AccessComputing NEWS

from the Alliance for Access to Computing Careers

Increasing opportunities in computing for people with disabilities

June 2018

New Resource Promotes Accessibility to Larger Community of CISE Projects

By Sheryl Burgstahler, *AccessComputing* Co-PI

The National Science Foundation's Computer and Information Science and Engineering (CISE) program is encouraging existing and new CISE projects to make significant efforts towards broadening participation by addressing the needs of groups underrepresented in computing, which include women, racial/ethnic minorities, and people with disabilities. *AccessComputing*, which is funded by CISE, is contributing to this effort by providing a new web resource to help current and future CISE project leaders proactively include broadening participation activities that address disability-related issues in their supported and proposed projects.

The new AccessComputing resource includes advice on the inclusion of people with disabilities in academic, employment, internship, and outreach opportunities. It also tells how to universally design onsite and online instruction and digital resources (e.g., websites, documents, videos) so that everyone can effectively access

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Engage in *AccessComputing*

Students with disabilities

- Internships
- Mentoring
- *AccessComputing* Team

Educators and employers

- Hosting an intern
- Communities of practice
- Mentoring
- Presentations
- Minigrants

When more citizens have access to computing opportunities, and when computing fields are enhanced by the perspectives of people with disabilities, we all benefit.

Find more information about these opportunities as well as videos, publications, and other resources on the *AccessComputing* website, *www.uw.edu/accesscomputing*.

and engage in content. It offers informative videos, publications, and other resources that give grant writers and project administrators a place to start in making sure that individuals with disabilities can fully participate in all they have to offer and in designing specific activities to address the needs of this underrepresented group.

Learn more about how to get started in addressing disability-related issues in a grant proposal or funded project at *www.uw.edu/accesscomputing/getting-started-addressing-disability-related-issues-grant-proposal-and-funded-project*.

Introducing the *AccessComputing* Resume Database

By Terrill Thompson, *AccessComputing* Staff

In the October 2017 edition of *AccessComputing* News, we announced the launch of our Resume Database (*www.uw.edu/accesscomputing/resources/accesscomputing-news-october-2017/accesscomputing-resume-database-launches*). The *AccessComputing* Resume Database was created to help employers connect with individuals with disabilities in computing fields, such as computer science and information technology. Students and recent graduates who have disabilities can use the Resume Database to complete an online profile and upload their resume. Then, employers can search the database to locate potential interns and employees with disabilities who match their specific needs.

To date, 82 applicants have logged into the system to complete profiles and upload resumes, and 12 industry partners have created accounts in order to search for possible candidates. Profiles have been viewed 497 times and 19 resumes have been downloaded.

In order for students to use the Resume Database, they must first join the *AccessComputing* Team, a community of high school and college students with disabilities who are interested in computing fields. It's free to join, and Team membership has many

An AccessComputing participant works with a faculty member to improve their resume.

benefits, including access to support staff and mentors and opportunities to engage in electronic mentoring, work-based learning, and other experiences that enhance college and career success in computing fields. Project staff help Team members locate paid internships and other work and research opportunities as they transition to and succeed in college, graduate school, and employment. To apply, complete an *AccessComputing* Team application at *www.uw.edu/accesscomputing/accesscomputing-team-application*.

In order for employers to access the Resume Database, they must be an *AccessComputing* Industry Partner. For additional information on becoming a Partner, please see our Industry Partners web page at *www.uw.edu/accesscomputing/about/industry-partners*.

Puget Sound SIGCHI

By Jacob O. Wobbrock, *AccessComputing* Co-PI

On April 19, 2018, I spoke at the Puget Sound Special Interest Group on Computer-Human Interaction (SIGCHI). Entitled "Ability-Based Design: Making Technologies Match All People's Abilities and Context," my talk was sponsored by TEK Systems and co-hosted by Puget Sound SIGCHI and the University of Washington (UW) Information School. Turn-out was the highest it had been in recent memory with about 150 people in attendance. In fact, pizzas had to be rush-ordered when the usual staple of sandwiches ran out!

