HIGHLIGHTS

RESEARCH: CREATE's high-impact research in accessible technology and experiences included making 2-D visual content such as slides and visualizations accessible to blind people, automating large-scale mobile app accessibility analyses and repairs, mapping sidewalk and indoor accessibility, and studying the impacts of COVID-19 on students with disabilities. CREATE and I-LABS continued their collaboration on the impact of access to mobility aids on early childhood development. CREATE published 52 papers on accessibility, six of which won awards, and two SIGCHI dissertation awards.

EDUCATION: During the past academic year, the University of Washington eased out of the pandemic and resumed on-campus classes. CREATE teaching emphasized hybrid participation for access and equity. CREATE co-sponsored five speakers in the design: use: build: (DUB) seminar, which was hybrid or online depending on the speaker, and co-sponsored a distinguished lecture with the Allen School, Microsoft's Jenny Lay-Flurrie. Jen Mankoff taught an accessible course in the CSE Professional Masters program with 18 students who work in local industry. In the coming Fall, Jen will introduce a new undergraduate accessibility course, with 50 students registered. There is no question that interest in accessibility is growing on campus!

TRANSLATION: CREATE organized four community events that expanded our campus and industry connections, including an eSports event and our first workshop on Race, Disability and Technology. We established a Translation Community of Practice through which we have engaged a diverse group of participants including community members, community partners, industry representatives, students, and faculty. This year 563 people engaged with CREATE

through our events and outreach; our membership has grown to 465 individuals spanning 4 continents, 7 countries, 14 U.S. states, and 22 universities. Our community partnerships are thriving with 18 partner organizations in our development pipeline, 11 of which are actively engaged non-profits. Seven research projects successfully utilized this program to connect to community partners for recruitment assistance. In addition to our ongoing partnerships with Microsoft, Google, and Meta, we are happy to announce a new relationship with GitHub and welcome BILLY Footwear as an industry partner. Finally, CREATE's policy efforts have directly impacted federal rulemaking, including a callout of CREATE work on mobile app accessibility in the recently released Department of Justice Notice of Proposed Rulemaking on the ADA's application to digital technology and resources, "Nondiscrimination on the Basis of Disability; Accessibility of Web Information and Services of State and Local Government Entities." CREATE's **writeup explaining this proposed rule** has led to engagement by community partners.

LEADERSHIP: As of June 2023, CREATE has new leadership! Jennifer Mankoff (CSE) will lead CREATE, now as sole Director, with Mark Harniss (Disability Studies) stepping into the role of Director of Education. Translation will be shared with the Taskar Center (led by Anat Caspi) and Kathleen Quin Voss, our Community Engagement and Partnerships Manager. Jacob Wobbrock, former Co-Director with Mankoff, will assume a role as an Associate Director.

FINANCE: CREATE thanks its generous donors. CREATE received a gift of $215,000 this year from the Allen School to support its leadership of the cross-campus initiative on race, disability and technology. In addition, we received significant funding from the Charles Simonyi Foundation and Microsoft that will allow us to further our work in accessible technology.

OVERVIEW

At its core, CREATE is a research center in an R1 university dedicated to making breakthroughs in accessible technology and experiences. CREATE's mission is *"to make technology accessible and make the world accessible through technology."* To this end, CREATE faculty and students continue to pursue high-impact research projects and publish prolifically in top-tier conferences and journals. After three years, CREATE has published about 150 papers, many award winning, containing breakthroughs in accessibility from a variety of fields, including computer and information science, biomechanical and biomedical engineering, occupational and physical therapy, rehabilitation medicine, and disability studies, among others.

RESEARCH MISSION AND VALUES

The core *mission* of CREATE is to produce cutting-edge research discoveries and inventions that address important needs in the disability community, leading the accessible technology field in top academic venues and ultimately impacting products, services, and practices. Within this, we emphasize *values* such as research impact, disability leadership, positive impact on the disability community through synergies with our translation work, inclusion of multiple perspectives, and multidisciplinarity.

RESEARCH PROJECT HIGHLIGHTS

Project Highlight: Generative AI. With the recent rapid rise in Generative Artificial Intelligence (GAI) tools, it is imperative that we understand their impact on people with disabilities, both positive and negative. However, although we know that AI in general poses both risks and opportunities for people with disabilities, little is known specifically about GAI in particular. To address this, seven CREATE members with a variety of disabilities, accessibility needs, and access experience conducted a three-month auto-ethnography exploring uses of existing generative artificial intelligence (GAI) tools for their personal and professional needs (e.g., summarization and information extraction, interpersonal communication support, making content accessible). They found a wide variety of potential accessibility-related uses for GAI, but also risks such as lack of verifiability, missing training data, false promises, and ableism.

Project Highlight: AR/VR. CREATE has new projects emerging in virtual reality (VR) and games, leading to a successful eSports day in Winter 2023. Some highlights include a new, inclusive data set of 3-D gestures by people with motor impairments (Mankoff & Yamagami);

A participant in a VR navigation research project by Ph.D. student Rachel Franz and Jacob Wobbrock performs a task using one hand to stabilize the controller and the other to press the buttons.

a novel AR system for detecting accessibility problems in indoor spaces (Froehlich); a heads-up system for generating "real-world ALT text" (Froehlich); accessible gaming; accessible cooking; and new algorithms for VR navigation for people with motor impairments (Wobbrock). For example, Ph.D. student Rachel Franz, an Apple AI/ML Fellow who is also supported by funding from Meta, built a custom testbed enabling users to

navigate among beacons using a variety of different VR locomotion techniques. It is difficult to know which of hundreds of possible locomotion techniques will be most successful for a user, so Franz and Wobbrock are investigating whether features extracted from a user's VR controller data can be used to predict which technique will be most successful. In another example, Ph.D. student Xia Su is working to help improve the safety and accessibility of indoor spaces by semi-automatically identifying, categorizing, and localizing indoor accessibility and safety issues using LiDAR + camera data, machine learning, and AR (**RASSAR**).

