Access Computing

NEWS from the Alliance for Access to Computing Careers

Increasing opportunities for people with disabilities

New Directions in Accessible Computing

by Richard Ladner, *AccessComputing* PI and Co-Director

This fall, I spoke about accessible technology in my "New Directions in Accessible Computing" lecture at North Carolina State University (NCSU). My talk was part of the Triangle Computer Science Distinguished Lecturer Series. It was telecast to Duke University and the University of North Carolina.

In my talk, I described ways that people with disabilities can use technology to create or configure their own accessibility solutions. This non-paternalistic approach respects the ability of persons with disabilities to determine their own destinies.

Highlights of this issue:

Engage in *AccessComputing*

Students with disabilities:
- Internships
- E-mentoring
- *AccessComputing* Team
- Summer programs

Educators & employers:
- Host an intern
- Communities of practice
- E-mentoring

www.uw.edu/accesscomputing/
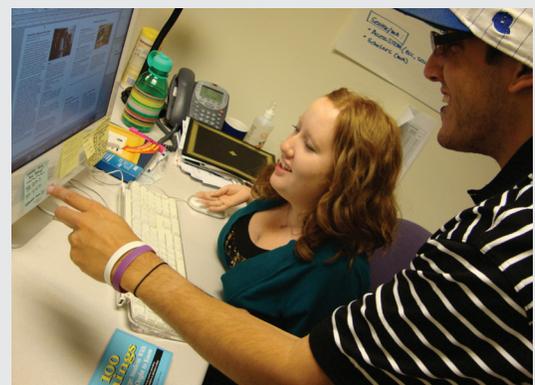
For example, if a person who is blind uses an iPhone they can download accessible applications using the phone's VoiceOver feature. New technology is also being developed that allows the user to access phone content through vibrations that represent Braille characters.

Before my lecture, I was able to connect with NCSU students, faculty, and staff. I met Sina

Bahram, an NCSU computer science Ph.D. candidate who is blind. I learned about various projects at NCSU, University of North Carolina, and Duke that may have a future impact on people around the world, including those with disabilities.

2009 Summer Academy students visit Adobe.

Summer Academy
by Rob Roth, *AccessComputing* Staff

A large crowd of family, friends, and community members attended the Community Premiere to honor the ten students who finished the nine-week 2009 Summer Academy for Advancing Deaf and Hard of Hearing in Computing. Held at the University of Washington, this event showcased the animated films the students created. These animation shorts can be viewed at *http://www.uw.edu/accesscomputing/dhh/academy/projects.html*.

Of course at the Summer Academy it was not always nose to the grindstone working on films and attending computer programming classes. Students also went on field trips to Adobe, Google, Intel, Microsoft, and Valve, where they met employees who are deaf and hard of hearing and work in computing fields. They met the president of Valve and previewed a new game weeks before its release to the general public. Summer Academy

students met guest speakers who were deaf and hard of hearing from companies including Viable Video Relay Service, CSDVRS, Oracle, Cray, Group Health, DeafCode, and IBM. The speakers discussed computing jobs and accessible workplaces. Besides academic and career preparation work, the students socialized during activities that included a Ride the Ducks boat tour and a Mariners baseball game.

Academy participants were from Alaska, Arkansas, Indiana, Maine, Maryland, Texas, Virginia, and Washington. Three were high school students, two were in college, and the rest were recent high school graduates. In addition, two students from the 2008 Summer Academy worked as animation tutors and took a more advanced computer science course than they took in 2008. A student who is deaf from Rochester Institute of Technology (RIT) was hired as a teaching assistant for computer programming courses and a resident assistant in the dorms. Additionally, Pam Siebert from IBM in Kansas City stayed for four weeks as a programmer-in-residence.

The Summer Academy has been in operation for three years. I met up with several of our graduates this summer. Updates from two of the participants are summarized below.

Jason, a 2007 Academy alumnus, completed an internship at NASA, where he worked on developing an interactive web page for the Image Science and Analysis Group at the Johnson Space Center in Texas. The web page offers scientists the ability to view images from the space shuttle and International Space Station. Image scientists analyze these images for debris from space shuttle lift-off and re-entry. Jason credits the Summer Academy for giving him a push in the right direction.

Bobby, another 2007 program alumnus, entered the RIT National Technical Institute for the Deaf and was planning

to pursue a career as a math teacher then decided to major in filmmaking instead. He acknowledged that participation in the Summer Academy helped him pursue his new career goals. Of particular value was the Summer Academy animation class, including script writing, story development, lighting and shadow, pacing, and editing.

