	Building (underground)		Bus Stop
	Path/Sidewalk		Bus Route
	Bridge/Overpass		Emergency Phone
	Campus Parking Area		Pay Phone
	Public Parking Area		Branch Library
	Parking (underground)		Bank Machine
	Gatehouse (with emergency phone)		Road Gate
	Automatic Parking Gate		Fence
			Construction Area



# University of Washington

## Campus & Vicinity

2000



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# UNIVERSITY OF WASHINGTON BUILDINGS, DEPARTMENTS, OFFICES, AND POINTS OF INTEREST

POLICE DEPARTMENT TELEPHONE 543-9331 any time

<b>Academic and Professional Programs</b> , 5001 - 25th Ave. N.E.	off map	<b>Drama</b> , Hutchinson Hall	5-M
<b>Academic Computer Center</b> , 3737 Brooklyn Ave. N.E. (ACC)	13-G	<b>Drama Library</b> , Hutchinson Hall	5-M
<b>Admissions</b> , Schmitz Hall	9-I	<b>Drama Scene Shop</b> , 3941 University Way N.E.	10-H
<b>Aerodynamics Lab (ADL)</b>	12-N	<b>Drug Plant Garden and Laboratory</b>	14-L
<b>Aeronautics and Astronautics</b> , Guggenheim Hall	11-N	<b>Drumheller Fountain</b>	12-M
<b>Aerospace and Engineering Research Building (AER)</b>	12-N		
<b>Aerospace Studies</b> , Clark Hall	7-O		
<b>Allen Center for the Visual Arts (AVA)</b> , addition to Henry	9-J	<b>Eagleson Hall</b> , 1417 N.E. 42nd St. (EGL)	7-I
<b>Allen Library (ALB)</b>	10-M	<b>East Asia Library</b> , Gowen Hall	9-M
<b>Alumni House</b> , 1415 N.E. 45th St.	3-I	<b>Economic Research Institute</b> , Savery Hall	8-L
<b>Anderson Hall (AND)</b>	14-M	<b>Economics</b> , Savery Hall	8-L
<b>Anthropology</b> , Denny Hall	6-L	<b>Edmundson Pavilion (EDP)</b> , 3870 Montlake Blvd.	14-O
<b>Applied Mathematics Department</b> , Guggenheim Hall	11-N	<b>Education</b> , Miller Hall	8-N
<b>Applied Physics Laboratory</b> , Henderson Hall	10-F	<b>Education Assessment Center</b> , Schmitz Hall	9-I
<b>Arboretum</b> , over Montlake Bridge to Washington Park	off map	<b>Educational Television KCTS-TV</b> , Seattle Center	off map
<b>Architecture</b> , Gould Hall	11-I	<b>Electrical Engineering</b> , Electrical Engineering Building (EEB)	13-N
<b>Architecture and Urban Planning Library</b> , Gould Hall	11-I	<b>Emergency Telephones</b> 3-J, 14-J, 11-K, 4-N, 9-N, 16-N, 9-P, 6-R, 9-R, 14-R, 18-Q and at all Gate Houses	
<b>Architecture Hall (ARC)</b>	11-J		
<b>Art</b> , Art Building (ART)	6-M	<b>Engineering</b> , Loew Hall	11-O
<b>Art Library</b> , Art Building	6-M	<b>Engineering Annex (EGA)</b>	12-O
<b>Arts and Sciences</b> , Padelford Hall	8-O	<b>Engineering Library</b> , Engineering Library Building	11-O
<b>Asian Languages and Literature</b> , Gowen Hall	9-M	<b>English</b> , Padelford Hall	9-O
<b>Associated Students (ASUW)</b> , Student Union Building (HUB)	10-N	<b>Environmental Health and Safety</b> , Hall Health Center	9-O
<b>Astronomy</b> , Physics-Astronomy Building	13-J	<b>Environmental Safety Storage Building</b>	5-W
<b>Astronomy-Physics Library</b> , Physics-Astronomy Building	13-J	<b>Ethnic Cultural Center</b> , 3931 Brooklyn Ave. N.E. (ECC)	10-H
<b>Atmospheric Sciences</b>			
<b>Atmospheric Sciences-Geophysics Building (ATG)</b>	12-K	<b>Faculty Center</b>	10-O
<b>Attorney General's Division</b> , Gerberding Hall (Suite 101)	10-K	<b>Fisheries</b> , Fisheries Center (FIS)	18-K
		<b>Fisheries-Oceanography Library</b>	
		<b>Oceanography Teaching Building</b>	16-I
<b>Bagley Hall (BAG)</b>	12-L	<b>Fisheries Research Institute</b> , Fisheries Center	18-K
<b>Balmer Hall (BLM)</b>	5-M	<b>Fisheries Teaching and Research Center</b> , 1104 N.E. Boat St.	14-G
