

Access Computing

NEWS

from the Alliance for Access to Computing Careers

February 2009

AccessComputing: Opening Doors to Opportunities

by Sheryl Burgstahler and Richard Ladner,
AccessComputing Co-Directors

Welcome to *AccessComputing News*! We invite you to read the stories of several students with disabilities who are successfully pursuing their goals, learn how to make your technology accessible to individuals with disabilities, and discover new ways you can engage in the *AccessComputing* project as a student or practitioner.

AccessComputing News is a publication of the Alliance for Access to Computing Careers (*AccessComputing*). Ultimately, the

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Engage in *AccessComputing*

Students with disabilities:

- Internships
- E-mentoring
- *AccessComputing* Team
- Summer programs

Educators & employers:

- Host an intern
- Communities of practice
- E-mentoring
- Capacity-building institutes
- Mini-grants

www.washington.edu/accesscomputing/



AccessComputing project will open doors to computing opportunities for more people and, as a result, enhance the field with the talents and perspectives of people with disabilities.

AccessComputing engages individuals with disabilities as well as those who support, serve, guide, educate, and employ them. Specifically, *AccessComputing* serves to

- increase the capacity of postsecondary institutions, pre-college educators, veteran associations, projects that broaden participation in computing, and businesses to fully include individuals with disabilities in computing fields;
- create lasting relationships with stakeholders that foster systemic changes toward inclusiveness in computing education and careers;
- implement mentoring and internships to increase the number of individuals with disabilities moving into computing careers; and
- expand an online resource (the Knowledge Base) to share research and promising practices worldwide.

AccessComputing is a collaboration of the Department of Computer Science & Engineering (CSE) and DO-IT (Disabilities, Opportunities, Internetworking, and Technology) at the University of Washington (UW). *AccessComputing* is funded by the National Science Foundation's Directorate for Computer and Information Science and Engineering (grant #CNS-0837508 and grant #CNS-0540615). More information is available at www.washington.edu/accesscomputing/.



Work-Based Learning: Confidence for the Future

by Kayla Brown,
AccessComputing Staff

I am a student at Bellevue Community College. I have found work-based learning opportunities through academic programs, internships, and community service. Starting in 2005 as a *DO-IT Scholar*, I learned the fundamentals of a successful educational career. I participated in a series of Summer

Study workshops aimed at college and career preparation and independence.

With placement assistance from DO-IT staff, I worked as an intern at the Kinderling Center, a non-profit organization that assists infants with developmental disabilities and their families. At the center, I learned about budgeting, finance, and non-profit management by procuring and managing donations for their annual auction gala. I learned firsthand how to plan a large-scale event and about the challenges of securing funding to sustain a non-profit organization.

In 2008, I graduated from City Year, an AmeriCorps organization that provides young adults with full-time community service and leadership experience. I completed more than 1,700 hours of community service working with suspended middle school students in the Highline School District, and I learned what it takes to be both a leader and a team member. For my year of service, I was awarded a \$4,725 scholarship toward my associate degree. After I graduate, I hope to transfer to the UW and major in psychology.

In 2007, I travelled to New Orleans where I volunteered for Habitat for Humanity's hurricane Katrina effort. I was the first person in a wheelchair to work on a house in my assigned neighborhood.

I am currently building my computer skills through an *AccessComputing* internship. So far, I have learned to streamline captions for the DO-IT online video database and create accessible PDFs using InDesign.

My work-based learning experiences have been fun and have helped me build an impressive resume and gain confidence!



Intern to Employee: Steps to Success

by Chris Schlechty,
DO-IT Ambassador

I graduated last year from the UW with a degree in computer science. I have muscular dystrophy,

which is a genetic disease that weakens muscles, and I now use a power wheelchair. During high school, I became a *DO-IT Scholar*. This program promotes the use of technology to prepare youth with disabilities for higher education and careers, particularly those in high-tech fields. Through *DO-IT Scholars*, I participated in academic summer programs at the UW, engaged in an electronic community of peers and mentors, and learned about internships and other opportunities.

