



CREATE Newsletter

Center for Research and Education on Accessible Technology and Experiences

DIRECTORS' WELCOME

Making a more accessible world

Welcome to the first Newsletter from the University of Washington Center for Research and Education on Accessible Technology and Experiences (CREATE). We plan to issue our Newsletter a few times per year, announcing new Center developments, research achievements, education highlights, and opportunities to engage with us.

As this is our first Directors' Welcome, please allow us to introduce ourselves! CREATE was founded by nine dedicated faculty members representing six different units at the University of Washington. These units come from engineering, computing, information, rehabilitation medicine, and disability studies. Elsewhere in this Newsletter, we introduce our exceptional founders and their roles within CREATE. The University of Washington has had a critical mass of faculty and students working on accessible technology for many years—perhaps the most people dedicated to this topic of any university anywhere—and CREATE brings us together like never before.

CREATE's mission is two-pronged: *To make technology accessible and to make the world accessible through technology.* CREATE faculty and students conduct research centered on one or both of these prongs. For example, we have projects focused on making smartphones accessible to people with visual or motor disabilities (the first prong), and we also have projects using smartwatches to make ambient noise recognizable to people who are deaf or hard of hearing (the second prong). Both of these projects are described in this Newsletter in our Research Highlights section.



CREATE strives to achieve its mission through three primary activities: research, education, and translation. First, as a research center, CREATE's lifeblood is in its research work, pushing the boundaries of accessible technology design, creation, evaluation, and conceptualization. Second, CREATE's educational mission connects its research to students who will become the next generation of engineers, designers, managers, advocates, and community leaders. It is vital that these future professionals have the skills and knowledge necessary to prioritize and champion accessibility in their work and organizations. Third, CREATE's translational mission connects its research to the broader world through commercialization, licensing, open-sourcing, non-profits, hackathons, workshops, and partnerships, achieving impact at scale.

CREATE was officially launched on May 28, 2020, at the Microsoft Ability Summit by University of Washington President Ana Marie Cauce and Microsoft President Brad Smith. Microsoft generously donated \$2.5M to provide the inaugural gift to launch CREATE. The initial five-year plan for CREATE is to raise \$10M from companies, philanthropies, and government grants.

Since our launch, we founders have been extremely (but happily!) busy, working earnestly to establish a sound operational foundation, governance structure, strategic vision, communications plan, financial plan, and other vital features of our Center. We are off to a good start, and we could not ask for a better team or better supporters.

Please join us in our mission to make the world a more accessible place. You can find us online at <http://create.uw.edu> or on Twitter at [@uwcreate](https://twitter.com/uwcreate).

Jacob O. Wobbrock and Jennifer Mankoff
CREATE Co-Directors

Introducing our founders

CREATE was founded by nine faculty members representing six different units across the University of Washington campus. Regardless of their specific field or home department, each member is dedicated to conducting research that advances technology accessibility and/or uses technology to address accessibility challenges in the world. Here is a brief introduction to each of our founders, all at the University of Washington:



JENNIFER MANKOFF is Co-Director of CREATE. She is the Richard E. Ladner Professor in the Paul G. Allen School of Computer Science & Engineering. Her research focuses on accessibility

and 3-D printing. She has led the effort to better understand both clinical and do-it-yourself stakeholders of personal fabrication technologies, and she has developed better, more usable tools for production. She believes 3-D printing and personal fabrication can enhance the capabilities and participation of all users in today's manufacturing revolution. She also advocates locally and nationally to ensure access for people with disabilities to academia, and has a disability herself.



JACOB O. WOB BROCK is Co-Director of CREATE. He is a Professor in The Information School. His research seeks to scientifically understand people's experiences of computers

and information, and to improve those experiences through design and engineering, especially for people with disabilities. His specific research topics include input and interaction techniques, human performance measurement and modeling, research and design methods in human-computer interaction, mobile computing, and accessible computing.



ANAT CASPI is CREATE's Director for Translation. She is a Principal Research Scientist in the Paul G. Allen School of Computer Science & Engineering and Director of the Taskar Center for

Accessible Technology. She is interested in exploring ways in which collaborative commons and cooperation can challenge and transform the current economics of

assistive technology and incentivize rapid development and deployment of ethically built accessible technologies. Her research focuses on engineering intelligent solutions for customizable real-time, responsive technologies in the context of work, play, and urban street environments.