I described ability-based design, which is an approach that designs for all people and all abilities by focusing on what people can do and by making computing systems accommodate their users, rather than the other way around. For example, if a touch screen could be calibrated to accept more flexible forms of touch, it wouldn't force a user who can't operate their fingers to procure a hand-mounted pointing stick or other technology. On this subject, I shared the project SmartTouch, which makes touch screens capable of modeling and interpreting different forms of touch, even if it is not with a single finger capable of landing and lifting from one spot with no interference from other parts of the hand.

Along with the motivation for, and principles of, ability-based design, I described multiple other research projects my students and I have pursued, including a system for writing by making letter-like gestures with a trackball, an automatic user interface generator informed by the mouse-pointing abilities of users, how to improve the accuracy of a mouse cursor, a voice-controlled painting program, finger-driven screen-reading for making smartphones accessible to blind people, and smartphone text entry based on a Perkins Brailler.

An ad for Jacob O. Wobbrock's talk on Making Technologies Match All People's Abilities and Context

Because ability-based design also focuses on the contexts in which people use technology, we are also pursuing research on how people are using mobile technology. For example, WalkType is a project that makes smartphone keyboards more accurate by modeling the gait of the user, specifically which foot is stepping forward, and corrects for subtle shifts in finger position that can result in missed keys. Other projects can detect the grip with which a user is holding a smartphone, when the user looks away and returns his gaze to the screen, and even the blood alcohol level of the user—all using commodity smartphone sensors. With the ability to sense these things comes the ability to accommodate them in various ways—for example, making interfaces operable with one hand, using on-screen highlights to help direct a user's attention, or preventing a user's car from starting when he is inebriated.

All living people have abilities. And accessibility is a concept for everyone. Ability-based design emphasizes both points, striving to recognize all that people can do in the design of computing systems that better accommodate their users.

My Trip to WWW'18 in Lyon, France

By Ivan Brugere, *AccessComputing* Team Member

I am a graduating Ph.D. student in computer science, specializing in machine learning on social networks. I was very fortunate to receive the support of *AccessComputing* to attend The Web Conference (*www2018.thewebconf.org*) in Lyon, France. Attending this conference allowed me to build new connections and collaborations during a crucial time when I transition to a career in industry research.

The Web Conference is a unique and valuable experience for students of many different backgrounds. In recent years, it has become a top venue for research in large-scale machine learning. However, it has strong communities in accessibility, security and privacy, and human-computer interaction. They also co-host the Web For All Conference, which focuses on developing accessible features and websites with respect to disability, socioeconomics, and other barriers. Due to this co-located event, The Web Conference itself also has better disability accommodation than similar top-tier conferences, both onsite and providing relevant local information. Outside of the Tapia Conference, I feel The Web Conference is the most diverse and valuable to students with disabilities who are in the relevant areas of computing.

The conference also hosts many sponsors and industry partners recruiting students at all levels. I was able to make direct contact with recruiters and researchers from Amazon, Facebook, Yahoo! Research, and Walmart Labs. Due to this, the conference is a great opportunity for masters and Ph.D. students, as well as undergraduates considering graduate school. There are several applied research tracks that are suitable for more junior students, including the "Web and Society" track, which focuses on empirical studies of websites and social networks, and recent emerging problems such as bias in machine learning, online abuse, and journalism and misinformation.

I presented my research in the BigNet International Workshop on Learning Representations for Big Networks. The workshop was very well-attended, in part due to notable keynote talks by Jon Kleinberg and Jure Leskovec. The research in this workshop focused on how to extract higher-order information from networks (e.g. using deep learning) for recommender systems, knowledge-bases, or biological networks. These alternative representations mitigate some complexity of networks to build better predictive models, but are still not well-understood.