Collaboration Highlight: CREATE and I-LABS continue their joint investigation into early childhood mobility aids and their effects on children's neurological development. The team has completed recruitment of 10 kids and are currently analyzing study data. Additionally, they used CREATE funds to extend this collaboration to support two Ph.D. students on related projects: Nicole Zaino has been investigating the effects of seated and standing powered mobility use and Mia Hoffman has been investigating the effect of steering modifications for powered mobility use, developing a new data-logger for monitoring powered mobility use, and integrating powered mobility data with Jon Froehlich's Project Sidewalk to investigate how environment impacts community use of powered mobility devices for young kids with disabilities. Results were presented at the International Seating Symposium in April, and the American Academy of Cerebral Palsy

Children who participated in the CREATE and I-LABS research study engaged in play sessions where they learned to use the Explorer Mini, the first FDA-approved powered mobility device for children 1-3 years of age.
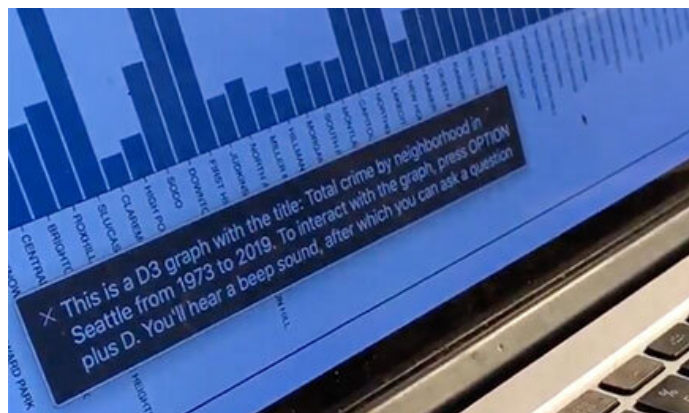
A screen-reader user interacting with a COVID-19 data visualization using VoxLens on their laptop. The laptop screen shows the visualization and the screen reader's response in a textual format.

& Developmental Medicine in Chicago in September. Mia's work was also selected for a student award for the RESNA Summer 2023 conference.

Project Highlight: Two important 2-D information spaces are digital artboards, such as those appearing in Microsoft PowerPoint or Google Slides, and online data visualizations, such as those appearing in the New York Times. CREATE's work in this area has focused on inclusion of blind and low-vision (BLV) users, and includes digital artboards, online data visualizations, streaming data visualizations, tactile graphics, and data science. For example, CREATE Co-Director (now Associate Director) Wobbrock is leading a project to make digital artboards, which are 2-D canvases containing text and objects, accessible. He and his student Zhuohao (Jerry) Zhang created **A11yBoard**, a multi-device multimodal system enabling finger-driven screen-reading, gestures, speech, and search to enable BLV users to both interpret and author their own digital artboards. A11yBoard was published at CHI 2023, and a follow-up field deployment for Google Slides was accepted for ASSETS 2023. Meanwhile, to address online data visualizations, Wobbrock and his student, Ather Sharif, created VoxLens, a Google Chrome plugin that enables speech-based Q&A and sonification of visualizations, including bar charts, line graphs, and geopolitical maps, among others. VoxLens has resulted in multiple publications, including the Best Technical Paper at W4A 2023. Mankoff and her student Venkatesh Potluri have focused on putting data science tools in the hands of BLV users, including support for accessible visualization authoring (UIST 2023).

RESEARCH NEWS

## Research by CREATE Postdoctoral Fellows

Maitraye Das, CREATE NIDILRR ARRT Postdoctoral Fellow, will be moving on to her faculty position this fall as an Assistant Professor in the Khoury College of Computer Sciences and College of Arts, Media and Design at Northeastern University in Boston, MA. During her year-long postdoctoral fellowship, Maitraye has focused on two main research projects in addition to attending seminars, networking, mentoring two Ph.D. students in CSE and HCDE, and successfully submitting conference papers and presenting at ASSETS and CHI. (1) A collaborative project to investigate how people with and without disabilities perform brainstorming activities together using digital whiteboarding technologies, whether they encounter any accessibility challenges in their work, and how existing and new accessible solutions can better support collaborative ideation practices among ability-diverse groups (in collaboration with CREATE postdoctoral fellow Abigale Stangl and faculty Leah Findlater; and (2) A project in collaboration with the Haring Center Experimental Education Unit to investigate whether and how computational kits (e.g., KIBO robots) can foster inclusive play in preschool classrooms that involve children with and without disabilities (ages 3-5 years), and how to develop new accessible solutions to promote a maker mindset and computational thinking among this ability-diverse population (with faculty mentors Heather Feldner and CREATE affiliate faculty Julie Kientz).