RICHARD LADNER is CREATE's Director for Education. He is a Professor Emeritus in the Paul G. Allen School of Computer Science & Engineering. He is interested

in accessibility technology research, especially technology for deaf, deaf-blind, hard-of-hearing, and blind people. He is active in promoting the inclusion of persons with disabilities in computing fields, serving as the Principal Investigator for the National Science Foundation funded AccessComputing and AccessCSforAll projects.



HEATHER FELDER is an Associate Director of CREATE. She is an Assistant Professor in the Department of Rehabilitation Medicine, Division of Physical Therapy. She is also a core

faculty member in the Disability Studies Program. Her focus is on advancing participation and health together with people with disabilities and their families by exploring the intersections between mobility, disability, and technology in a variety of personal and environmental contexts. Her research centers on the design and implementation of mobility assistive technology, including how perceptions of disability and identity emerge and evolve through technology use.

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LEAH FINDLATER is an Associate Director of CREATE. She is an Associate Professor in the Department of Human Centered Design & Engineering. She is interested in how to create

technologies that adapt to individual user needs and preferences, whether to improve basic interactions such as touchscreen text entry or more complex tasks such as working with machine learning models. Her research goal is to ensure that the next generation of computing technologies are designed to meet the needs of the broadest possible range of users.



JAMES FOGARTY is an Associate Director of CREATE. He is a Professor in the Paul G. Allen School of Computer Science & Engineering. His broad research interests are in human-

computer interaction, user interface software and technology, and ubiquitous computing. His focus is on developing, deploying, and evaluating new approaches to the human obstacles surrounding widespread everyday adoption of ubiquitous sensing and intelligent computing technologies.



JON FROEHLICH is an Associate Director of CREATE. He is an Associate Professor in the Paul G. Allen School of Computer Science & Engineering. His research focuses on designing,

building, and evaluating interactive technology that addresses high value social issues such as environmental sustainability, computer accessibility, and personalized health and wellness.



KAT STEELE is an Associate Director of CREATE. She is the Albert S. Kobayashi Endowed Professor in the Department of Mechanical Engineering. Her research focuses

on using novel computational and experimental tools to understand human movement and improve treatment and quality of life of individuals with cerebral palsy, stroke, and other neurological disorders. Her research also strives to connect engineering and medicine to create solutions that can advance an understanding of human ability, but also translate research results to the clinic and to daily life.

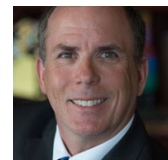
ORGS & OPS

CREATE's advisory board formed

We are excited to announce the launch of [CREATE's advisory board](#), with four inaugural members. Our goals were to assemble an advisory board who will help amplify, complement, and support CREATE by providing advice and helping increase the visibility of our center and mission. In addition, we hope that over their two-year terms, our advisory board will provide a critical outside perspective to maximize our impact and meet with us twice annually for feedback. Our inaugural members represent a range of perspectives and we are honored by their commitment to CREATE:

MARY BELLARD, a leader in accessibility and innovation at Microsoft who has worked on accessibility training curriculum, the Disability Answer Desk, and accessibility hacks.

RORY A. COOPER, inventor and assistive technology researcher at the University of Pittsburgh, where he is a professor in the departments of Rehabilitation



From left: Bellard, Cooper, Gilbert, and Lazar.

Science & Technology and Bioengineering, Physical Medicine & Rehabilitation, and Orthopedic Surgery.

JUAN E. GILBERT, a professor and Chair of Computer & Information Science & Engineering at the University of Florida, where his research interests include human-centered computing, user experience and accessibility, and advanced learning technologies.

JONATHAN LAZAR, a prominent advocate for digital accessibility and leader in research working with participants with disabilities, and a professor at the College of Information Studies (iSchool) at the University of Maryland.

CREATE and I-LABS join forces

This winter, we are excited to celebrate the launch of a new research and innovation partnership between CREATE and the [UW Institute of Learning & Brain Sciences](#) (I-LABS) focusing on access, mobility, and the brain.