During my time in Lyon, I was largely focused on my work for the conference, and meeting a few closer colleagues. When I travel, I tend to meet many different groups of colleagues, and take time with them to see the city. These have been very important experiences and connections later on. However, the focus was very fruitful. This yielded good presentation slides, and a small breakthrough on research.

I am looking forward to attending future Web Conference iterations and facilitating junior students to attend as I work with the community in industry.

Are you a student with a disability studying computing? Access mentoring, funding opportunities, and more by joining the *AccessComputing* team. Find out more at *www.uw.edu/accesscomputing/*.

An Exciting 2018 CSUN Conference

By Tami Tidwell, *AccessComputing* Staff

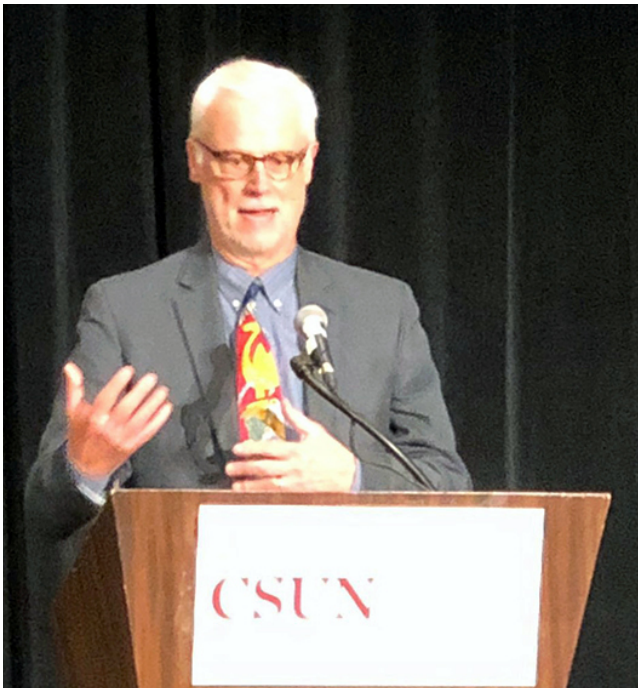
Nine DO-IT participants from across the US attended the 33rd annual International Technology and Persons with Disabilities Conference (CSUN). The students attended sessions, helped at the exhibit booth, explored offered resources, and networked with both professionals and one another. Many of them knew each other from interactions over our email listservs but had never met in person. Their highlight was attending networking events hosted by Microsoft, Google, and Deque. They made a lot of valuable connections.

At the opening keynote, *AccessComputing* and *AccessCSforAll* principal investigator (PI) Richard Ladner received the Strache Leadership Award.

Also during the conference, Terrill Thompson presented the session "Media Player Accessibility: Insights from Interviews and Focus Groups," where he described the lessons learned from interviews and focus groups conducted at CSUN in 2017 to better understand how persons with disabilities use video players.

The numerous sessions and wide array of resources offered left the students with a packed schedule and many assets to bring back with them. The students left excited about future technologies and inclusion.

To learn more about this year's event or subscribe to the Center on Disabilities' mailing list, visit *www.csun.edu/cod/conference/2018/sessions/index.php/*.



Richard accepts the Strache Leadership Award.

AccessComputing **PI Richard Ladner Wins Strache Leadership Award**

By Elizabeth Lee, *AccessComputing* Staff

AccessComputing and *AccessCSforAll* PI Richard Ladner was recently honored with the Strache Leadership Award for his work in accessibility education and research. He got his award from the Center on Disabilities at California State University, Northridge (CSUN), which hosts the CSUN Assistive Technology Conference each year—the largest international conference to focus on assistive technology.

Ladner has been a leading researcher in the field of accessibility for over thirty years, and his work—both through our programs and in his teaching and research at the University of Washington—has increased access for people with disabilities to technology and computing careers. Ladner has been recognized numerous times throughout the years for all work he has done in the field of accessibility, winning the 2004 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM), the 2008 Computing Research Association A. Nico Habermann Award, and the 2016 ACM SIGACCESS Award for Outstanding Contributions to Computing and Accessibility.