Alexandra (Sasha) Portnova has completed her first year as a CREATE NIDILRR ARRT Postdoctoral Fellow, co-advised by Jennifer Mankoff, Heather Feldner, and Kat Steele. She has focused he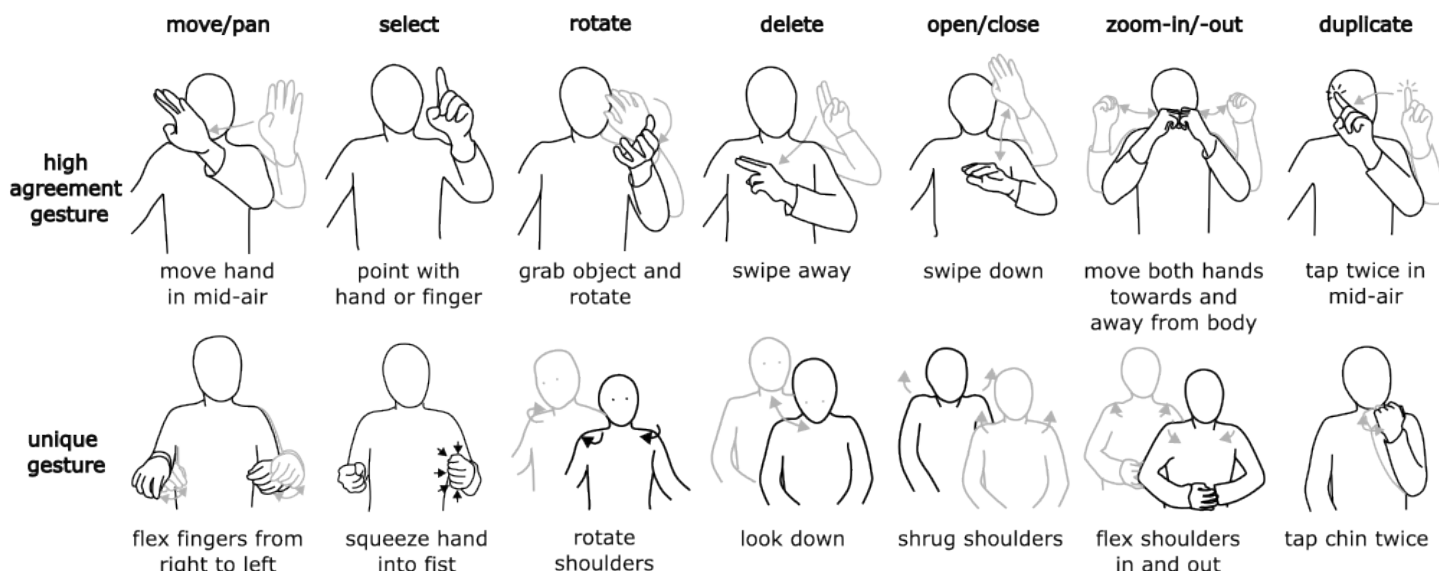r research in the past year on two projects: (1) evaluating smart textiles for accessibility through the development of metamaterials fabricated using an embroidery machine, and (2) evaluating the
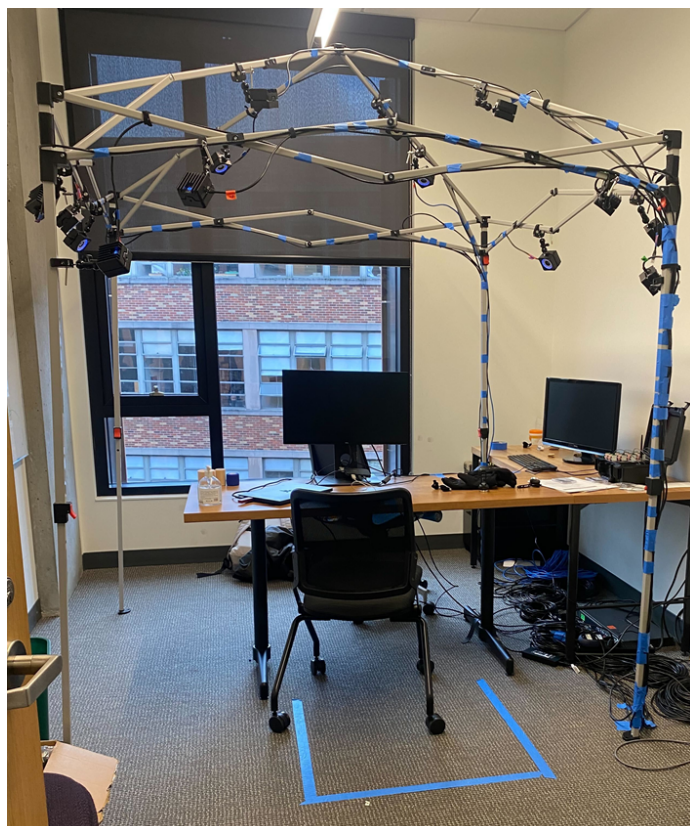
Research participants took part in a hand-tracking study that used a combination of motion capture and infrared camera technology to track hand gestures of people with varying fine motor capabilities. Led by Momona Yamagami and Sasha Portnova, this study aimed to improve accessibility in gesture-based computing.

accessibility of hand-tracking methods through an intensive data collection with individuals with a variety of disabilities. In this work, she has collaborated with Adria Gonzalez and Tracy Jirikowic in Rehabilitation Medicine, who have provided feedback on translation for rehabilitation applications. In the next year, she will be continuing as a ARRT Postdoctoral Fellow and will be focused on connecting with community partners and translation.

Momona Yamagami has been a CREATE Postdoctoral Fellow supported by Meta Research and advised by Jennifer Mankoff. In Fall 2023, she starts as an Assistant Professor of Electrical & Computer Engineering at Rice University as part of the Digital Health Initiative. Her research focuses on modeling and enhancing human-machine interaction (HMI) to support accessibility and health using biosignals and control theory applied to the field of human-computer interaction. In the past

move/pan	select	rotate	delete	open/close	zoom-in/-out	duplicate

high agreement gesture

| move hand in mid-air | point with hand or finger | grab object and rotate | swipe away | swipe down | move both hands towards and away from body | tap twice in mid-air |

unique gesture

| flex fingers from right to left | squeeze hand into fist | rotate shoulders | look down | shrug shoulders | flex shoulders in and out | tap chin twice |

A study led by CREATE postdoc Momona Yamagami (now a professor at Rice University) gathered gestures created by people with motor impairments. The top row of gestures were suggested by many different participants. Gestures on the bottom row were unique to one individual. Our study showed the importance of customizable gesture interfaces.

year, her research has investigated how multi-input biosignals can improve HMI accessibility for new and emerging technology, like virtual reality, and support the health of people with disabilities. She has examined how people with limited movement can personalize and use upper-body gestures for interface design and interactions using wearable sensors and camera technology. Reflecting on her time as a CREATE Postdoctoral Fellow, Dr. Yamagami emphasized, *"Being embedded in the CREATE community and make4all lab has taught me a lot about how to design studies and questionnaires more inclusively, how my research fits into the rest of accessibility research, and how to write about my work for an accessibility audience."*

LOOKING FORWARD

OUR GOALS FROM LAST YEAR included continued research excellence fostered by CREATE, as reflected in our publications, acknowledgements of CREATE support, and CREATE funding of research projects. In addition, we set ourselves the goal of fostering research in the understudied area of Race, Technology and Disability. In this latter category, CREATE has funded two proposals: one looking at equitable transportation and one examining the Black experience of access technologies. Other projects in this space include an ongoing interview study exploring multi-lingual captioning and a case study of best practices for inclusive, intersectional research.

Looking forward, CREATE aims to foster its Research Mission through strategic application of funding to help support growth in priority areas, such as early access to accessibility technologies; and to move the field of accessibility (and CREATE) in important new directions, such as AI+Accessibility and race, disability and technology. This will be combined with enabling activities, such as helping to connect projects with disabled perspectives and study participants (through our translation work); training and supporting accessibility researchers (through our education work); supporting impact on the disability community (through our translation work); supporting fundraising (through both translation and education); and more.

OVERVIEW

CREATE has 216 student members as of academic year 2022-2023. Many of the education efforts from prior years were continued, including the CREATE weekly graduate seminar, Teach Access Study Away, DUB lectures sponsored by CREATE, the postdoc program, student minigrant program, and others. What is new is a stronger relationship with HuskyADAPT, and CREATE is now a significant funder of this student organization. Also, two CREATE graduates, Megan Hofmann (now at Northeastern) and Dhruv Jain (now at the University of Michigan) shared the ACM SIGCHI Dissertation Award.