As a *DO-IT Scholar*, I took part in a several video conferences with educators in Japan. I was invited to lecture at the first *DO-IT Japan Scholars* program in 2007, where I shared personal experiences and insights.

While in high school and college, I had a number of tech-related internship experiences in government agencies and large corporations. In 2004, I was a high school intern at Microsoft. This was my first real work experience. The following summer, I worked in the human resources department of a telephone company's call center. In 2006, I was selected as a federal IT intern by the American Association of People with Disabilities. This opportunity took me to Washington, D.C. where I worked in the Department of Commerce. During the summer of 2007, I was back working with Microsoft on the SharePoint team. Toward the end of this internship, I was invited to return as an employee. I am currently a Microsoft employee (after taking some time

off for fun after graduation in late summer 2008). My main accommodations at work are an adjustable work station and assistive technology so I can operate a computer.

I am also a United States Business Leadership Network (USBLN) Student Advisory Council Member. I have participated in the past two USBLN national conferences in Florida and Oregon. As a USBLN council member I hope to share what I have learned about preparing for and succeeding in my computing career.

Research shows that students with disabilities who participate in work-based learning experiences are more successful than their peers who do not. Internships, job shadows, informational interviews, and other work-based learning experiences help students

- pay for their education and gain academic credit;
- develop job-searching skills, resumes, and cover letters;
- clarify academic and career interests;
- broaden human relation skills through interaction with co-workers;
- gain exposure to specialized facilities not available on campus;
- expand their list of contacts for employment after graduation; and
- practice disclosing their disability and requesting accommodations.

For more information about the value of work-based learning, read the DO-IT publication *It's Your Career: Work-Based Learning Opportunities for College Students with Disabilities* at www.washington.edu/doit/Brochures/Careers/worklearn.html.

Postsecondary students with disabilities can request assistance in locating internships in high-tech fields by contacting *AccessComputing* staff at accesscomp@u.washington.edu.



Summer Academy students visit Valve, producers of gaming software. Daniel Steed is fourth from the left.

Daniel Rockets into the Future with Computers

by Rob Roth, *AccessComputing* Staff

The Summer Academy for Advancing Deaf and Hard of Hearing in Computing, an *AccessComputing* program now entering its third year, has had a profound impact on high school senior Daniel Steed. Upon entering the Summer Academy in June 2008, Daniel, who is deaf and also has Tourette's syndrome, wanted to major in computer engineering, aerospace engineering, and mechanical engineering, as well as attend college in his home state of California.

While attending the Summer Academy at the UW, Daniel took courses in computer programming and animation; met guest speakers who worked at Google, Oracle, Microsoft, IBM, CSDVRS, and Cray who were themselves deaf or hard of hearing; and participated in field trips to Boeing, Google, Adobe, Microsoft, and Valve.

By the end of the summer, Daniel knew that he wanted focus his major in computer science and continue his interest in rocketry from a computer science framework. Additionally, after meeting and communicating with other deaf and hard of hearing students, he decided

to apply to the National Technical Institute of the Deaf at Rochester Institute of Technology (RIT).

In December, we heard from Daniel, who said, "Thanks to this program, my life is wonderful. I got a temporary job that will be using skills I learned in classes in the summer...15 bucks per hour whoo!!!" Just a few days later, Daniel was excited to tell us that he not only was accepted to RIT, but also received two scholarships! We are very proud of Daniel and his accomplishments.

AccessComputing Summer Academy for Advancing Deaf and Hard of Hearing in Computing is now accepting applications for 2009. For more information visit www.washington.edu/accesscomputing/dbh/academy/.

Closing the Gap: Summer Camp and Work-Based Learning

By Michael Richardson, *AccessComputing* Manager

Every October, one of the largest assistive technology conferences in the country occurs in Minnesota. The conference, called Closing the Gap (CTG), focuses on computing tools and education. Each year, DO-IT projects participate by hosting an exhibit and delivering presentations. For the past two years *AccessComputing* resources and activities have been highlighted.