DO-IT Director Sheryl Burgstahler has also won the Strache Leadership Award, being recognized in 2012 for her leadership in promoting college success for students with disabilities and the universal design of instruction, technology, and services in higher education.

Learn more about his award and his background from the UW Allen School Newsletter (*news.cs.washington.edu/2018/03/20/richard-ladner-honored-with-strache-leadership-award-for-impact-on-accessibility-education-and-research/*) or watch his acceptance of the award starting at 1:08 of the CSUN conference keynote (*www.youtube.com/watch?v=XAEJx4GlRPQ*). Congratulations, Richard!

Elizabeth (second from right) and other attendees of the CRA Grad Cohort Workshop

CRA Graduate Cohort Workshop

By Elizabeth Spingola, *AccessComputing* Team Member

In March of 2018, I attended the Computing Research Association (CRA) Graduate Cohort Workshop for Underrepresented Minorities and Persons with Disabilities in San Diego, California. *AccessComputing* was one of the workshop's sponsors.

The workshop aimed to increase the ranks of underrepresented minorities and persons with disabilities in computing research by allowing graduate students to meet mentors and build nationwide communities that can persist through their graduate studies and beyond.

Having the opportunity to go to San Diego for the CRA Graduate Cohort was a truly amazing experience. The inclusive environment and the commitment to accessibility were phenomenal and far beyond most of the conferences, workshops, and academic events I have participated in previously.

Throughout the event I made meaningful connections with numerous peers and leaders in my specific research area. The advice and guidance that I received was incredibly helpful. They provided me with new information that affects my graduate school, research, and conference focuses.

Additionally, the information provided within the workshop sessions was geared to my graduate timeline. Participants were allowed to pick one of three tracks based on where they were in their grad program, as well as fluctuate between sessions of all three. These tracks allowed me to understand the populations the particular workshops were targeting. All information provided within the sessions were presented in accessible formats.

I highly recommend that graduate students who are a minority or underrepresented within the computing field attend the CRA Graduate Cohort. The experience allows for graduate students at any stage of their graduate studies to participate in useful information sessions, build community, and grow their professional network.

SIGCSE 2018 Trip Report: CS for All!

By Andrew Ko, *AccessComputing* Co-PI

When I first started doing research on the learning of computing, most of my exposure to the topic was through the excellent Association of Computer Machinery (ACM) International Computing Education Research (ICER) conference. As a small, inclusive community of rigorous learning science and education researchers, it was the best way for me to learn about the best work in the field. I had found my people.

From afar, the Special Interest Group on Computer Science Education (SIGCSE) technical symposium was an entirely different beast. My first experience was disorienting: not only was it nearly as large as the ACM Computer-Human Interaction (CHI) conference, my first academic community, but it was and is still dominated by practicing teachers, not researchers. As a researcher, this is both a blessing and a curse. The blessing is that there's an incredible group of teachers that come ready to learn and change their

practices; that's an unprecedented resource for research dissemination. Nearly everyone I talk to is someone who might adopt my lab's ideas. However, I rarely get to engage in research conversations about learning to code. This has meant that attending SIGCSE has always felt like more of a dissemination event for me rather than an opportunity to learn about new discoveries and generate new research ideas.

However, this year's SIGCSE was different than those of the past. Not only was there a dedicated research track for the first time, improving the quality of the research work and attracting more researchers than ever before, but the dialogue between teachers and researchers was more mature and urgent than ever. This was fueled by the national and international efforts at providing access to computing education to everyone, not just those who show up.

The conference was about more than just the ideas in computer science and our goals of spreading it. In fact, the more dominant theme was inclusion, which is at the heart of efforts to broaden participation in computing.