Mobility technology such as manual and powered wheelchairs, scooters, and modified ride-on toy cars, are essential tools for young children with physical disabilities to self-initiate exploration, make choices, and learn about the world. In essence, these devices are mobile learning environments. Although there is some evidence that mobility technology positively impacts the developing brain and identity of children with physical disabilities in the first years of life, we still do not understand how the introduction of such technology, as well as its timing and dosage, affects learning and developmental outcomes, specifically related to communication, cognition, and agency. This knowledge could fundamentally shift the landscape of mobility technology provision in early childhood, influencing social attitudes.

The collaboration, led by [Heather Feldner](#) and [Kat Steele](#) from CREATE, and [Pat Kuhl](#) and [Andy Meltzoff](#) from I-LABS, brings together expertise from fields of rehabilitation medicine and disability studies, engineering, language development, psychology, and learning. The centers are currently searching for two postdoctoral fellows with expertise in disability, movement, brain, and behavior to work on the project. This collaboration will address several critical knowledge gaps: How do early experiences with mobility technology impact brain development and learning outcomes? What are critical periods for mobility? How and when should mobility technology be deployed to compliment traditional motor skill acquisition in pediatric rehabilitation? How does



Go Baby Go Seattle

current technology meet (or fail to meet) the needs of children with physical disabilities and their families? We believe that answers to these questions will begin to demonstrate that early access to mobility technology is a critical asset for development and learning, rather than a last resort for remediation or accommodation.

This two-year project will be conducted in partnership with children ages 1-3 years and their families using a series of qualitative and quantitative methods to uncover patterns across multiple contexts of mobility and socialization. It is our hope that this project represents the first of many fruitful collaborations between CREATE and I-LABS.

Mobility technology such as manual and powered wheelchairs, scooters, and modified ride-on toy cars, are essential tools for young children with physical disabilities to self-initiate exploration, make choices, and learn about the world.

Highlights from ACM ASSETS 2020

The ACM SIGACCESS Conference on Computers and Accessibility (the “ASSETS” conference) is the premiere forum for research at the intersection of technology, accessibility, and disability. This year was the 22nd such conference, dating back to the early 1990s. It was originally to be held in Athens, Greece, but the COVID-19 pandemic forced it to be held online only. Despite the challenges of transitioning to an online format, the conference went very well and had significant participation, as usual, by faculty and students from the University of Washington and CREATE in particular. There were 395 attendees in all, including 210 students, both record numbers. The average Zoom attendance in each session was over 100. The conference was highly accessible using 13 sign language interpreters (both American and British sign language) and 12 captionists. The Zoom platform was used for sessions along with Discord for discussion. There were more than 100 Discord channels for the various papers, posters, and demos. Discord also could be used for one-on-one text conversations.

One highlight of the conference was the keynote address by CREATE Advisory Board Member Jonathan Lazar, a professor at the University of Maryland. His talk, titled “Accessibility Research in the Pandemic: Making a Difference in the Quality of Life for People with Disabilities,” covered many of the issues facing people with disabilities during the COVID-19 pandemic and how the accessibility research community is responding. His closing remarks were a call to action for the community: “We have the ability to make a huge difference right now! We have the power to save lives. Let’s get to work!”

There were 57 papers published at ASSETS this year. Of those, six (10.5%) had at least one author from the University of Washington. CREATE faculty and students also were authors on multiple award-winning papers.

The Best Paper was entitled, “Input Accessibility: A Large Dataset and Summary Analysis of Age, Motor Ability and Input Performance.” The authors were Leah Findlater (CREATE Associate Director) and Lotus Zhang. Their paper offers a large dataset of mouse- and touch-based interactions by people with and without disabilities and of various ages. One interesting

empirical finding was that as age increases, the speed with which people use a mouse decreases, but errors generally do not change.

The Best Student Paper was entitled, “Living Disability Theory: Reflections on Access, Research, and Design.” The authors were Meagan Hofmann, Devva Kasnitz, Jennifer Mankoff (CREATE Co-Director), and Cynthia L. Bennett. The paper delineates three themes: ableism in research, oversimplification of disability, and human relationships around disability based on the lived experiences of the four authors and looking through a disabilities studies lens. In the end, the authors give concrete advice to accessibility researchers that will

“We have the ability to make a huge difference right now! We have the power to save lives. Let’s get to work!”

— Jonathan Lazar

enable them to pursue research that respects and dignifies the lives of people with disabilities. They also advocate building bridges between the accessibility research and disability studies communities.