<b>Bank Cash Machine (HUB)</b>	17-J, 10-N and 11-O	<b>Flag Pole</b>	8-K
<b>Bank Machines</b>		<b>Fluke Hall</b> , Washington Technology Center (FLK)	9-P
<b>1-Wing</b> , Magnuson Health Sciences Center, 1st Floor	15-J	<b>Food Services Facilities:</b>	
<b>Odegaard Undergraduate Library</b>	9-K	<b>By George</b> , Odegaard Undergraduate Library	9-K
<b>South Campus Center</b>	17-J	<b>E-Court Cafe</b>	16-L
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<b>Benefits Office</b> , Staff Services Building	11-G	<b>Hospital Cafeteria</b>	18-M
<b>Benson Hall (BNS)</b>	13-K	<b>Husky Den</b> , Student Union Building	10-N
<b>Bioengineering</b> , Aerospace and Engineering		<b>Mac City Square</b>	7-O
<b>Research Building &amp; Harris Lab</b>	12-N, 16-I	<b>South Campus Center</b>	17-J
<b>Biology Program</b> , Hitchcock Hall	14-J	<b>Terry Cafe</b>	10-G
<b>Blakeley Village</b> , 4747 - 30th Ave. N.E.	off map	<b>Forest Resources, Institute of</b> , Anderson Hall	14-M
<b>Bloedel Hall (BDL)</b>	15-M	<b>Forest Resources</b> , Anderson Hall	14-M
<b>Book Store</b> , 4326 University Way N.E.	4-I	<b>Forest Resources Library</b> , Bloedel Hall	15-M
<b>Branch</b> , Student Union Building (HUB)	10-N	<b>Friday Harbor Laboratories</b> , Kincaid Hall	13-J
<b>Branch</b> , South Campus Center	17-J		
<b>Botany</b> , Hitchcock Hall	14-J		
<b>Botany Greenhouse</b>	14-K	<b>Genetics</b> , Magnuson Health Sciences Center	15-K
<b>Brooklyn Building</b> , 4045 Brooklyn Ave. N.E.	8-H	<b>Geography</b> , Smith Hall	9-M
<b>Bryants Building</b> , 1101 N.E. Boat St.	14-F	<b>Geography Library</b> , Smith Hall	9-M
<b>Building Construction</b> , Gould Hall	11-I	<b>Geological Sciences</b> , Johnson Hall	11-L
<b>Burke Memorial Washington State Museum (BMM)</b>	4-J	<b>Geophysics</b> , Atmospheric Sciences-Geophysics Building	12-K
<b>Business Administration</b> , Mackenzie Hall	6-M	<b>Gerberding Hall (GRB)</b> formerly Administration Building	10-K
<b>Business Administration Library</b> , Balmer Hall	5-M	<b>Germanics</b> , Denny Hall	6-L
<b>Business and Finance</b> , Gerberding Hall	10-K	<b>Golf Driving Range (GDR)</b> , 4209 Mary Gates Memorial Drive	6-T
		<b>Gould Hall (GLD)</b> , 3949 - 15th Ave. N.E.	11-I
		<b>Gowen Hall (GWN)</b>	9-M
<b>Campanile</b>	9-K	<b>Graduate School</b> , Gerberding Hall	10-K
<b>Canoehouse</b>	19-R	<b>Graves Annex (GBA)</b>	14-Q
<b>Capital Projects Office</b> , University Facilities Building	10-O	<b>Graves Building (TGB)</b> , 3910 Montlake Blvd.	13-Q
<b>Cashier's Office</b> , Schmitz Hall	9-I	<b>Graves Field</b>	4-W
<b>Center for Quantitative Sciences in Forestry, Fisheries and Wildlife</b> , 3737 - 15th Ave. N.E.	15-I	<b>Guggenheim Hall (GUG)</b>	11-N
<b>Center for Studies in Demography and Ecology</b> , Savery Hall	8-L	<b>Guthrie Annexes 1, 2, 3, and 4</b> (GA1, GA2, GA3, and GA4)	12-J, 11-J, 11-J, 11-J
<b>Center on Human Development and Disability</b>	19-M	<b>Guthrie Hall (GTH)</b>	12-J
<b>Central Plaza Garage</b> , Central Plaza	9-K		
<b>Central Stores</b> , Plant Services Building	2-Q	<b>Haggett Hall (HGT)</b>	5-P
<b>Ceramic and Metal Arts Facility (CMA)</b> , 4205 Mary Gates Memorial Drive	5-X	<b>Hall Health Center</b>	9-O
<b>Ceramic Engineering</b> , Roberts Hall	14-O	<b>Hanse Hall (HNS)</b>	3-M
<b>Chemical Engineering</b> , Benson Hall	13-K	<b>Harris Hydraulics Laboratory (HHL)</b>	17-J
<b>Chemistry</b> , Bagley Hall	12-L	<b>Health Sciences Annex 4</b> , 1705 N.E. Pacific	15-K