Brenda Wilkerson of AnitaB.org gave the first keynote of the conference. AnitaB envisions a future where "the people who imagine and build technology mirror the people and societies for whom they build it." Brenda encouraged us to think of efforts to democratize ideas in computing not just as an education reform effort, but a revolution. Her argument was that if we change education to incorporate computer science (CS), and youth embrace CS, we won't just change what they know and can do, we'll change the face of who creates and designs technology, which will change technology, which will change the world. Brenda then talked about how to grow this revolution, reviewing her work in Chicago, where CS is now required across K-12.

Kristen Shinohara presenting the paper on a survey of efforts to teach accessibility in computer science.

I spent the rest of the first day of the conference also talking about inclusion. *AccessComputing* PI Richard Ladner, *AccessComputing* coordinator Brianna Blaser, and I kicked off the new Inclusion track for the conference on a session about incorporating ideas from accessibility into computer science classes. We shared ideas with our attendees and generated many interesting ideas about integration. For example, some who teach machine learning realized that there were fascinating ways to teach about bias in data by talking about how outliers can emerge from variation in ability. This variation shouldn't be discarded; rather, machine learning algorithms should be robust to it, which actually means that diversity is a grand challenge for machine learning. Another example for data structures classes showcases how since screen readers require content to be serial or hierarchical, data must be structured into lists, regardless of how else it is structured. Attendees really wanted a website that conveyed all of these resources, which we are working on. Attendees also felt they needed some basic resources to develop their own expertise about accessibility, such as a book covering all of the foundations that they might also use for teaching.

These conversations mirrored the results of a survey that Kristen Shinohara, Saba Kawas, Richard Ladner, and I did to understand who is teaching accessibility in the US. We had a robust audience of 50 attendees with many interesting questions about the cultural changes that might be needed in computer science departments to incorporate even small amounts of accessibility into classes.

On Saturday, I helped lead an *AccessComputing* session on inclusive learning and teaching. Attendees came from high schools and universities, including some department chairs and even the College Board. Everyone came to learn what inclusion means and how to support it in classrooms and culture. We provided a few basics about universal design and norms, and then walked through some scenarios about students with physical disabilities, learning disabilities, and other issues of neurodiversity.

I had a great time this week in Baltimore. There's so much energy and passion in this community, across all kinds of institutions and organizations. It's not the normal research conference, but I think that's a good thing: If only for a few days a year, leaving the ivory tower and contextualizing my research is invaluable to me and I hope to the world.

A full trip report with my thoughts on big ideas, programming, software engineering, mentorship, boot camps, ethics, and measurement is available on Medium at *medium.com/bits-and-behavior/sigcse-2018-trip-report-cs-for-all-57f1cf94155f*.

Able Player 3.1 Released, Research Paper Published

By Terrill Thompson, *AccessComputing* Staff

The release of Able Player 3.1 was announced at the CSUN 2018 International Technology and Persons with Disabilities Conference in San Diego. Able Player is an accessible online open-source media player designed and developed with support from *AccessComputing*. It features high contrast buttons and controls that can easily be operated by screen reader users, keyboard users (without a mouse), and speech input users.

It is the only media player that supports all five kinds of <track> elements, introduced in HTML5 to provide a means of synchronizing text with media during playback. The five

A screenshot in Able Player of the video Quorum: An Accessible Programming Language

kinds of <track> elements are captions, subtitles, descriptions (which can be read aloud at appropriate times by screen readers), chapters (which add structure to videos, enabling users to jump to the start of particular sections), and metadata (enabling interactive features in videos such as clickable hot spots). It also parses the content from chapters, descriptions, and captions (or subtitles) tracks and reassembles them into an interactive transcript. The content of the transcript is highlighted during video playback, and users can click anywhere in the transcript to play the video at that point. Able Player also features "slower" and "faster" buttons that enable users to control playback rate, and supports sign language in a supplemental video, synchronized with the main video.