The Best Artifact Award went to: “Exploring Smartwatch-based Deep Learning Approaches to Support Sound Awareness for Deaf and Hard of Hearing Users.” The authors were Dhruv Jain,

Hung Ngo, Pratyush Patel, Steven Goodman, Leah Findlater (CREATE Associate Director), and Jon Froehlich (CREATE Associate Director). This work explored using a smartwatch for detecting and visualizing ambient noise for deaf and hard of hearing individuals. One of the Research Highlights in this Newsletter goes into more detail about this fascinating project.

Although most people were disappointed not to attend ASSETS 2020 in person, we look forward to next year’s conference in October 2021, when we hope we will get together to see more amazing things our community has to offer. As in 2020, CREATE faculty and students will no doubt be a large and enthusiastic conference contingent. Until then!

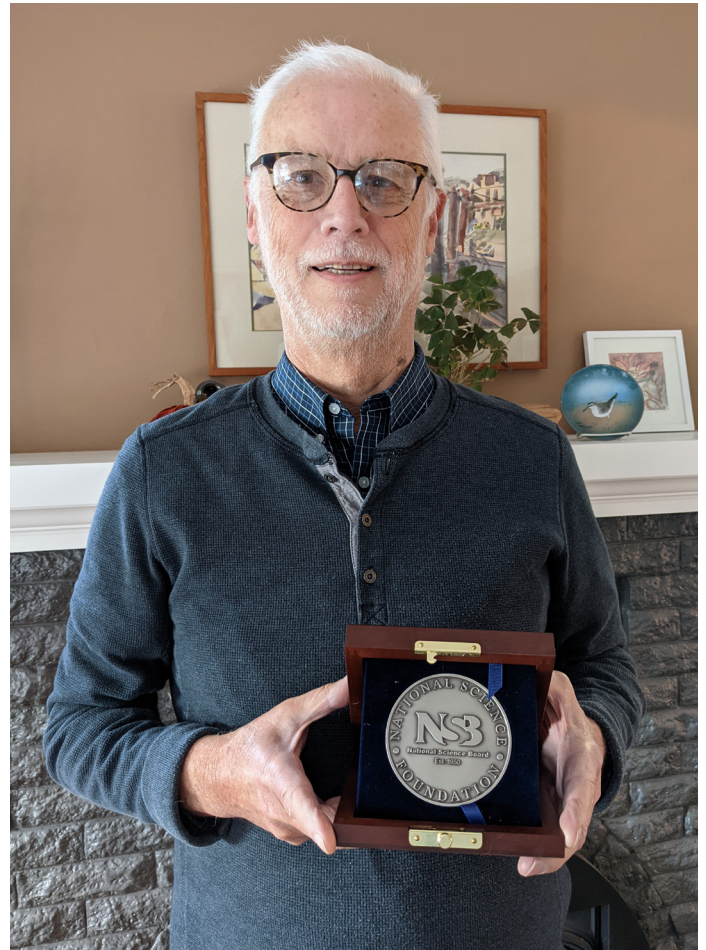
Ladner wins National Science Board Award

Richard E. Ladner, CREATE's Director for Education, was one of three scientists honored this year with a National Science Board (NSB) Public Service Award. Ladner was recognized for his work advocating that people with disabilities can participate fully in STEM careers, and that disability must be included in any concept of diversity. His contributions include [AccessCSforAll](#) and [AccessComputing](#).

[This 10-minute video](#) describes the award winners. In the video, Ladner speaks about what he learned from his deaf parents, his career switch from theoretical computer science to accessible computing; the many famous scientists who had disabilities including Albert Einstein (dyslexic), Thomas Edison (deaf), and Isaac Newton (epileptic); the importance of nurturing disabled perspectives in science; and his own work to make science accessible and welcoming to everyone.

A video of the National Science Board meeting on December 19, 2020 contains [a panel discussion](#) led by Internet pioneer [Vint Cerf](#) touching on topics such as how prevalent disability is, why disability is part of diversity, and how making accessible products is more an issue of training rather than science.

CREATE is proud to have Richard E. Ladner among its founders. Congratulations, Richard!