To read an article published in the *Seattle Times* about the Summer Academy, visit *http://seattletimes.nwsource.com/html/ education/2009555657_deafacademy28m.html.*

Summer Computing Experience
by Rob Roth, *AccessComputing* Staff

Five deaf and hard-of-hearing students from California, Iowa, Minnesota, Pennsylvania, and Washington attended a one-week Summer Computing Experience at the University of Washington. This was an opportunity for high school students to experience what computing is all about. They went on field trips to Adobe, Google, Valve, and Microsoft's Home of the Future and had fun learning about Seattle on the famous Ride the Ducks tour.

Every morning the students attended an animation class and learned basic animation techniques, as well as the programming aspects behind animation cells. They also met the three principals of DeafCode and learned about entrepreneurship in computing. Motivated by this exciting introduction, some participants are now thinking about applying for the 2010 Summer Academy!

WebAnywhere: Accessible Accessibility
by Brian King, *AccessComputing* Staff

For a person with a visual impairment, a computer can initially present some accessibility challenges. However, there are a wide variety of software products available to help people of all abilities access and use a computer. One of the more popular products for people with visual impairments is a screen reader that uses a digital voice to read aloud text that appears on a computer screen. While a very helpful tool in making a specific computer accessible, screen readers are not always installed on public computers in libraries and Internet cafés.

To make speech output available on any computer at any time, University of Washington alumnus Jeffrey Bigham developed WebAnywhere. Anyone can use this product with almost any web browser and operating system, without the need for additional software. WebAnywhere even predicts web content that may interest the user based on the individual's past history, and it pre-loads speech patterns allowing instant audio access to on-screen content.

Unlike many screen readers, WebAnywhere is free of charge. It can be accessed from *http:// webanywhere.cs.washington.edu/*.

Bigham was recognized as one of *Technology Review's* 2009 Young Innovators Under 35 for his creation of WebAnywhere and is currently an assistant professor in the Computer Science department at the University of Rochester.

Communities of Practice
by Sheryl Burgstahler, *AccessComputing* PI and Co-Director

AccessComputing engages stakeholders through a variety of ways, including Communities of Practice (CoPs). CoP members communicate using email and other electronic tools. They share perspectives and expertise and identify practices that promote the participation of people with disabilities in computing fields. Five project CoPs are described below.

- The **Computing Faculty, Administrator, and Employer CoP** engages computing professionals, faculty, and administrators,

as well as representatives from industry and professional organizations, with the goal to increase their knowledge about disabilities and make changes in computing departments that lead to more inclusive practices.

- The **Broadening Participation CoP** connects collaborators who administer alliances and projects that serve to broaden participation in computing fields.

- The **Disability Services CoP** connects disability service professionals from community/technical colleges, four-year colleges, and universities nationwide, together with their networks of postsecondary and K-12 schools (e.g., affiliates of AHEAD) and parent groups (e.g., affiliates of PACER).

- The **Deaf and Hard of Hearing CoP** connects existing practitioners and networks that support individuals who are deaf or hard of hearing and are interested in increasing the representation of these individuals in computing fields. It includes researchers; college educators; K-12 teachers; and representatives of networks of professional organizations, parent groups, and precollege and postsecondary institutions that have special programs for students who are deaf and hard of hearing.

- The **Blind and Low Vision CoP** connects practitioners who support individuals who are blind or have low vision. Members include researchers, college educators, high school teachers, schools for the visually impaired, and professional organizations.

To join an *AccessComputing* CoP, send your name, position/title, institution, postal address, email address, and which of the five CoPs you would like to join to *accesscomp@uw.edu*.

AccessComputing Interns help high school students at a virtual reality workshop.

AccessComputing Internships
by Scott Bellman, *AccessComputing* Staff

There are a lot of great reasons for you to work as an intern while you are in college. You'll gain confidence, develop new skills, and improve your resume. You can improve work habits and learn what jobs you may want (or may want to avoid) after graduation.

Employers want experience! They also want to be able contact your former supervisors and hear about your work as they seek out the best and brightest workers. DO-IT's *AccessComputing* project has helped more than fifty students land paid internship positions in the last year. Some interns also received college credit for their work.