Version 3.1 includes a number of bug fixes and enhancements. Perhaps the most noteworthy new feature is support for the playsinline attribute, which instructs mobile devices to play the video within its original context in the web page, rather than load the video into the device's native video player. In prior versions this had been a problem particularly with iPhones. When a user tapped the play button in Able Player, the video would be loaded in the iOS video player. Users could watch the video there, and access captions

if enabled in their accessibility settings, but it was otherwise impossible to access all the other features of Able Player that make video interactive and accessible.

At the 2017 CSUN conference, we conducted interviews and focus groups with individuals with disabilities throughout the conference and acquired insights into how users with various disabilities interact with online media players. These insights will be used to guide future development of Able Player. A paper titled "Media Player Accessibility: Insights from Interviews and Focus Groups" (*scholarworks.csun.edu/handle/10211.3/203005*) was published in the 2018 edition of *The Journal on Technology and Persons with Disabilities* (*csun.edu/cod/journal*).

Autism at Work Summit 2018

By Richard Ladner, *AccessComputing* PI

The Autism at Work Summit 2018 was held April 24-26, 2018 on the Microsoft campus in Redmond, WA. The conference brought together about 180 participants from a wide range of stakeholders including representatives from companies that have autism hiring programs such as DXC.technology, Ernst & Young, Ford, JP Morgan Chase, Microsoft, and SAP. Other participants included representatives from companies considering starting autism hiring programs, employment support agencies representatives, university and industry researchers, government agency representatives, and autism advocates.

There were keynote presentations from Tom D'Eri who helped found the Rising Tide Car Wash company that primarily hires people with autism and the actress Holly Robinson Peete who formed the HollyRod Foundation that provides support and resources for families that experience autism. There were many panels about hiring, onboarding, and retaining workers with autism at all kind of skill levels including computing majors. There were two panels of people with autism—one about career paths and the other about women with autism.

The panel about career paths featured John Marble who co-founded the Autism Advantage Program (*expandability.org/autism-advantage/*), which trains and supports people with autism who are interested in data analysis or quality assurance. John described his personal path where his view of his own autism changed from stigma to a positive advantage.

The panel on women with autism included Sara Luterman the founder and editor of NOS Magazine (*nosmag.org/*), which focuses on news and commentary about neurodiversity culture and representation. Sara articulately described the autistic experience in a way that does not emphasize deficits, but positives.

The conference was very well run with lots of time for questions, answers, and discussion. This was the third Autism at Work Summit and another one is planned for next year.

Prior to the Summit, Richard attended the Autism at Work Research Workshop. A leading question for the researcher is what are the features of a successful autism at work program. Exploring answers to this question will lead to better models for successful autism at work programs.

Autism at Work Summit 2018 program

A screenshot of the AccessCSforAll 2018 STEM for All Video Showcase submission

AccessCSforAll Featured in Video Showcase

By Brianna Blaser, *AccessComputing* Staff

For the fourth year, *AccessCSforAll* participated in the STEM for All Video Showcase (*stemforall2018.videohall.com/*). The Showcase, which ran from May 14-21, highlighted work being done by federally-funded programs to transform STEM education. This year, the *AccessCSforAll* submission (*stemforall2018.videohall.com/p/1078*) will bring attention to including students with disabilities in K-12 computer science education by showing a blind student programming a robot using Blocks4All (*dl.acm.org/citation.cfm?id=3051525*). Blocks4All, developed by University of Washington Computer Science and Engineering graduate student Lauren Milne, explores techniques to make block-based programming accessible to students who are blind or low vision.

Last year's *AccessCSforAll* video *Quorum: An Accessible Programming Language* (*stemforall2017.videohall.com/presentations/900*) won a Facilitator's Choice award.

Check out the disability related videos from previous years at *www.uw.edu/accesscomputing/stem-all-video-showcase*.

About *AccessComputing*

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