<b>Chemistry Building (CHB)</b>	13-L	<b>Health Sciences Center</b>	
<b>Chemistry Library</b> , Chemistry Library Building (CHL)	12-K	<b>Magnuson Health Sciences Center</b>	15-K
<b>Child Care Center</b>	10-G	<b>Health Sciences Library</b>	
<b>Civil Engineering</b> , More Hall	14-O	<b>Magnuson Health Sciences Center</b>	15-K
<b>Clark Hall (CLK)</b>	7-O	<b>Henderson Hall (HND)</b> , 1013 N.E. 40th St.	10-F
<b>Classics</b> , Denny Hall	6-L	<b>Henry Art Gallery (HAG)</b>	9-J
<b>Classroom Support Services</b> , Kane Hall	9-L	<b>History</b> , Smith Hall	9-M
<b>Climbing Rock</b>	19-Q	<b>Hitchcock Hall (HCK)</b> , 1521 N.E. Pacific	14-J
<b>Columns and Sylvan Theater</b>	13-N	<b>Hospital</b> , University of Washington Medical Center (UWMC)	17-M
<b>Commodore-Duchess Apartments</b> , 4009 - 15th Ave. N.E.	10-I	<b>HUB</b> (Student Union Building)	10-N
<b>Communications</b> , Communications Building (CMU)	8-N	<b>Hughes Penthouse Theater</b>	4-L
<b>Comparative Literature</b> , Padelford Hall	8-O	<b>Hutchinson Hall (HUT)</b>	5-M
<b>Comptroller</b> , Gerberding Hall	10-K		
<b>Computer Science</b> , Sieg Hall	11-M	<b>Infirmiry</b> , Hall Health Center	9-O
<b>Condon Hall (CDH)</b> , 1100 N.E. Campus Parkway	8-F	<b>Institute for Marine Studies</b> , Marine Studies	14-G
<b>Conference and Management</b> , 5001 - 25th Ave. N.E.	off map	<b>Institute for Public Policy and Management</b> , 324 Parrington Hall	8-K
<b>Conibear Shellhouse</b>	13-R	<b>Instructional Center/Theater</b> , 1307 N.E. 40th St.	10-H
<b>Continuing Education</b> , (See University Extension)	off map	<b>Instructional Media Services</b> , Kane Hall	9-L
<b>Copy Centers:</b>		<b>Intercollegiate Athletics</b> , Graves Building	13-Q
<b>B36 Gerberding Hall</b>	10-K	<b>International Pacific Halibut Commission</b>	
<b>115 Balmer Hall</b>	5-M	<b>Oceanography Teaching Building, #251</b>	16-I
<b>Center on Human Development and Disability</b>	19-M	<b>International Services Office</b> , Schmitz Hall	9-I
<b>B042 Communications Building</b>	8-N	<b>International Studies</b> , Thomson Hall	9-N
<b>235 Condon Hall</b>	8-G	<b>Intramural Activities Building</b> , 3924 Montlake Blvd.	12-Q
<b>202 Engineering Library</b>	11-O	<b>Isaacson Hall (ISA)</b> , 3501 N.E. 41st St.	7-Y
<b>A206 and E220 Health Sciences</b>	15-K		
<b>122 Lewis Hall</b>	6-N	<b>Johnson Annex A (JHA)</b>	11-K
<b>127 Odegaard Library</b>	9-K	<b>Johnson Hall (JHN)</b>	11-L
<b>B18 Schmitz Hall</b>	9-I		
<b>560 Suzzallo Library</b>	10-L	<b>Kane Hall (KNE)</b>	9-L
<b>BB381 University Hospital</b>	17-L	<b>Keep Washington Green Association</b> , Anderson Hall	14-M
<b>EE104 University Hospital</b>	17-M	<b>Kincaid Hall (KIN)</b>	13-J
<b>Counseling Center</b> , Schmitz Hall	9-I	<b>Kirsten Aeronautical Laboratory (KIR)</b>	11-N
<b>Cunningham Hall</b> , <b>Cunningham Gallery (ICH)</b>	11-K	<b>KUOW Radio</b> , Communications Building	8-N
<b>Cyclotron</b> , Nuclear Physics Laboratory	5-P		
<b>Cyclotron Shop</b> , Nuclear Physics Laboratory	5-P	<b>Lander-Terry Halls</b> , 1201 N.E. Campus Parkway (LTH)	10-G
		<b>Landscape Architecture</b> , Gould Hall	11-I
<b>Denny Hall (DEN)</b>	6-L	<b>Language Learning Center</b> , Denny Hall	6-L
<b>Dentistry</b> , Magnuson Health Sciences Center	15-K	<b>Laurel Village</b> , 4200 Mary Gates Memorial Drive	4-X
<b>Douglas Research &amp; Conservatory</b> , Urban Horticulture Center	7-Z	<b>Law</b> , Condon Hall	8-F
<b>3501 N.E. 41st St.</b>		<b>Law Library</b> , Condon Hall	8-F