Interns have worked on computer programming, computing research, and in various workshops and labs. Some specific examples of paid internships completed by *AccessComputing* interns include

- Manager of an assistive technology lab.
- Researcher on iPhone accessibility.
- Microsoft "College Intern Program" participant.
- Computing intern at NASA.
- Computing instructor at a large library.
- Graphic design intern for *Popular Science* magazine.
- Google programmer.
- Lab instructor for a digital arts project.

Computing students with disabilities nationwide are encouraged to contact DO-IT about paid internships. Opportunities include computing research on college campuses, computing projects for companies, and opportunities to work for government agencies and non-profit organizations. Request more information by sending a message to *doit@uw.edu*.

Programming Instant Messaging is a Slam!
by Brian King, *AccessComputing* Staff

Youth Slam—an annual, week-long academy for students who have visual impairments—was held this summer at the University of Maryland. Youth Slam is sponsored by the National Federation of the Blind and its goal is to encourage students with visual impairments to seek out and explore careers in the fields of science, technology, engineering, and math. Attendees participated in a number of activities over the course of the week and were mentored by adults with visual impairments.

As a part of the event, Dr. Richard Ladner led an introductory workshop to computer programming using instant messaging chatbots. A chatbot is a type of computer program used by many of the Internet-based instant messaging services. A total of fifteen students and five mentors, all with visual impairments, participated in the workshop. Participants built their own chatbots and presented them to the group at the conclusion of the workshop. The students also learned about computer science careers, interviewed three students and mentors who have visual impairments, and participated in a sorting activity using the Computer Science Unplugged curriculum. These educational tools helped students learn about the behind-the-scenes work involved in computer programming.

Responses to the workshop were overwhelmingly positive. One undergraduate student remarked, "It was the most important thing that I've ever done."

Technology and Disability in the Developing World
by Wendy Chisholm, *AccessComputing* Staff

Several participants in the *AccessComputing* project, including three *AccessComputing* Team members, presented at the Technology and Disability in the Developing World conference held at the University of Washington (UW) this fall. The presentation was coordinated through Change, a UW group that explores how technology can improve the lives of underserved populations in the developing world.

Conference topics included the following:

- Overview of the distribution of people with disabilities and of computer and mobile technologies for people with disabilities in developing countries.
- Discussion of low-cost technologies, universal design possibilities, and the role of advocacy groups in technology adoption.
- Clarification of the basic technological status of people with disabilities around the world in order to see how this topic fits into larger political, social, and research agendas.
- Discussion of essential computer access technologies for people who are blind that included access barriers and potential solutions.
- Discussion of natural signed language as an important and relatively inexpensive strategy for people who are deaf.
- Review of deaf technology around the world, its current usages, and its potential in the developing world.
- High-level overview of current speech-based technologies and interaction

methods, and how they may apply to people with motor impairments or in hands-busy situations in the developing world.

- Information regarding how people with disabilities use mobile phones to enhance independence.

For more information, consult: *http://change.washington.edu/access/*.
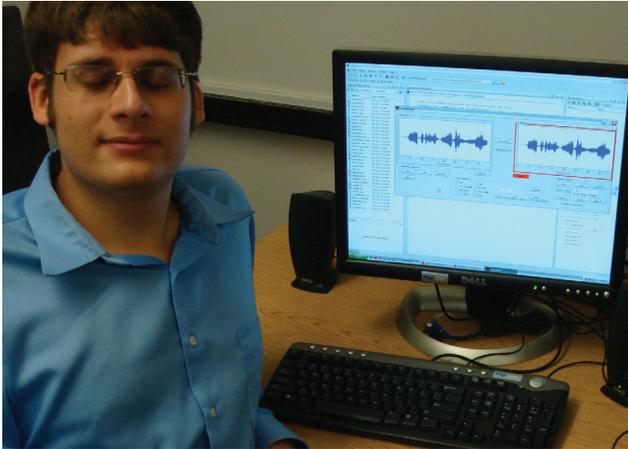
Program participant Marco studies sound using graphs.

Robots and Sound Studied in Engineering Labs
by Scott Bellman, *AccessComputing* Staff

In fall 2009, seven students with disabilities came to the University of Washington's College of Engineering to attend learning labs. The five high school and two college students met with graduate students and the Associate Dean to learn about different kinds of signal processing. Students split into two groups to complete one of two laboratory experiments:

One of the labs, "Sounds You Can See," allowed the students to work on powerful data-crunching computers in the Electrical Engineering department. The students learned how computers process sound and how to recognize sound patterns through the use of visual graphs. Students manipulated different sounds to create unique soundbites.