Two *AccessComputing* articles were featured in the January 2009 issue of the CTG journal, which is distributed in print and online. One is described in the following article entitled "Ignite Your Education with Work-Based Learning" on page five. In the other article "Including Accessible Technology-Rich Activities in an Existing Summer Camp," *AccessComputing* Co-Director Sheryl Burgstahler discussed how to develop a strategic plan to bring accessible computing activities into a summer camp. Using a

technology-rich program co-sponsored by DO-IT and Camp Courage, a camp for students with disabilities, as a case study, Burgstahler outlined strategies for success. She included the following tips:

- Find out about campers' interests and previous computer and Internet experiences. You are likely to find that you need to create flexible, alternative activities for a diverse group.
- Find a facility with computers or make plans to rent or buy them.
- Arrange for Internet service. Sometimes you can obtain accounts through a school or university.
- Integrate the Internet program into other camp activities. For example, let your campers research a camp activity via the Internet, or create a World Wide Web page for the camp, including pictures of campers and camp activities.

More information on including technology in a summer camp program can be found at www.washington.edu/accesscomputing/articles?65. For more information about the CTG conference and journal, visit www.closingthegap.com/conference/.

Ignite Your Education with Work-Based Learning

by Sheryl Burgstahler, *AccessComputing*
Co-Director

Work-based learning is an important part of both academic and career preparation. In his article "Internships and Students with Disabilities" that appeared in the January 2009 issue of the CTG Journal (see previous article), *AccessComputing* project staff Scott Bellman discussed the needs of students who participate in internships:

Challenging internships are a critical part of career success for all students. Internships help students clarify their career interests and provide new

opportunities for learning and growth. Students with disabilities in high school and college have unique needs as they pursue internships. It's important that professionals who serve them, such as career counselors and internship coordinators, understand research that relates to work-based learning and students with disabilities.

Bellman outlines principles from the book *Quality Work-Based Learning and Postsecondary Employment Success* by Luecking and Gramlich as well as the results of DO-IT research and practice that *AccessComputing* staff apply when developing successful work-based learning experiences for participants. For example, the results of research conducted by DO-IT staff (Sheryl Burgstahler, Scott Bellman, and Sara Lopez) and published in the National Association of Colleges and Employers Journal includes the following suggestions for work-based learning programs that serve students with disabilities:

- Develop disclosure strategies with the student early in the job search process.
- Encourage employers to identify their employees with disabilities to act as role models for students.
- Develop clear, specific goals for the work-based learning experience.

More information on successful work-based learning for students with disabilities can be found at www.washington.edu/doit/Resources/research.html.



Harry Lang: Sharing History of Technology in the Deaf Community

by Richard Ladner, *AccessComputing*
Co-Director

In the fall of 2008, Professor Harry Lang from the National Technical Institute for the Deaf at Rochester Institute of Technology delivered a lecture titled “The Genius of Community: Technology as Friend and Foe in the Lives of Deaf People” to an audience of 150 people at the UW. In his lecture, Lang traced the invention of the teletypewriter (TTY) to a small group of determined deaf people who wanted to access the telephone in the 1960s. One of the deaf inventors of the TTY was engineer and physicist Robert Weitbrecht, who developed the acoustic modem that translated electronic signals to sound and vice versa. This acoustic modem was a precursor to modems that connect computers over phone lines. Lang stressed the effort that has been made to ensure TTYs are available, free of charge, to all people who are deaf in the U.S. For further information about the history of TTYs in the U.S., check out Lang’s book *A Phone of Our Own*.

Professor Lang shared many stories of the achievements of scientists who are deaf, including Thomas Edison. To learn more about notable scientists and thinkers who are deaf, read Lang’s book *Deaf People in the Arts and Sciences*, co-written with his wife Bonnie Meath-Lang.

A captioned version of Lang’s lecture can be viewed at <http://tinyurl.com/c36yke>.