**Lewis Hall (LEW)** 6-N  
**Lewis Annexes 1, 2 and 3** 6-O, 5-O, 7-O  
**Library and Information Science, Suzzallo Library** 10-L  
**Linguistics, Padelford Hall** 8-O  
**Loew Hall (LOW)** 11-O  
**Lost and Found (HUB)** 10-N  
  
**Mackenzie Hall (MKZ)** 6-M  
**Magnuson Health Sciences Center, 1750 N.E. Pacific St.** 15-K  
**Magnuson Health Sciences Center Annex 4** 15-K  
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**Marina Apartments** 13-F  
**Marine Resources, 3716 Brooklyn Ave. N.E.** 14-H  
**Marine Sciences Building (MSB), 1501 N.E. Boat St.** 17-I  
**Marine Studies Building (MAR), 3707 Brooklyn Ave. N.E.** 14-G  
**Mary Gates Hall (MGH)** 11-L  
**Mathematics, Padelford Hall** 8-O  
**Mathematics Research Library, Padelford Hall** 8-O  
**McCarty Hall (MCC)** 4-O  
**McMahon Hall** 7-O  
**Meany Hall (MNY)** 10-J  
**Mechanical Engineering, Mechanical Engineering Building (MEB)** 12-O  
**Medicine, Magnuson Health Sciences Center** 15-K  
**Memorial Way** 3-K  
**Mercer Hall, 1009 N.E. Pacific St.** 11-F  
**Merrill Hall (MER), 3501 N.E. 41st St.** 7-Y  
**Message Center (Telex), B042 Communications Building** 8-N  
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**Miller Hall (MLR)** 8-N  
**Miller Library, Merrill Hall** 7-Y  
**Mining, Metallurgical and Ceramic Engineering, Roberts Hall** 14-O  
**Minority Affairs, Schmitz Hall** 9-I  
**Mueller Hall (MUE)** 14-N  
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**Music, Music Building (MUS)** 7-N  
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**Naval Sciences, Clark Hall** 7-O  
**Near Eastern Languages and Literature, Denny Hall** 6-L  
**Nordstrom Tennis Center (NTC)** 15-R  
**Northlake Building (NLB), 814 N.E. Northlake Place** 10-D  
**Northwest Center for Research on Women (NCROW) Cunningham Hall** 11-K  
**Northwest Horticultural Society Hall (NHS), 3501 N.E. 41st St.** 7-Y  
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**Nuclear Engineering, Benson Hall** 13-K  
**Nuclear Physics Laboratory (NPL)** 4-P  
**Nuclear Reactor Building (NRB)** 13-O  
**Nursing, Magnuson Health Sciences Center** 15-K  
  