The second lab, "Understanding Robot Movement," required students to upload data to underwater robots and make observations about their movements. The robots helped students understand how aquatic creatures move through water.

Check the campus calendar at local schools to find out about events of interest to you. Watch for open houses and other activities that are open to the public.

Working Toward an Accessible Web
by Tamitha Tidwell, *AccessComputing* Staff

In summer 2009, a dozen students attended a five-day Web Accessibility Workshop to learn how to evaluate the accessibility of websites and computer applications. Wendy Chisholm was the instructor. The students spent time discussing what it means for technology to be accessible and developed a set of criteria to measure the accessibility of a website. After measurable criteria were determined, the students learned about a variety of tools that are used to determine accessibility. Finally, students learned how to document their test results to provide constructive feedback to website developers and managers. Throughout the workshop, students evaluated actual websites to determine their accessibility. The class curriculum is available at *https://files.getdropbox.com/u/3401/doit-wat/unit%201/module%201/lesson1.html*.

A few students were selected to become paid *Interns*. The *Interns* evaluated the accessibility of twenty-five different academic computing departments' websites. These websites had been evaluated several years prior to the 2009 *Interns'* evaluation. The goal was to determine if the websites had become more or less accessible, or if there had been no change since the previous evaluation. Findings from this evaluation will be sent to the website managers. The evaluation form is available at

*http://spreadsheets.google.com/viewform?hl=en&f
ormkey=dDB3NVliOXVUN05obzR0bDBJV1o4
UlE6MA.*

If you would like the accessibility of your
website evaluated, contact Wendy Chisholm at
chiswa@uw.edu.

Talking Points: Universal Design
by Wendy Chisholm, *AccessComputing* Staff

This summer, KUOW (Puget Sound Public
Radio) broadcast my interview with Jeannie
Yandel. We discussed universal design and
its benefit for everyone, including people
with disabilities. The segment, "Web
Accessibility for Everyone" is available at
http://www.kuow.org/program.php?id=18043.
A transcript is available at *http://sp1ral.
com/2009/08/interview-transcript/*.

This fall, Minnesota Public Radio's John
Moe talked to Darren Burton from the
American Foundation for the Blind and
myself about technology and disability.
I enjoyed our discussion and was happy
that we talked about challenging people's
assumptions. A recording of the radio program
is available at *http://minnesota.publicradio.
org/display/web/2009/09/23/midmorning2/*.

HTML5 Super Friends
By Wendy Chisholm, *AccessComputing* Staff

The next wave of HTML, called HTML5,
is in development by the Web Hypertext
Application Technology Working Group
(WHATWG) and the World Wide Web
Consortium (W3C). HTML5 is an important
step for web accessibility, because it is the first
time that people with disabilities have been
included in the web language development
process from the beginning. Two very
different cultures are learning how to work
together, and it's both exciting and frustrating.

Accessibility advocates are educating engineers
about the technological needs of people with
disabilities. Although the engineers can be
hard to convince, when they "get it," they
often come up with very cool solutions.

On the other hand, when they don't get it and
want to move forward with something that
is not accessible, it is frustrating. In the past,
accessibility has been thrown out for the sake
of progress. Once this happens, it is difficult
to implement accessibility at a later stage of
development.

With HTML5 going into the next
development phase, a group of developers and
designers from the web standards movement
decided to meet to develop feedback for the
HTML5 specification. For two days in early
August, Dan Cederholm, Tantek Çelik, Jeremy
Keith, Ethan Marcotte, Eric Meyer, Nicole
Sullivan, Jeffrey Zeldman, and I gathered
at Happy Cog Studios in New York City to
talk about HTML5. This is a who's who of
standards-based web development, and I was
honored to be invited to such a powerhouse of
a group!

We dubbed ourselves the HTML5 Super
Friends and wrote the Super Friends Guide to
HTML5 Hiccups as well as a statement that
endorses the direction HTML5 is heading.
Most of us have written our own blog posts
about the issues and advantages we found in
the specification. I list my concerns at *http://
sp1ral.com/2009/08/html-5/*.

The reaction to our comments was good. We
even appeared in an issue of CSSquirrel, an
online comic strip that provides perspective
on the politics of web design and standards
development at *http://www.cssquirrel.
com/comic/?comic=35*.