Computer Science Unplugged

by Richard Ladner, *AccessComputing*
Co-Director

This past summer, Anna Cavender, Lindsay Yazzolino, and I led thirty blind youth ages eight to twelve in two different Computer Science Unplugged activities. The Computer

Science Unplugged program introduces youth to computing concepts without the use of computers. One group of fifteen students learned about sorting in a hands-on activity using different algorithms, including insertion sort, selection sort, and bubble sort. They sorted themselves by first name, birthday, and length of cane using the different algorithms. By physically moving their bodies during the sorting process, they modeled what these algorithms do.

A second group of fifteen students learned about finite state machines by becoming a candy machine. Each student played a role: some were coins entering the slot, while others acted out the various states of the machine. For example, one person was the twenty-cent state that was activated after two dimes were inserted. They learned how events like coins entering a machine cause the active state to change. They also learned that states are like primitive forms of memory that are found in all computational processes and machines.

Both Lindsay and I had the opportunity to speak with the students’ parents as a group. I described some of the newest research on accessible technology and shared the experiences of several very successful blind scientists and engineers. Lindsay described how as a child, her interest in science grew with the support of her parents and teachers. She encouraged parents to keep their expectations high for their children.

Lindsay reviewed the Computer Science Unplugged activities to assess their accessibility to children who are blind for the Junior Science Academy. If an activity was not very accessible she modified it using her own experience as a person who is blind. For more details about the program visit <http://csunplugged.org/>.

Discover Opportunities for People Who Are Deaf or Hard of Hearing

By Scott Bellman, *AccessComputing* Staff

Advancing Deaf and Hard of Hearing in Computing (ADHHC) is an *AccessComputing* project that was developed to increase the participation of individuals who are deaf or hard of hearing in computing fields. The ADHHC website is a great place for students and practitioners alike to find new resources and opportunities. Visitors can discover

- program and application information on the UW's Deaf and Hard of Hearing Summer Academy for high school students;
- how students who are deaf or hard of hearing can engage in internships, e-mentoring, and other activities by joining the *AccessComputing* team;
- how practitioners can engage with colleagues through the Deaf and Hard of Hearing Community of Practice to support students who are deaf as they pursue education and careers in computer science; and
- a searchable Knowledge Base of articles specifically related to the engagement of individuals who are deaf or hard of hearing in computing fields.

Visit the website at www.washington.edu/accesscomputing/dbh/index.html.

AccessComputing Co-Director Receives 2008 Purpose Prize

by Michael Richardson, *AccessComputing* Manager

Richard Ladner, UW Department of Computer Science & Engineering professor and *AccessComputing* Co-Director, was one of fifteen recipients of the 2008 Purpose Prize, an award for social innovators over sixty years of age. Ladner has shifted the focus of his research from computer science theory

to developing better technologies for people with disabilities. He, along with students and colleagues, have developed such software applications as WebAnywhere that allows individuals who are blind or have low vision to use the Internet on the go, MobileASL that makes it possible for people who are deaf to use video communication on cell phones, and the Tactile Graphics Assistant that efficiently translates visual graphics into tactile form for people who are blind. The Purpose Prize, now in its sixth year, is awarded by Civic Ventures and funded by the Atlantic Philanthropies and the John Templeton Foundation.

For further information about WebAnywhere visit <http://webanywhere.cs.washington.edu/>, for MobileASL visit <http://mobileasl.cs.washington.edu>, and for the Tactile Graphics Project visit <http://tactilegraphics.cs.washington.edu/>.



Richard Ladner interacts with students in the Summer Academy.

AccessComputing Collaborator Receives Mellon Award

by Michael Richardson, *AccessComputing* Manager

The UW Department of Computer Science & Engineering's WebAnywhere project was a recipient of the Andrew W. Mellon Foundation Award for Technology Collaboration (MATC). As Vint Cerf

presented the award at the Coalition for Networked Information fall meeting he stated,

The MATC Awards have a history of recognizing projects that improve accessibility for people with visual or other impairments, and this year is no exception...By providing a screen-reader as a web server component, WebAnywhere allows an institution to provide screen-reading functionality to any computer, anywhere in the world, as long as it has speakers, an Internet connection, and a web browser. Because screen readers can cost thousands of dollars per machine and cannot be moved easily, the total benefit to an institution can be considerable—and the improved mobility for persons with visual impairments generates substantial benefits for students and faculty.