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**Oceanography, Oceanography Teaching Building (OTB)** 16-I  
**Oceanography Building (OCE)** 18-K  
**Oceanography-Fisheries Library, Oceanography Teaching Building, 1503 N.E. Boat St.** 16-I  
**Oceanography Research Building (ORB), 3711 - 15th Ave. N.E.** 16-I  
**Odegaard Undergraduate Library (OUG)** 9-K  
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**Padelford Hall (PDL)** 8-O  
**Padelford Parking Garage** 8-P  
**Parking:**  
    C-Areas central campus  
    E-Areas east campus  
    N-Areas north campus  
    S-Areas south campus  
    W-Areas west campus  
**Parking Division, 3901 University Way N.E.** 11-H  
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**Performing Arts Ticket Office, 4001 University Way N.E.** 10-H  
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**Philosophy, Savery Hall** 8-L  
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**Physical Plant Office Building** 10-O  
**Physics, Physics/Astronomy Bldg.** 11-L  
**Physics/Astronomy Building (PAB)** 13-J  
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**Placement Center, Loew Hall** 11-O  
**Plant Laboratory (PLT)** 14-K  
**Plant Operations Building** 11-O  
**Plant Services Building, 4515 - 25th Ave. N.E.** 2-Q  
**Playhouse Theater** 8-H  
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**Political Science Library, Smith Hall** 9-M  
**Post Office, U.S., 4244 University Way N.E.** 5-I  
**Postal Center, Self-Service, Student Union Building (HUB)** 10-N  
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**President's Office, Gerberding Hall** 10-K  
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**Publications, Publications Services Building, 3900 7th Ave. N.E.** 10-C  
**Purchasing and Accounting Building, 3917 University Way N.E.** 11-H  
  