EDUCATION MISSION AND VALUES

We are working to define our Educational Mission, which is to empower student members, including members with disabilities, to learn about access technology and accessibility research, that they might go on to positively impact research and industry, creating a more accessible world. As part of this effort, we also have developed our Educational Values:

- **Education for Supporting Research:** Our efforts should generally enhance CREATE's core focus on research.
- **Education that is Accessible & Inclusive:** We should ensure that teaching, public talks, and mentoring in CREATE is inclusive of students and faculty with disabilities. We should continue to recruit and support large numbers of students with disabilities in CREATE.
- **Education that Leads Toward Advocacy:** We should not only include, but also advocate for and improve the experience of students with disabilities in CREATE and beyond.
- **Education that Showcases Critical, Intersectional, and Rigorous Teaching:** Our mentoring and coursework should reflect critical and intersectional disability perspectives and should ensure rigor.
- **Education that Nurtures Student Growth:** We should nurture student involvement in research and in CREATE.

EDUCATION NEWS

Passing the Education Baton

Mark Harniss is to become the new CREATE Director for Education, and Richard Ladner is to step down. Mark Harniss is an Associate Professor in the Department of Rehabilitation Medicine and serves as the Director of the University Center for Excellence in Developmental Disabilities (UCEDD) and the Center for Technology and Disability. Until recently, he was the director of the Disability Studies Program but stepped down at the end of the 2022-23 academic year. Mark's professional background lies in special education and instructional technology, but his current focus revolves around knowledge translation, assistive technology, accessible information technology (IT), and disability law and policy. In his role as CREATE Director for Education, Mark

aims to foster collaboration and cooperation between the UW "upper and lower campuses," a distinction that largely represents a divide between the health sciences and the arts and sciences. This work will involve forging connections between CREATE, the Disability Studies Program, the Institute on Human Development and Disability (IHDD), and the Department of Rehabilitation Medicine. Additionally, he intends to expand CREATE's reach by establishing links with important external communities, ensuring that the innovations generated within CREATE are available to these communities. In turn, he envisions that these communities will provide valuable insights to CREATE researchers regarding their specific needs.

- A big thank you goes to **Professor Emeritus Richard Ladner**, one of the CREATE founders and its inaugural Director for Education. Ladner initiated the CREATE Minigrant Program that helps fund small grants up to $2,000 in support of student initiated research projects. During the past three years, he has shepherded 10 minigrants and worked directly with eight Teach Access Study Away students. Through his AccessComputing program, he helped fund several summer research internships for undergraduate students working with CREATE faculty. All CREATE faculty contribute to accessibility related education in their courses, where he provides encouragement. Our thanks to Professor Ladner for his leadership.

CREATE Student Minigrant Recipients:

- **Mia Hoffman and Daniel Campos Zamora (shown below)** from the Department of Mechanical Engineering. Faculty advisors Kat Steele and Heather

Feldner. Title: *Quantifying the Control of Children using Adapted Ride-on Cars: A Comparison of Steering Profiles.*

- **Sherry Wang, Shaun Kalweit, Xing He, and Minjia Yu** from the Department of Human-Centered Design and Engineering. Faculty advisor Daniella Kim. Title: *Exploring Virtual Whiteboard Sessions in Mixed Hearing Environments*.

- **Haotian Wu, Sai Ma,** and **Deeksha Meshram** from the Department of Human-Centered Design and Engineering. Faculty advisors Sarah Coppola and Steven Goodman. Title: *Noise Meter: A Sound Detection Tool for D/deaf and Hard of Hearing Individuals*.

- **Amal Nanavati** from the Paul G. Allen School of Computer Science and Engineering. Faculty advisors Siddhartha Srinivasa and Maya Cakmak. Title: *Understanding User Preferences for a Robot Feeding System*. This work spanned two academic years. The paper based on this work won the Best Design Paper at the 2023 ACM/IEEE International Conference on Human-Robot Interaction.

Graduating CREATE Ph.D.s:

- **Megan Ebers.** Dissertation Title: *Machine learning for dynamical models of human movement*. Advised by Kat Steele and Nathan Kutz. Megan will join the University of Washington as a postdoctoral fellow after graduating in Spring 2023 to pursue clinical translation of her methods to evaluate digital biomarkers to support health and function from wearable data. She was awarded an NSF Graduate Research Fellowship and also received dual M.S. degrees in mechanical engineering and applied math.

- **Elijah Kuska.** Dissertation Title: *In silico techniques to improve understanding of gait in cerebral palsy*. Advised by Kat Steele. Elija will start as a teaching professor at the Colorado School of Mines in the Mechanical Engineering Department in January 2024. While at UW he was awarded the TL1 Translational Research Fellowship.

- **Alyssa Spomer.** Dissertation Title: *Evaluating multimodal biofeedback to target and improve motor control in cerebral palsy*. Advised by Kat Steele. Alyssa is now a Clinical Research Scientist in Rehabilitation Medicine at Gillette Children's Specialty Healthcare in St. Paul, MN. While at UW she held an NSF Graduate Research Fellowship and TL1 Translational Research Fellowship and was chosen as a Husky 100. **Read more about her research here**.

- **Nicole Zaino.** Dissertation Title: *Walking and rolling: Evaluating technology to support multimodal mobility for individuals with disabilities*. Co-Advised by Kat Steele and Heather Feldner. Nicole is headed to Bozeman, Montana to join the Crosscut Elite Training team to work towards joining the national paralympic nordic ski team for Milano-Cortina 2026, while working part-time with academia and industry partners. Papers/awards: National Science Foundation Graduate Research Fellow 2018, Gatzert Child Welfare Fellowship, University of Washington, 2022. Best Paper Award at the European Society of Movement Analysis for Adults and Children, 2019. Finalist for International Society of Biomechanics David Winter Young Investigator Award, 2019.

- **Ricky Zhang.** Dissertation Title: P*edestrian path network mapping and assessment with scalable machine learning approaches*. Advised by Anat Caspi and Linda Shapiro. Ricky will be a postdoc in Bill Howe's lab at the University of Washington Information School.

CREATE Seminar

The CREATE Seminar (CSE 590W) has continued to focus on cutting edge topics such as the intersection of race and disability, and mental health. This year, it was led by graduate students Kelly Mack and Venkatesh Potluri, with support from Jennifer Mankoff. Attendance ranged from 10-15 people, depending on the quarter, including both students, postdocs, and faculty. In fall quarter, the seminar attendees read Keah Brown's book, "The Pretty One," which was an autobiographical exploration of what it means to live at the intersections of blackness, womanhood, and disability. In winter quarter, there was a series of talks by students, postdocs, and visitors on their own

Clinical scientist Alyssa Spomer evaluates real-time feedback from the Biomotum SPARK ankle exoskeleton, which can assist and resist ankle motion to support gait training and rehabilitation.

accessibility research. In spring quarter, there was a series of presentations on recent accessibility research papers.

