

Chairs' Corner – October 2007

Research Centers

TO: UW Foundation, Campaign Cabinet, Deans, Development & Alumni Staff
FROM: Orin C. Smith, Chair, UW Foundation
Daniel J. Evans, Vice Chair, UW Foundation
William H. Gates, Campaign Chair

Dear Friends,

What is a research center? Even Mary Lidstrom, the accomplished microbiologist and chemical engineer who is now the UW's Vice Provost for Research, laughs at this question. "There are so many of them," she says, "and they're called by so many different titles." On the Web page of the Office of Research, you will learn that there are now "over 150 specialized research centers at the UW," and you will see a representative list of some two dozen of them—the Genome Center, the Water Center, the Center for Cell Dynamics, and many more.

At the risk of oversimplifying, here is a layman's working definition: a research center brings together scientists and scholars from different fields to tackle questions that transcend single faculty research areas.

Who decides which big research questions will turn into research centers? There is a kind of ongoing dance between scientists in the trenches and the big federal agencies that fund most of the research in this country—primarily the National Institutes of Health (NIH) and the National Science Foundation (NSF). (Funding from these and other federal agencies supports almost 80 percent of UW research.) Again oversimplifying, this is how it goes:

Working scientists constantly explore new problems, find promising new directions, form new collaborations. The NIH and NSF track this work closely. They also respond to political mandates for national priorities. When they judge the time is right to focus a collection of research areas on a big research challenge, the agencies call for proposals to create a particular kind of research center. Scientists (with their institutions' blessings) submit their proposals, the agencies' peer review process selects the most promising ideas and people, funding is assigned, and—voilà!—new research centers appear on a number of campuses across the country.

The UW, not surprisingly, has been very good at winning and keeping research centers. The best-known are those in the health sciences, funded by NIH. But what we would like to talk about here is our impressive NSF centers.

The National Science Foundation is charged with supporting all fields of fundamental science and engineering *except* for the medical sciences. Starting in 1985, the foundation created eight different categories of NSF-wide research centers. They are meant, says the NSF, "to exploit opportunities in science, engineering, and technology in which the complexity of the research problem or the resources needed to solve the problem require the advantages of scope, scale, duration, equipment, facilities, and students." In other words, the timid need not apply.

The UW won the first of its current NSF centers in 1996—UWEB, of which more below—and now has a center in five of the eight categories. As of 2006, there were 98 such centers nationally, so five at one university is a pretty good record. (We ignore here other high-profile NSF centers that fall outside the official "NSF-wide" category, such as the Center for the

Advancement of Engineering Education and the Pacific Northwest Center for Human Health and Ocean Studies.)

Diverse as they are, says Dr. Lidstrom, the five UW centers have some characteristics in common.

First, because the process is highly competitive, each center is a badge of excellence for the UW and for the individuals and programs involved. Second, each addresses a very challenging research area—a sign that “we’re taking on grand challenge problems.” Third, all have, by NSF mandate, a strong outreach component, meaning that Puget Sound and the state are participants in and beneficiaries of the centers’ work. And finally, all are by definition interdisciplinary. In fact, says the official literature, “Centers are the principal means by which NSF fosters interdisciplinary research.” So the centers have played to and also enhanced the UW’s interdisciplinary strengths. “It’s very difficult to be competitive [for a center] if you don’t already have collaborations,” says Dr. Lidstrom, “but it’s the funding that makes it all work and takes it to the next level.”

So here, in the order of their initial funding, are our current NSF centers:

UWEB (University of Washington Engineered Biomaterials) is an NSF Engineering Research Center created in 1996. Its overall research goal is devising “biomaterials that heal”—that is, medical implants (such as heart valves) that are fully integrated into the body, not walled off as foreign substances that ultimately fail. Bioengineering professor Buddy Ratner leads the collaboration of 20 professors (biologists, engineers, physicians), 100 students, and 20 medical-implant companies. Now at the end of its maximum 11-year NSF funding period, UWEB is seeking other funds to continue its work. See www.uweb.engr.washington.edu

The Center on Materials and Devices for Information Technology Research (MDITR) focuses on photonics: the use of light rather than electrons to transmit and manipulate information. “Revolutionary” is a term regularly used for the potential impact of photonics. In 2002, MDITR was one of only six new NSF Science and Technology Centers funded out of 143 proposals, and NSF renewed its funding last spring. Larry Dalton, the chemistry and electrical-engineering professor who heads the center, is a national leader in photonics research, and the work of his team has already spawned several companies. See <http://stc-mditr.org>

The Center for Enabling New Technologies through Catalysis (CENTC) is an NSF Chemical Bonding Center—one of three such centers created in 2004, and the only one to win second-phase funding this year. “Problems to be addressed” by these centers, says NSF, “are high-risk but with potentially high scientific and societal impact.” Like MDITR, this center combines not only several disciplines but several universities. Its researchers, led by chemistry professor Karen Goldberg, work on producing more-usable versions of materials through manipulating chemical bonds—for example, turning flammable methane gas into a transportable energy source. See <http://depts.washington.edu/centc>

The LIFE Center (Learning in Informal and Formal Environments) was one of just four centers chosen to inaugurate the new NSF Science of Learning Centers in 2004. The center’s goal, says education professor John Bransford, is “to understand and advance human learning” in all its different settings and permutations. Dr. Bransford shares leadership of the center with five other UW researchers (including Patricia Kuhl and Andrew Meltzoff, whose work on infant learning is well known), four from Stanford, and two from SRI International, a California research institute.

“Our expertise,” says Dr. Bransford, “spans neurobiological, psychological, and socio-cultural approaches.” See <http://life-slc.org>

The Genetically Engineered Materials Science and Engineering Center (GEMSEC) brings together faculty from five UW departments in three different colleges. It was created in 2005, one of only two NSF Materials Research Science and Engineering Centers funded that year (there are now 28 total). Unlike most NSF centers, these can be refunded every six years indefinitely. Led by Mehmet Sarikaya of materials science and engineering, GEMSEC aims “to formally marry materials sciences and biology” and thereby spark innovations in technology and medicine. One of its research partners is Istanbul Technical University. See <http://depts.washington.edu/mse/gemsec.html>

Thumbnail description cannot begin to do justice to these prestigious centers. We urge you to click on a Web site or two and immerse yourself in the complex and multifaceted work they are doing, including their partnerships with schools and industry. They are among the reasons we are now a \$1-billion research university.

Orin, Dan, and Bill

Looking Back

- As of September 30, 2007, our **total Campaign giving since July 1, 2000, reached \$2,410,535,708 toward our \$2.5 Billion goal.**
- The September Report of Contributions Notes is attached and contains fundraising details.

Looking Ahead

- **Friday, January 25, 2008**, Foundation Board & Campaign Cabinet Meeting, 8:30 a.m. coffee; 9:00-11:00 a.m. meeting.
- **Friday, April 25, 2008**, Foundation Board & Campaign Cabinet Meeting, 8:30 a.m. coffee, 9:00-11:00 a.m. meeting. Washington Weekend April 24-26, 2008.
- **Friday, September 26, 2008**, Campaign Finale. Foundation Board & Campaign Cabinet Meeting, and Recognition Gala.