Mankoff wins AccessComputing Capacity Building Award

The AccessComputing Capacity Building Award is awarded annually to individuals whose work and accomplishments have changed the way the world views people with disabilities and their potential to succeed in challenging computing careers and activities. This year the award went to Jennifer Mankoff, Co-Director of CREATE, for her leadership in helping make the Special Interest Group on Computer-Human Interaction (SIGCHI) conferences accessible to attendees with disabilities. SIGCHI is the leading organization that focuses on research, education, and the practical application of human-computer interaction. She was a founding member of [AccessSIGCHI](#), which advocates for accessibility in SIGCHI activities and conferences.



AccessSIGCHI supports a Facebook Group that has almost 300 members.

As part of her work, she interacted with the SIGCHI Executive Committee (EC) to set policy related to conference accessibility. Through her leadership, the SIGCHI EC now has adjunct chairs for accessibility, which institutionalizes accessibility as an important facet of SIGCHI activities. Jen holds monthly online meetings of the AccessSIGCHI leadership team to help set and execute its agenda. She also led the group in producing three SIGCHI Accessibility Reports (2015, 2017, 2019) with policy proposals that will help SIGCHI-sponsored conferences become more accessible.

SoundWatch app visualizes ambient sounds for deaf users

A team of students working with CREATE Associate Directors Leah Findlater and Jon Froehlich have developed SoundWatch, a smartwatch application for deaf and hard of hearing people who want to be aware of nearby sounds. Soundwatch identifies the sound a user is interested in and sends a friendly notification along with information about the sound.

The team presented the [research findings](#) at the ACM SIGACCESS Conference on Computers and Accessibility, where the invention won the [best artifact award](#).

“This technology provides people with a way to experience sounds that require an action—such as getting food from the microwave when it beeps. But these devices can also enhance people’s experiences and help them feel more connected to the world,” said lead author Dhruv Jain, a Ph.D. student in the Paul G. Allen School of Computer Science & Engineering, in a [recent press release](#). “I use the watch prototype to notice birds chirping and waterfall sounds when I am hiking. It makes me feel present in nature. My hope is that other d/Deaf and hard-of-hearing people who are interested in sounds will also find SoundWatch helpful.”

The SoundWatch app is available as a [free download](#) for Android devices. The team is eager to hear feedback from interested users so they can make the app more useful. The next step in the app’s development is to enable personalization of recognizable sounds, an effort being led by team member Steven Goodman, a Ph.D. student in the Department of Human Centered Design & Engineering. At the moment, SoundWatch users can select up to 11 sounds for the app to recognize, but are not able to actively train it with new sounds. “We could imagine, for example, a deaf parent training the system to recognize the sound of their children laughing or crying by recording a few voice samples from each child,” said Goodman.

“Training a machine learning model is hard enough even with lots of data, so it’s going to be fun to see where this ambitious exploration takes us. But we’re all really passionate about this greater granularity of personalization,” said Jain in a comment to [Forbes](#).



“This technology provides people with a way to experience sounds that require an action—such as getting food from the microwave when it beeps. But these devices can also enhance people’s experiences and help them feel more connected to the world.”

— Dhruv Jain

Large-scale analysis finds many mobile apps are inaccessible

Mobile apps have become a key feature of everyday life, with apps for banking, work, entertainment, communication, transportation, and education, to name a few. But many apps remain inaccessible to people with disabilities who use screen readers or other assistive technologies. Any person who uses an assistive technology can describe negative experiences with apps that do not provide proper support. For example, screen readers unhelpfully announce "unlabeled button" when they encounter a screen widget without proper information provided by the developer. We know that apps often lack adequate accessibility, but until now, it has been difficult to get a big picture of mobile app accessibility overall. How good or bad is the state of mobile app accessibility? What are the common problems? What can be done?

[Research led](#) by Ph.D. student [Anne Spencer Ross](#) and co-advised by James Fogarty (CREATE Associate Director) and Jacob O. Wobbrock (CREATE Co-Director) has been examining these questions in first-of-their-kind large-scale analyses of mobile app accessibility. Their latest research automatically examined data from approximately 10,000 apps to identify seven common types of accessibility failures. Unfortunately, this analysis found that many apps are highly inaccessible. For example, 23% of the analyzed apps failed to provide accessibility metadata, known as a "content