Jeff Bigam, a UW doctoral candidate in computer science and the creator of WebAnywhere, accepted the award on behalf of the UW. As part of *AccessComputing*, Bigam will facilitate a computer science track at the National Federation of the Blind (NFB) Youth Slam in summer 2009. For more information on the NFB Youth Slam, visit www.blindscience.org/ncbys/youth_slam.asp.

Minigrants: Support Your Event

by Michael Richardson, *AccessComputing* Manager

Since February 2006, *AccessComputing* has contributed funds to support computing-related activities, training, and experiential learning opportunities nationwide. Individuals can seek funding to support

- an existing campus computing event to attract and involve students with disabilities or
- a stand-alone event to attract and support students with disabilities in computing fields.

The University of Minnesota Duluth (UMD) received an *AccessComputing* minigrant to fund a stand-alone event. This event gave incoming freshmen with disabilities a running start, as they made the critical transition from high school to college and explored potential studies and careers in computing fields.

In conjunction with UMD's orientation program for incoming freshmen, the UMD Career Services and Disability Services and Resources (DS&R) departments held a special orientation program, called Orientation 2, for incoming freshmen with disabilities. This workshop introduced students with disabilities to college, DS&R, assistive technology, computing careers, and self-advocacy. It included an introduction to adaptive technologies used on campus, including an opportunity to try assistive software programs. A science and engineering panel of students with disabilities exposed the freshmen to role models and potential mentors. Panelists shared academic experiences, accommodation strategies, and led a campus tour. Career Services staff led a discussion that featured computing fields of study at UMD. A student affairs advisor from the College of Science and Engineering talked about computing fields and study strategies.

A companion workshop at Orientation 2 for parents educated them about DS&R, college transition issues, and ways to support their children's development of self-determination.

For more information or to apply for a minigrant, visit www.washington.edu/accesscomputing/minigrant.html.

UW Hosts *AccessComputing* Leadership Institute

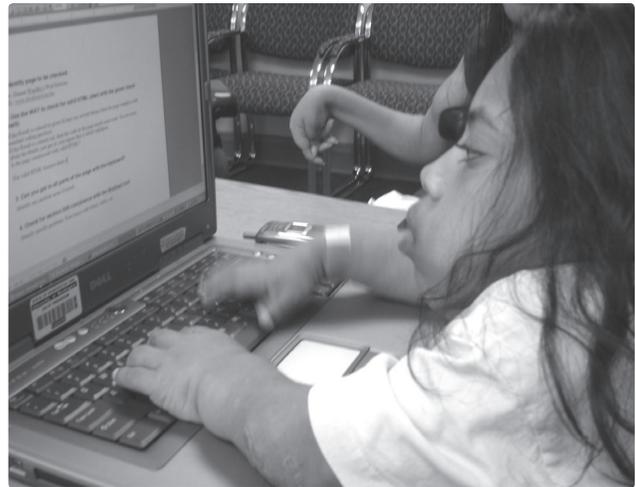
by Lisa Stewart, *AccessComputing* Staff

The UW hosted the *AccessComputing* Leadership Institute in Seattle in fall 2008. The event brought together more than twenty-five leaders from around the country to broaden participation in computing for people with disabilities. The goals of the institute were threefold:

1. Share best practices and develop new ones that will help increase the number and success of people with disabilities in computing fields.
2. Share and learn about funding opportunities to bring these practices to the people who need them.
3. Help develop new leadership in broadening participation in computing for people with disabilities.

The institute consisted of a series of presentations, panels, and discussion forums. To stimulate ideas for implementation, presentations highlighted successful projects, and panels included students with disabilities who were successful in computing. In small group discussion forums, participants brainstormed ideas to increase the participation of people with disabilities in computing fields. Institute participants—some with vast experience and others beginning to develop interests in computing or disability—uncovered many challenges and possible solutions for broadening participation.

For more information about this institute, its participants, resources, and outcomes, visit www.washington.edu/accesscomputing/acli/index.html.



DO-IT Scholar Jessie learns how to optimize web searches in a computer class.