Recently, the HTML Working Group met
for two days in Santa Clara, California to talk
about some of the outstanding issues that

need to be addressed before the HTML5 specification can move into the next phase. I attended one day and was happy to see good progress being made on some of the trickier accessibility issues. We aren't out of the woods yet, but the engineers seem open to most of our concerns. Keep your fingers crossed.

Top Ten Degrees
by Scott Bellman, *AccessComputing* Staff

Do you know which college degrees are in high demand? In a recent survey* the top ten in-demand college degrees reported by respondents are:

1. accounting
2. mechanical engineering
3. electrical engineering
4. computer science
5. business administration/management
6. economics/finance
7. information sciences & systems
8. computer engineering
9. management information systems
10. marketing/marketing management

Four out of ten, a whopping 40%, are computer science degrees! That means when students invest their time and money in computing degrees, they are making a good investment. Employers need to find computing graduates to keep their businesses running. This trend is projected to continue well into the future.

*Source: Job Outlook 2009, National Association of Colleges and Employers

AccessComputing Minigrants
by Sheryl Burgstahler, *AccessComputing* PI and Co-Director

In the last two years, the following projects have received funding through *AccessComputing* minigrants. Congratulations to all of these recipients for conducting successful projects!

Projects:
- **Accessibility Awareness Training Workshop** was organized at the University of Maryland Baltimore County to familiarize faculty, staff, and teaching assistants with academic issues affecting students with disabilities.
- **Alice in Roboland** project at Auburn University was integrated into a hands-on technology and science summer camp.
- **Assistive Technology Expo** was held at the University of Wisconsin–Madison to promote computing/IT careers.
- **Capacity Building Institute** was brought to Commonwealth Alliance for Information Technology Education to increase the capacity of computer science and information technology programs to fully include and increase the representation of students with disabilities.
- **Computer Literacy Academy for Children with Disabilities** at Auburn University provided children with disabilities the opportunity to improve computer, communication, cognitive, and social skills.
- **Computing Science Road Show** was developed at Southern Oregon University to travel to five high schools to recruit students to study computing in college and provide accessible technology tools.
- **EAST-2 Computing Institute** was held at University of Southern Maine to increase the representation of individuals with disabilities in computer science fields.
- **Idaho Partnership on Higher Education** at Eastern Idaho Technical College coordinated a conference of practitioners to discuss working with veteran students to make campuses more accessible.
- **Increasing STEM Lab Accessibility** course was organized at the University of Southern Maine to integrate adaptive technology into a university class.
- **Promoting Computer Science to Students with Visual Impairments through Game Programming** collaborative event between the Rochester

Institute of Technology and Auburn University was held to promote interest in computing for students with visual impairments.

- **Return to Learn for Veterans Course** was held at Missouri Southern State University to encourage and support veterans with disabilities to succeed in higher education and careers in the computer/technology field.
- **Roadshows, Tours and TechNights for Children with Hearing Loss** event was held at Carnegie Mellon University to provide computing-related information to students and expose children to basic technology skills.
- **Robotics Track at the National Federation of the Blind Youth Slam** was organized at the Rochester Institute of Technology to provide students with team working experiences while learning robotics programming.
- **Scripting Enabled** event at the University of Washington brought together developers, researchers, and students with disabilities to develop web accessibility solutions.
- **Summer Computing Institute** was held at the University of Rhode Island for students with disabilities to promote their interest in college courses and careers related to computing.
- **Technology and Disability in the Developing World** conference was held at the University of Washington to expand the interest of computer science and engineering students in researching and designing low-cost technologies for people with disabilities.
- **VET Support for Tallahassee Community** was created at Florida State University to conduct a capacity-building institute to create community support and awareness for veterans.
- **You Can DO-IT High School Transition Event** at Eastern Idaho Technical College held two separate events for students with disabilities to learn more about the college experience.

Individuals:
- **Accessing Higher Ground 2009** Attended by: One faculty and one staff member from Eastern Idaho Technical College's Computer Network Technician and Web Development Programs.
- **CSUN 2009** Attended by: Assistive Technology Coordinator at Boise State University; AccessComputing team member and employee from Yahoo!; and Technology and Production Support Services representative from Oregon State University, who also delivered a presentation.
- **U.S. Department of Defense's Worldwide Education Symposium** Attended by: Ten employees from Georgia State University's Veterans Coordinating Council.

Participants in a computing workshop learn how to design accessible technology.

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.