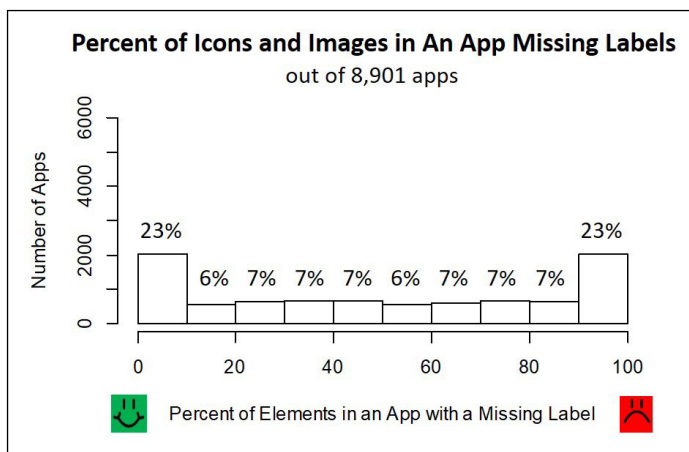


iStockPhoto

description," for more than 90% of their image-based buttons. The functionality of those buttons will therefore be inaccessible when using a screen reader. Clearly, we need better approaches to ensuring all apps are accessible.

This research has also shown that large-scale data can help identify reasons why such labeling failures occur. For example, "floating action buttons" are a relatively new Android element that typically present a commonly-used command as an image-button floating atop other elements. Our analyses found that 93% of such buttons lacked a content description, so they were even more likely than other buttons to be inaccessible. By examining this issue closely, Ross and her advisors found that commonly used software development tools do not detect this error. In addition to highlighting accessibility failures in individual apps, results like these suggest that identifying and addressing underlying failures in common developer tools can improve the accessibility of many apps.

Next, the researchers aim to detect a greater variety of accessibility failures and to include longitudinal analyses over time. Eventually, they hope to paint a complete picture of mobile app accessibility at scale.



Seminar explores race and disability

The CREATE Accessibility Seminar launched this past fall and met weekly, led by Anne Spencer Ross and Jennifer Mankoff. The seminar's focus was on the intersection of race and disability, primarily focusing on under-represented minorities. This topic was chosen both for its timeliness and also as part of CREATE's commitment to ensure that our work is inclusive, starting with educating ourselves about the role of race in disability research and the gaps that exist in the field. Although we know this is only the first step in our journey toward racial justice, we learned some important things along the way.

- A search of the ACM digital library for papers that used words like "race" "disability" and "Black" turned up extremely few results. Even when papers talk about both disability and race, they are often treated separately. For example, some provide information on what percentage of a certain group is in various categories without considering their intersection. A rare exception is author Dr. Christina Harrington, who has directly spoken to this intersection and was kind enough to make a guest appearance at our seminar.
- The research topics we found, which included work on both disability and race-related factors, were more wide-ranging than disability alone, including transportation, e-government access, hate speech, policing, surveillance, and institutionalization.
- Guest researchers joined in to share their expertise including [Dr. Christina N. Harrington](#), from DePaul University, on community-based approaches to reconsidering design for marginalized populations; [Dr. Karin D. Martin](#) from UW's Evans School of Public Policy and Governance, a crime policy specialist whose areas of expertise are monetary sanctions, racial disparities in the criminal justice system, and decision-making in the criminal justice context; and [Dr. Shari Trewin](#), IBM Accessibility Manager and Research Lead, on bias in artificial intelligence.
- There is an active and informative dialogue taking place outside of academia at the intersection of race and disability, including blogs and podcasts

SELECTED READINGS

- [How to center Disability in the Tech Response to COVID-19](#)
- [On Being Black and "Disabled but Not Really" by Imani Barbarin](#)
- Jeff Link. [Why racial bias still haunts speech-recognition AI](#) [PDF]
- Talking with Tech AAC Podcast: Kevin Williams & Lateef McLeod: Black AAC User Perspectives on Racism and Disability. From timestamp 42:25. [[Podcast Website](#)] [[YouTube at Timestamp](#)] [[Transcription](#)]
- [Financial Inequality: Disability, Race and Poverty in America.](#)
- [Chicas Talk Disability 6 : Police Interactions with People With Disabilities](#) (transcript coming soon)

Find the full reading list [here](#).

such as the [Chicas Talk Disability YouTube Channel](#) and [Black Disabled Men Talk](#).