Other courses that were taught in the 2022-23 academic year that had significant accessibility and disability content:

- **DISST 332 - Disability & Society:** Community and the Outdoors
- **GenSt 297 - Disability 101:** Identity, Education, Careers, Leadership
- **HCDE 315 - Inclusive Design and Engineering**
- **HCDE 515 - Accessibility and Inclusive Design**
- **Immersion Studio (MHCI+D)**
- **PMP - Future of Access Technology**

Jenny Lay-Flurrie (left), Chief Accessibility Officer at Microsoft, speaks about working to make Microsoft accessible during a talk in the Allen School Distinguished Lecture Series.

New undergraduate course:
Accessibility CSE 493

This class asks how computing can enable new solutions to accessibility, including both access to the world and access to computers; and how a disability studies perspective can guide us in developing empowering and relevant solutions to accessibility problems. This course explores both of these questions through a combination of discussions, reading, and building. It will focus on a combination of practical skills, such as how to assess accessibility of documents, websites and apps, and how to do disability-based UX; advanced skills such as how to address accessibility in visualization, AR/VR and AI/ML; and forward-looking topics such as intersectional concerns, accessible healthcare, and accessibility in disaster response. The largest project in the class will be an open-ended opportunity to explore access technology in more depth. We will also cover disability justice and advocacy.

Public Talks

CREATE co-sponsored five accessibility researchers in the "design: use: build:" (DUB) Seminar and one accessibility talk in the Allen School Distinguished Lecture Series.

- **Megan Hoffmann** from Carnegie Mellon University, now faculty at Northeastern University, talked about optimizing medical making for fabrication in healthcare settings.

- **Jason Wiese** from the University of Utah talked about methodological limitations he has encountered in his research group's recent projects, including work with individuals who have had a spinal cord injury and a project examining air quality data with parents of asthmatic children.

- **Maitraye Das** from the University of Washington and Northeastern University talked about the technological, social, and organizational factors that shape accessible collaboration.

- **Nicholas Bolten** from the University of Washington talked about the OpenSidewalks project that is addressing the lack of data that is needed by pedestrians with disabilities when navigating their outdoor environments.

- **Matthew Butler** from Monash University in Australia talked about emerging technologies to support access to visual information for those who are blind or have low vision.

- **Jenny Lay-Flurrie**, Chief Accessibility Officer at Microsoft, talked about her journey and work to make Microsoft accessible.
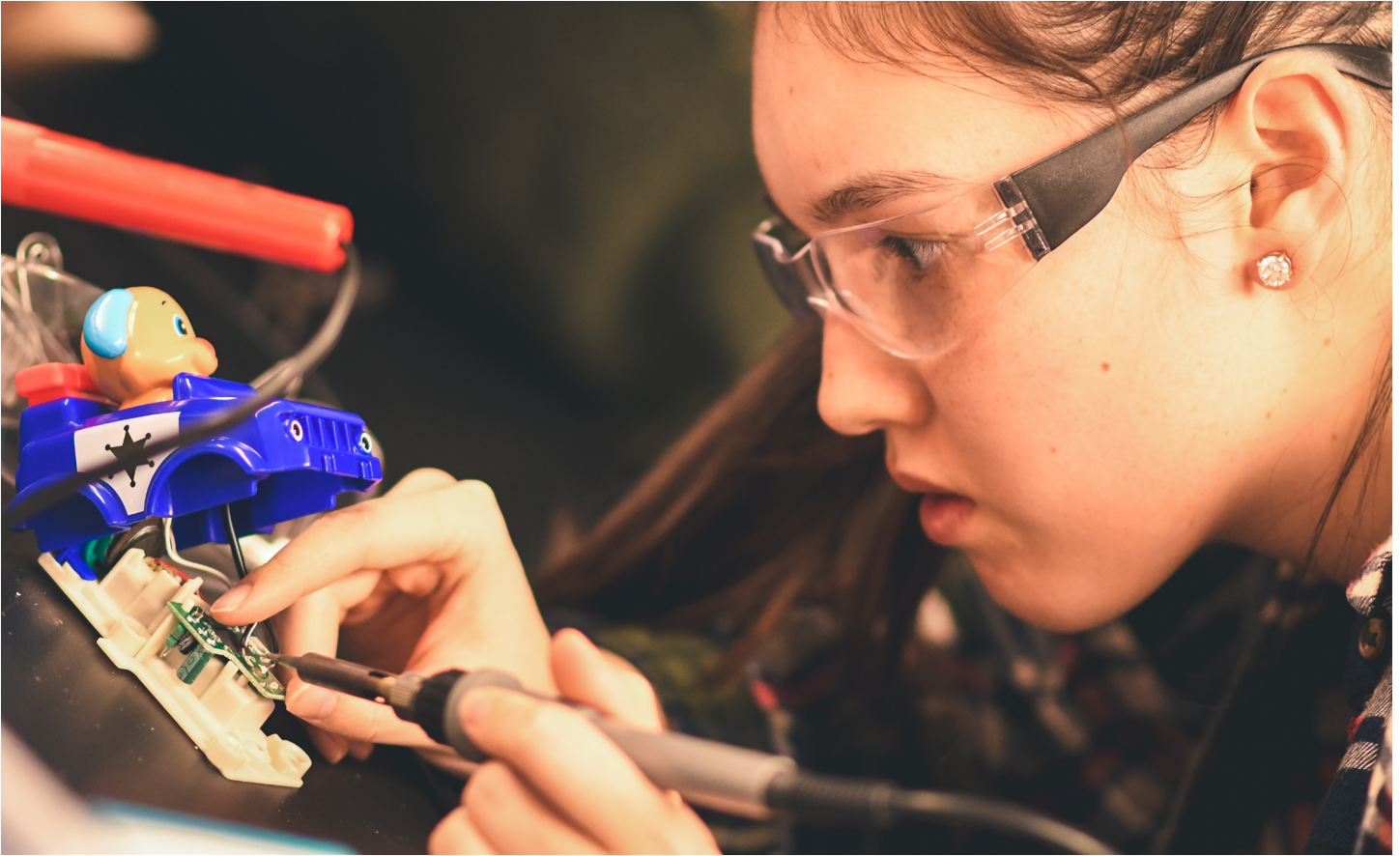
A HuskyADAPT student volunteer solders a circuit board to adapt a toy for a local family. To request an adapted toy, visit https://depts.washington.edu/adaptuw/toy-adaptation/request-adapted-toys/.