Knowledge Base: Info at Your Fingertips

By Scott Bellman, *AccessComputing* Staff

The online *AccessComputing* Knowledge Base was developed for computing students with disabilities, faculty, and professionals. Its goal is to make academic programs and careers in computing fields welcoming and accessible to individuals with disabilities.

Every month thousands of visitors consult this free resource. By searching the Knowledge Base, they find answers to common questions, learn about promising practices, and explore case studies that highlight real-life applications. Listed below are titles of a few articles from the Knowledge Base:

Questions & Answers

- How can I make my computing department more accessible to students with disabilities?
- What are specific computer applications that can assist students with learning disabilities?

Promising Practices

- University of Washington: A Promising Practice in Using Existing Policies to Support Web Accessibility Practices

- The Educational Leadership Team: A Promising Practice on Promoting Accessible IT

Case Studies

- Distance Learning: A Case Study on the Accessibility of an Online Course
- Web Access: A Case Study on Making Content Accessible to a Student who is Blind

Find the content of these articles and more in the *AccessComputing* Knowledge Base at www.washington.edu/accesscomputing/kb.html.

Checking in on Accessibility

by Wendy Chisholm, *AccessComputing* Technical Staff

AccessComputing staff and participants developed an Accessibility Checklist to guide faculty and administrators in making their computing departments more accessible. The checklist is based on the concept of universal design, defined by Ron Mace of the Center for Universal Design as, “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.”

The checklist, available at www.washington.edu/accesscomputing/equal_access_csd.html, includes tips that enable computing departments to be more welcoming and accessible to students and instructors. Checklist items include:

- Is an adjustable-height table available for each type of computer workstation?
- Is screen enlargement software available for users with low vision?
- Is text-to-speech software available for those with print-related disabilities?
- Is a trackball available for those who have difficulty controlling a mouse?
- Are adequate work areas available for both right- and left-handed users?

Currently, I am helping colleges and universities implement the checklist. We start with a department’s website and make sure it is accessible. We add other elements to make the site welcoming to visitors with disabilities, such as photos of students with disabilities. We add links to an Office of Diversity or Disability Services Office so students can learn more about the accessibility of a campus and its programs.

If you have suggestions for improving the checklist, or if you would like me to help your institution implement the checklist, contact me at chiswa@u.washington.edu.

Creating Video Content? Consider Universal Design

by Terry Thompson, *AccessComputing* Technical Specialist

It is easier than ever to produce and distribute video content via DVD or the web. As an educator, how do you ensure that the videos you create are accessible to all students?

For students who are unable to hear, the solution is to provide either open or closed captions with the video. Open captions are included in the video track, and are always on. Closed captions are in a separate text track, and can typically be turned on or off by the user. Closed captions are supported by most media players and on YouTube (after uploading a video to YouTube, select the “Captions and Subtitles” link to upload a caption file or to learn more). There are a variety of tools and services to facilitate production of closed captions. The process is simple, provided you have a transcript.

For students who are unable to see, the solution is to provide audio description with the video. Audio description is a separate narration track that is added to the video, in which key visual content is described. Online videos can be made with closed caption audio

description, which is contained within a separate audio file, and may be turned on or off by the user.

Accessibility features benefit others, such as those watching a video in a noisy environment or in a quiet setting such as a computer lab or library. Closed captions have the added benefit of being fully searchable; to experience this feature, see the DO-IT Video Search website at www.washington.edu/doiit/video/search/.

The best time to consider accessibility is when you are planning your video. DO-IT uses a universal design approach in the creation of its videos. This approach takes into account the wide variety of characteristics of potential viewers during the design phase. As a result, incorporating accessibility features costs less and goes more smoothly. Consider these steps when planning and filming your video:

- Consult with people with disabilities regarding video content, format, and presentation. Key stakeholders can provide formative input.
- Start with a script, which can easily be converted to a transcript for captioning. This reduces time and costs.
- When planning or scripting the video, include brief periods of silence during or near visual content in order to accommodate audio description.
- Consider how your captions will be displayed. If they will be overlaid on the lower portion of video, film with that in mind; make sure the space that will later contain captions does not include important visual content.