**Quadrangle** 8-M  
**Quaternary Research Center, Atmospheric Sciences-Geophysics Building** 11-K  
  
**Radiation Ecology Laboratory, University of Washington Medical Center** 18-M  
**Radio Broadcast Services and KUOW, Communications Building** 8-N  
**Rainier Vista** 15-N  
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**Regents, Board of, Gerberding Hall** 10-K  
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**Roberts Annex** 14-O  
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    Aerospace Studies, Clark Hall 7-O  
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**Salmon Homing Pond** 19-K  
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**Schmitz Hall, 1410 N.E. Campus Parkway** 9-I  
**Seafirst Executive Education Center and Foster Library (SEEC)** 5-L  
**Shellhouse Annex** 13-S  
**Sieg Hall (SIG)** 11-M  
**Slavic Languages and Literature, Smith Hall** 9-M  
**Smith Hall (SMI)** 9-M  
**Social Work, Social Work/Speech and Hearing Sciences Building (SWS), 4101 - 15th Ave. N.E.** 7-I  
**Social Work Library, Social Work/Speech and Hearing Sciences Building** 7-I  
**Sociology, Savery Hall** 8-L  
**South Campus Center** 17-J  
**South Campus Parking Garage** 17-K  
**Speech Communication, Raitt Hall** 7-M  
**Speech and Hearing Clinic, Social Work/Speech and Hearing Sciences Building** 7-I  
**Stadium (STD) 3800 Montlake Blvd. N.E.** 16-Q  
**Staff Employment Office, 1320 N.E. Campus Parkway** 9-H  
**Staff Services Building, 3903 Brooklyn Ave. N.E.** 11-G  
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**Stevens Court (STC), 3801 Brooklyn Ave.** 11-G  
**Student Affairs, Schmitz Hall** 9-I  
**Student Employment, Schmitz Hall** 9-I  
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**Student Health Center, Hall Health Center** 9-O  
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**Student Union Building (HUB)** 10-N  
**Summer Quarter Office, (See University Extension)** off map  
**Suzzallo Library (SUZ)** 10-L  
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    Edmundson Pavilion 14-Q  
    Hutchinson Hall 5-M  
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**Telephone Emergency** 3-J, 14-J, 11-K, 4-N, 9-N, 16-N, 9-P, 6-R, 9-R, 14-R, 18-Q and at all Gate Houses  
**Television Satellite Earth Terminal** 5-O  
**Tennis Courts** 5-N, 11-Q, 13-Q, 15-R  
**Terry-Lander Halls, 1201 N.E. Campus Parkway (LTH)** 10-G  
**Thomson Hall (THO)** 9-N  
**Transportation Services** 1-Q  
**Triangle Parking Garage** 17-N  
  
**University District Building, 1107 N.E. 45th St.** 3-G  
**University Extension and Summer Quarter, 5001 - 25th St.** off map  
**University Facilities Building** 10-O  
**University of Washington Medical Center (UWMC), 1959 N.E. Pacific St.** 17-M  
    4225 Roosevelt Way 6-E  
**University Police, Bryant Building** 14-F  
**University Press, 1326 - 5th Ave. N.E.** off map  
**University Records Center, 3902 Cowlietz Rd. N.E.** 11-G  
**University Relations and Development, Gerberding Hall** 10-K  
**Urban Horticulture Center (UHF), 3501 N.E. 41st St.** 7-Y  
**Urban Planning, Gould Hall** 11-I  
  
**Veterans Affairs and Special Services, Schmitz Hall** 9-I  
**Views Through a Circle Earthwork** 15-S  
**Visitor Entrance** 8-J  
**Visitors Information Center, 4014 University Way N.E.** 10-I  
  
**Washington Monument (Statue)** 9-J  
**Washington Sea Grant Program, 3716 Brooklyn Ave. N.E.** 14-H  
**Washington Technology Center, Fluke Hall** 9-P  
**Waterfront Activities Center** 18-R  
**Wilcox Hall (WIL)** 14-O  
**Wilson Annex** 15-N  
**Wilson Ceramic Laboratory (WCL)** 15-O  
**Winkenwerder Forest Sciences Laboratory (WFS)** 15-M  
**Women's Information Center, Cunningham Hall** 11-K  
  
**Zoology, Kincaid Hall** 13-J  
  
**Emergency Numbers**  
    Police/Fire/Medical Emergency Telephone 911 (or 9-911)  
    University Police (Non-emergency) 543-9331  
    Campus Emergency News and Information 547-INFO (or KIRO 710 AM radio)  
  
**Emergency Procedures**  
**Fire/FireAlarm**  
    Evacuate building via stairs and assemble with others. Do not use elevators.  
**Earthquake**  
    Inside: Stay inside, drop, cover, & hold.  
    Outside: Stay outside & move to open area.  
  
Additional copies of this map are available from University Stores-University Stores #1008-110. Contact University of Washington Facilities Services Records Section for information concerning the production and contents of this map.  
(ACC) indicates building abbreviation used on official programs. Rev. 7/96



# GRADUATE AND PROFESSIONAL STUDY

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