- There is an important and growing body of critical literature on the topic. To touch on just a few of the books we read when preparing for the seminar, see [DisCrit: Critical conversations across race, class, & dis/ability](#) (Connor et al, 2016), [Disability incarcerated](#) (Moshe et al, 2014), and [Disability Visibility](#) (Wong, 2020).

"I appreciated the opportunity to talk about the intersection of accessibility and race because although we talk a lot about accessibility in this research area, we don't really talk about how race and its intersection with other minority identities plays a huge role in who gets access and for whom technologies are made," said student Momona Yamagami.

By the end of the seminar, we were sure of one thing only: This is a topic we could not do justice to in a single quarter. There is much more to uncover here, and much work to be done.

CREATE supports research workshop for undergraduates with disabilities

OurCS@AccessComputing+CREATE was a research-focused workshop for undergraduates with disabilities in computing fields that was held virtually on Wednesday, January 13 through Friday, January 15, 2021. [AccessComputing](#) is a valued partner of CREATE, helping CREATE in its objective to help “create pathways for more individuals with disabilities to pursue careers in technology innovation.”

Forty-six undergraduate students from around the nation participated in the workshop along with 10 mentors, who were faculty members working in various research areas. The keynote speakers were Elaine Short from Tufts University, Nicholas Giudice from the University of Maine, and Jeanine Cook from Sandia National Laboratory. There were plenary presentations on applying to graduate school and succeeding in graduate school. A panel of senior and recently finished graduate students with disabilities talked about their own experiences in graduate school. Each of the mentors led a short course on research in their area of expertise. There was also time for networking with the mentors.

Eddith Figueroa from the University of Texas at Austin appreciated hearing about the panelists’ experiences. “I really enjoyed the panel of people who were in grad school. It gave me a lot of perspective into what it would be like to try and go to grad school with a disability,” Figueroa said.

Cameron Cassidy from Texas A&M University highlighted the information about graduate school, saying, “Professors Milne and Ladner shared a lot of



Participants use VR at the 2019 OurCS workshop.

good information about graduate school, which made me more comfortable in my decision to pursue an advanced degree.”

And Nayha Auradkar of the University of Washington found the networking opportunities valuable. “I learned a lot through networking with research leaders and engaging in the interactive research workshops,” Auradkar said.

Funding for this workshop was provided by [Google Explore CSR](#) with additional support from [AccessComputing](#) and the UW Center for Research and Education on Accessible Technology and Experiences ([CREATE](#)).

“I really enjoyed the panel of people who were in grad school. It gave me a lot of perspective into what it would be like to try and go to grad school with a disability.”

— Eddith Figueroa, University of Texas at Austin

Accessible CS Education workshop focuses on inclusive experiences

Amid a global pandemic, innovative thinkers have been hard at work developing plans to improve equity in modern learning environments. The [Accessible Computer Science Education Fall Workshop](#) was held November 17-19, 2020, and jointly sponsored by Microsoft, The Coleman Institute for Cognitive Disabilities, and the University of Washington's Center for Research and Education on Accessible Technology and Experiences (UW CREATE). Each day of the event focused on strategies to improve classroom experiences for students and faculty with disabilities. [Speakers provided a wide range of perspectives](#) on computer science pedagogy and how to increase diversity, equity, and inclusion in computing disciplines.

The event gathered a range of researchers and developers who are passionate about inclusivity in computer science education, and provided an intimate environment to share work and establish new collaborations. Throughout the workshop, participants focused on four areas: (1) education for employment pathways, (2) making K-12 computing education accessible, (3) making higher education in computing accessible, and (4) building accessible hardware and systems. Conversations generated ideas about technologies that can boost employment and assist people with disabilities who experience barriers in various learning environments. Following the event, each group continued their discussion and [developed formal white papers and action plans](#).

The program resulted in more than conversations; each group produced a plan that will guide future research and collaboration. The committee behind the event successfully cultivated a productive and inclusive atmosphere that sponsors hope will translate to future projects. Members of the committee include Andrew Begel, Heather Dowty, Cecily Morrison, Teddy Seyed, and Roy Zimmerman from Microsoft; Anat Caspi and Richard Ladner from UW CREATE; and Clayton Lewis from the University of Colorado Boulder.



Scholars work with robots at the Bill & Melinda Gates Center during the 2019 DO-IT Summer Study.

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