Learn more about creating accessible videos in the article “How do I make multimedia accessible?” at www.washington.edu/accessit/articles?70. Information on how educational entities can plan an accessible video is located at www.washington.edu/accessit/articles?211. Captioning and audio description resources are listed at www.washington.edu/doiit/Brochures/Technology/vid_sensory.html.

About AccessComputing

Led by the Department of Computer Science & Engineering and DO-IT (Disabilities, Opportunities, Internetworking, and Technology) at the University of Washington, *AccessComputing* partners with Gallaudet University, Landmark College, and Rochester Institute of Technology. *AccessComputing* alliance partners are *AccessSTEM*, EAST, MIDWEST, RASEM2, National Center for Women and Information Technology, National Girls Collaborative Project, Commonwealth Alliance for Information Technology Education, Computing Alliance of Hispanic-Serving Institutions, Empowering Leadership: Computing Scholars of Tomorrow, and Advancing Robotics Technology for Societal Impact Alliance.

AccessComputing is supported by the National Science Foundation (grant #CNS-0540615 and #CNS-0837508). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. For further information, to be placed on the mailing list, to request materials in an alternate format, or to donate funds to *AccessComputing* or DO-IT contact:

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AccessComputing Resources

Website—www.washington.edu/accesscomputing/

Connect to *AccessComputing* project information, resources, and materials.

Knowledge Base—www.washington.edu/accesscomputing/kb.html

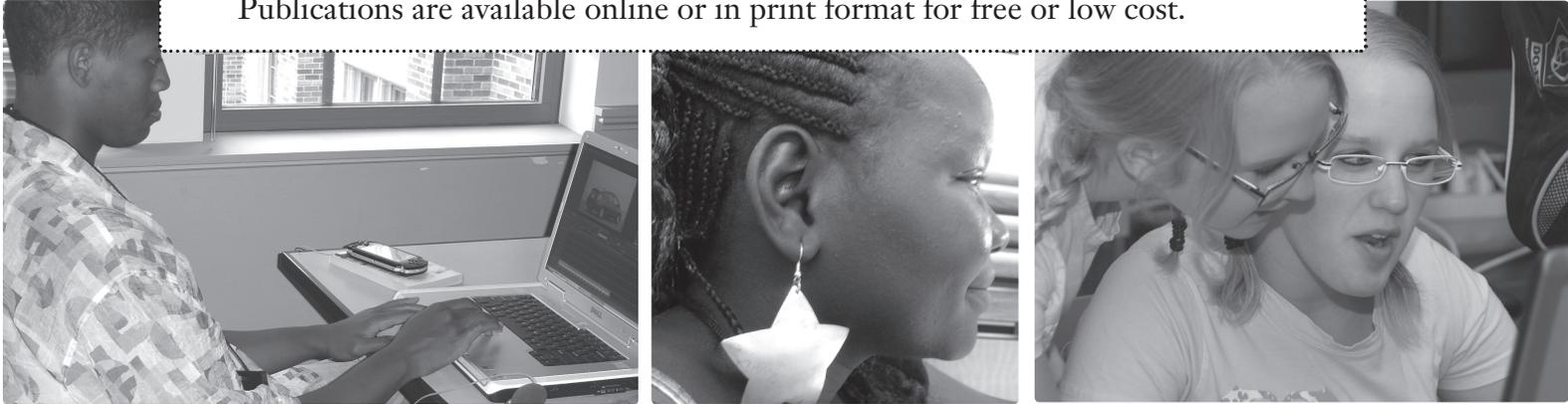
Consult Q&As, case studies, and promising practices regarding universal design of instruction; strategies for making computing curricula, classes, labs, and careers accessible; and accessible technology for people with disabilities.

Videos—www.washington.edu/doi/Video/Search/

Open-captioned and audio-described videos are available freely online for streaming or download and DVDs are also available for purchase.

Publications—www.washington.edu/doi/Brochures/

Publications are available online or in print format for free or low cost.



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