HuskyAdapt

HuskyADAPT is a student organization with the goal of fostering an inclusive, sustainable, and multidisciplinary community to support the development of accessible design and play technology. In September 2022, HuskyADAPT entered into a partnership agreement with CREATE to accept significant financial sponsorship from CREATE, resulting in more interaction between CREATE faculty and students in HuskyADAPT. As a result, a design project to develop an open-source wireless switch that can be easily and cheaply reproduced was begun by HuskyADAPT students. HuskyADAPT students mentored 5 design teams this year composed of multidisciplinary teams of UW students and mentored 2 senior capstone design teams in mechanical engineering. Over 160 adapted toys were delivered to families/clinics this year and 196 students and community members were trained in toy adaptation.

In addition, HuskyADAPT and CREATE co-sponsored the Accessible Technology Research Showcase for the community that had over 25 exhibits of student work in accessible technology.

Students in Research

AccessComputing is a National Science Foundation funded project with the goal of increasing the participation of people with disabilities in computing fields. CREATE shares this goal as well. Richard Ladner is the Principal Investigator for AccessComputing. In summer 2022, AccessComputing sponsored or partially sponsored four undergraduate students in research internships with Distributed Research Experience for Undergraduates (DREU) faculty. All these students identified as having a disability.

CREATE collaborated with the Allen School's "Ability" group to hold an event for students with disabilities who are considering entering graduate school.

LOOKING FORWARD

OUR GOALS FROM LAST YEAR included an ongoing commitment to the CREATE seminar; co-sponsoring lectures; enriching activities for CREATE undergraduate and graduate students; and ongoing advocacy for campus accessibility. Some highlights include three awarded Student Mini Grants; six co-sponsored lectures; and our enhanced relationship with HuskyAdapt, which has over 100 active members. Three goals from last year were not met: we gave out one fewer Student Minigrant than last year; we had reduced CREATE participation in the Teach Access Study Away program; and we do not yet have an education degree certificate option in the works. With these accomplishments and needs in mind, we have developed a 1, 3, and 5 year plan for our education efforts.

1-YEAR GOALS

- Engage UW students in CREATE through improved onboarding of new students entering CREATE, continued partnership with HuskyAdapt, continued support of student participation in TeachAccess study away, and encouraging student participation in CREATE Community Days.
- Enhance student educational opportunities related to accessibility by supporting the CREATE seminar and expanding educational offerings for undergraduate students within CREATE departments.
- Explore a community-engagement undergraduate course through the UW Center for Community Engagement and Leadership Education Center, and plan for an accessibility certificate to train designers and developers in accessibility.
- Support student research efforts by mentoring students in CREATE graduate programs, beginning development of training to students in how to positively engage with people with disabilities in research, and promoting and funding Student Mini Grants.
- Explore opportunities for fund-raising and advancement related to educational opportunities for faculty and students, including consideration of Advanced Rehabilitation Research and Training (ARRT) and NSF REU site and Ph.D. training grant opportunities.
- Increase cross-campus collaborations through outreach to initiatives, centers, and departments that have shared interests (e.g., DUB, Institute on Human Development and Disability, Disability Studies Program, Department of Rehabilitation Medicine).
- Initiate development of an evaluation system to identify successes and areas for improvement related to education.

3-YEAR GOALS

- Engage UW students in CREATE through continued attention to onboarding; engagement with student organizations and opportunities; and student mini grants.
- Enhance student educational opportunities by applying for a community-engagement undergraduate course through the UW Center for Community Engagement and Leadership Education Center and applying for a certificate program for training designers and developers in accessibility.

- Support student research efforts with funding and mentoring. Expand this to include opportunities to dialogue about accessibility that increase shared understanding of disability and other identities (e.g., race, gender, sexual orientation).
- Develop plans for managing and maintaining alumni relationships including ongoing communication and engagement with past students.
- Engage in fund-raising and advancement related to educational opportunities by submitting at least two proposals to grant competitions that expand educational opportunities. Work toward funding support for faculty, staff, and students with disabilities.
- Implement cross-campus engagements that support interdisciplinary work on issues related to accessibility and support of faculty, student, and staff with disabilities.
- Trial and iteratively develop an evaluation system.

▶ 5-YEAR GOALS

- Establish a robust, engaged student culture within CREATE where students feel a sense of belonging, ownership, and purpose.
- Implement comprehensive educational programs that support students' professional development.
- Establish a culture and process for accessible, equitable research among CREATE faculty and share it beyond CREATE.
- Establish systems that foster innovation and create research opportunities for undergraduate, graduate, and postdoctoral trainees,
- Establish a reputation for graduating and placing outstanding alumni as accessibility experts into local and national industry and faculty positions and a strong alumni network that continues to support the values and mission of CREATE.
- Establish grants and endowed funds that support faculty, staff, and students (with an emphasis on those with disabilities), including funding training opportunities for post docs, graduate students, and undergraduates.
- Establish a deeply engaged, cross-campus, interdisciplinary community that facilitates rich interactions and opportunities for faculty and students.
- Implement an evaluation system that provides continuous progress monitoring to inform program leaders about necessary improvements.

OVERVIEW

Over the past year, we have successfully organized a series of accessible events that brought together individuals from diverse backgrounds to foster inclusivity and showcase the transformative power of accessible technology in people's lives. Our collaborative efforts with five organizations have allowed us to build strong relationships within the community, enabling us to better understand the technology needs and aspirations of individuals living with disabilities. Furthermore, we take great pride in establishing a vibrant community of practice focused on translation for accessible technologies, fostering knowledge sharing, innovation, and continuous improvement. Our industry affiliates program has grown to include BILLY Footwear and Github. And our policy impact has led to a new relationship with the U.S. Access Board; an invited interview with the Government Accountability Office about biometrics and AI fairness for people with disabilities; and a callout of CREATE work on mobile app accessibility in the recently released Department of Justice *Notice of Proposed Rulemaking* on the ADA's application to digital technology and resources, "Nondiscrimination on the Basis of Disability; Accessibility of Web Information and Services of State and Local Government Entities."

TRANSLATION MISSION AND VALUES

To help increase the impact of CREATE's research on people with disabilities, our translation mission is to increase uptake of CREATE research products—including new knowledge, methods, software, data, and apps in community, industry, and policy settings—and to enhance CREATE research through community and industry input.

In accomplishing these goals, we will emphasize the following translation values:

- **Research-Positive:** Translation should enhance our research and, in turn, be enhanced by our research.
- **Community-Led:** Disability-focused organizations should be informed about, and inform, CREATE's research, from problem definition onward.
- **Disability-Led:** People with disabilities should be invited to guide our work wherever possible.
- **Partner-Positive:** Partners and Affiliates should feel they are gaining from participation in our programs.

TRANSLATION NEWS

Community Engagement

- **Membership:** CREATE's membership has grown substantially over the past year, with a 149% increase in individual engagement and a 106% increase in subscribers to our mailing lists. We have engaged with 563 different individuals and 465 have subscribed to at least one of our communications. Our membership includes individuals spanning 4 continents, 7 countries, 14 U.S. states, and 22 different universities.
- **Events:** We have hosted a variety of events this past year and, to ensure accessibility for the largest number of participants, have embraced the hybrid model whenever possible. Our newly formed Translation Community of Practice, co-sponsored by the Taskar Center, hosted two events that featured unique, expert voices on the process and challenges encountered in the translation of accessible technology from the lab to sustainable,

Visitors at CREATE's Accessible eSports Showcase play games using adapted controllers and other accessible technology.

commercial production. This winter, CREATE joined forces with six campus partners to kick off the start of the Race, Disability & Technology Initiative. This cross-campus initiative sought to build community connections and cross-disciplinary collaborations that support research on the experiences, outcomes, technology needs, and opportunities available to people of color with disabilities. This spring, we hosted an Accessible eSports Showcase event that brought together members of the CREATE community, local community organizations, tech and games corporate partners, and folks from all over the Seattle area looking to learn about and celebrate strides being made in making video games more inclusive and accessible to people with disabilities. CREATE and HuskyADAPT teamed up to present a Spring Research Showcase that provided the opportunity for the community to explore the work being done at the UW around accessibility.

Partnerships

- **Community:** We have a total of 18 organizations currently in our partnership development pipeline, and are actively engaged with 11 local/regional community nonprofits. This represents a 550%

Read our community spotlight on The Here and Now Project

increase from a year ago. In the past year, our partnerships have enabled us to provide targeted study recruitment assistance to seven researchers, secure subject matter experts for panels, expand informational offerings to participants at events, and tangibly demonstrate community support for our grant efforts. In turn, we have been able to support the missions of our community partners by providing content for community newsletters, accessibility audits of websites with

suggestions for improvements, connections to other local organizations, speakers for conferences, and visibility for their organizations through our partner webpage and the new "Partner Spotlight" feature in our quarterly digest.

- **Campus:** We continue to maintain close ties with our campus partners. The Race, Disability & Technology Initiative provided an opportunity not only to work closely with our current campus partners but to expand our visibility and reach within the UW. Our new connections to the Simpson Center for the Humanities, the Population Health Initiative, and the Buerk Center for Entrepreneurship have the potential to create additional opportunities for collaboration and increase our reach by providing new avenues for dissemination. Our campus partners also contributed to our grant efforts, which were primarily funded by a large donation from the Allen School.

- **Industry:** CREATE continues to engage its industry partners through special invitations to events, opportunities to connect with researchers at various stages of both professional and project development, and by providing top-level relationship management. In addition to our ongoing partnerships with Microsoft, Google, and Meta, we are happy to announce a new relationship with GitHub and welcome BILLY Footwear to our industry affiliates program.

Industry Impact

- CREATE's Soundwatch project has impacted watch-based software provided by Apple and Google. Also, CREATE's **study of 10,000 Mobile Apps** impacted Google's accessible app design documentation. Through our partnership with the Taskar Center, CREATE worked with Amazon

employees and Nintendo to increase accessibility capacity.

Policy

- In the course of developing a recent NIDILRR RERC proposal, CREATE began to develop relationships with groups that can support policy and advocacy, putting together an "inclusion consortium" that includes the U.S. Access Board, the Consumer Technology Association, Google, and Meta.

- CREATE faculty have continued to write and disseminate advocacy oriented pieces, including an RFI response on **centering accessibility and patient-centered care for people with multiple chronic conditions** and an RFI response on **data equity**.

- In 2021, CREATE, in collaboration with representatives of the **Trace Center**, submitted a response to the **Science and Technology Policy Office**'s request for "Information on Public and Private Sector Uses of Biometric Technologies" (See our **full response on Arxiv**). Because of this response, in Spring of 2023, our team was invited to participate in an interview on this topic with the **U.S. Government Accountability Office**, who are developing a summary of concerns with Biometrics that will be used by policy makers in deciding on next steps.

- CREATE co-founders James Fogarty and Jacob O. Wobbrock, along with Ph.D. alum Anne Spencer Ross (now at Bucknell), were cited for their **work studying the accessibility of 10,000 mobile apps** in the recently released Department of Justice Notice of Proposed Rulemaking on the ADA's application to digital technology and resources, "**Nondiscrimination on the Basis of Disability; Accessibility of Web Information and Services of State and Local Government Entities.**" CREATE's **writeup explaining this proposed rule and how to comment on it** has led to engagement by community partners.

LOOKING FORWARD

IN THE LAST YEAR, CREATE MET ITS GOAL of bringing research technologies to the attention of industry, community, and policy leaders as well as developing its community partnerships and industry affiliates. We have continued to grow our industry affiliates program and our impact on policy. We have begun work on establishing a community of practice where we can learn together about translation and have held multiple successful events that have engaged industry and community such as the eSports event in winter 2023. With these accomplishments and needs in mind, we have developed a 1, 3, and 5 year plan for our translation efforts.

▶ 1-YEAR GOALS

- Establish a process, rhythm, and goals for translation events.
- Regularly post accessible, plain-language summaries on the CREATE website of key research results and open-source software releases.
- Actively train CREATE students about translational work and safe, disability-positive approaches to participant engagement.
- Develop a tiered structure for community partner/affiliate engagements.
- Establish regular meetings of key stakeholders including members of the Community Partners and Industrial Affiliates Programs.
- Establish structure, goals, and expectations for campus partnerships that support our translation and research missions.

▶ 3-YEAR GOALS

- Develop a recruitment pool for studies with human participants.
- Establish a mentorship program between stakeholders from the disabled community and researchers.
- Retain and expand our industrial affiliates, campus partnerships, and community partners.

- Expand our plain-language summaries into a "research impact database" for use in discussions with policy makers.
- Develop a regular assessment rhythm for obtaining and incorporating feedback about successes and areas for improvement.

▶ 5-YEAR GOALS

- Enhance research activities through an established culture and process around connecting disabled leaders as mentors with projects.
- Firmly establish our partner program and industrial affiliates program with clear engagement protocols. Affiliates/partners participate in events and both researchers and affiliates/partners see value in the program.
- Positively impact CREATE's reach across campus and into the wider community through co-sponsorship and/or other campus partnership activities.
- Increase the real-world impact of our research through an established process for communicating research results that might impact technology and policy to industrial affiliates, other translation partners, and policy-setting groups, such as the U.S. Access Board, based on our research impacts.
- Establish a regular process for assessing our translation work.

Operations

OVERVIEW

CREATE INCREASED THE FUNDING going toward both our community partnership program (moving Kathleen Quin Voss from half-time to full-time) and toward communication (moving Liz Diether-Martin to a consistent half-time commitment). We also put aside funds specifically to hire a staff director to support center operations in AY 2023-2024 and beyond. CREATE thanks its donors for their generous support in the last year, which included $215,000, primarily from the Allen School but with additional contributions from the Race & Equity Initiative, and from the Population Health Initiative. This gift is specifically targeted to support our new grant effort at the intersection of race, disability and technology. Donations also included $500,000 from Microsoft and $14,910 from additional private donors, including a donation by Mankoff to create a new fund of $5,000 to support students and faculty with disabilities.

OPERATIONS MISSION AND VALUES

CREATE's *operations mission* should support its overall mission and values, including increasing CREATE's research, translation, and education impact and building a strong and multidisciplinary community of accessibility researchers at the UW. Our operational values are:

- **Transparent and Empowering:** People in CREATE are able to see and feel empowered to contribute to decision-making and leadership.
- **Inclusive:** People who want to be part of CREATE and its mission should be included in CREATE. CREATE ensures that people with disabilities and other marginalized identities feel included and supported.
- **Enriching:** CREATE helps make opportunities for interdisciplinary work and encourages research that is greater than any individual project.

OPERATIONS NEWS

Strategic planning

- CREATE spent time this summer developing a strategic plan based on the feedback we received through our advisory board meeting. This plan was initially developed by Director Mankoff and then shared with the other directors for input and feedback through a series of 1:1 meetings.
- CREATE also spent time this year trying to ensure that the founding faculty members were in agreement about the roles and responsibilities of our staff, to ensure that they were meeting and supporting all faculty. This is an ongoing process that we will continue to do on a yearly basis as the center moves forward.

Communications

New communications goals were defined in AY 2022-2023. Foremost was publicizing events and work by CREATE and its members and partners. CREATE staff was essential in publicizing events such as the **Race, Disability & Technology seminar** and Accessible eSports events. We increased the frequency and value of newsletters, adding regular spotlights on student and faculty research (**A11yBoard - Digital Artboards Accessible to Blind and Low-Vision Users**), open source accessibility tools, and our community partners (for example, the **Here and Now Project Community Spotlight**). We have increased our social media presence on Twitter and LinkedIn.

CO-DIRECTOR WOBBROCK: FROM VISION, TO LAUNCH, TO SUSTAINABLE LEADERSHIP

It was back in June 2019 that Jacob O. Wobbrock, CREATE's founding Co-Director (along with Jennifer Mankoff), was on a panel discussion at Microsoft's IdeaGen 2030 event, where he talked about ability-based design. Also on that panel were future CREATE Associate Directors Kat Steele and Heather Feldner. After the event, they talked with Microsoft Research colleagues, particularly Dr. Meredith Ringel Morris, about the possibility of founding an accessible technology research center at the University of Washington. The UW has had more activity in this research space than any other university worldwide for a number of years, but faculty have always been on their own or working in small teams. Wobbrock and Steele thought that a center could bring faculty together and make them more than the sum of their parts.

Within a few months, Wobbrock returned to Microsoft with Jennifer Mankoff, Richard Ladner, and Anat Caspi to pitch Microsoft's Chief Accessibility Officer, Jenny Lay-Flurrie, on the idea of supporting the new Center for Research and Education on Accessible Technology and Experiences (CREATE). With additional support from Microsoft President Brad Smith, and input from Dr. Morris, the center was launched by Smith and UW President Ana Marie Cauce at Microsoft's Ability Summit in Spring 2020. Wobbrock, along with Mankoff, served as CREATE's inaugural Co-Directors until the present time, when Wobbrock now steps down into an Associate Director role, with Mankoff leading CREATE as sole Director.

"I'm a founder by nature," Wobbrock said. "I helped start DUB, the MHCI+D degree, a startup called AnswerDash, and then CREATE. I really enjoy establishing new organizations and seeing them take flight. Now that CREATE is soaring, it's time for more capable hands than mine to pilot the plane. Jennifer Mankoff is one of the best, most capable, energetic, and visionary leaders I know. She will take CREATE into its next chapter, and I can't wait to see what she does. Also," Wobbrock added, "I'm not going anywhere. I'll still be very active with the center." CREATE thanks Wobbrock for his founding energy and service in helping to launch the center.

Leadership

CREATE's leadership team has also changed substantially. Founding Co-Director Jacob Wobbrock has stepped down **(see above)**. Also stepping down are Richard Ladner from the Director for Education role, with Mark Harniss to take over, and Anat Caspi, from the Director for Translation role, with her duties to be distributed across Mankoff, Quin Voss, and the Taskar Center, which Caspi directs. CREATE thanks Ladner and Caspi for their founding vision and service.

Finances

CREATE currently has close to $3M in available funds. We have focused our financial planning on a 5-year projection exploring what our center can accomplish.

EXPENSES

CREATE's primary expenses are salary and research funding. This includes:

- Full-time support for Quin Voss (and our Director of Operations (once hired) and half time support

for Diether-Martin, in addition to a small amount of salary support for the Director and Director of Education, as well as about 2 postdocs each year (through our training grant).

- Funding for student research (~$15,000/year), translation (up to $10,000), faculty research in the form of matching money (up to $15,000) and seed funding (up to $40,000) requests; and the Race, Disability and Technology program (which provides seed money of $15,000 and more extended funding of $35,000, plus community partner support).

We have a few miscellaneous expenses including events, stipends for community and advisory board members; and other smaller expenses.

INCOME

CREATE's primary regular source of income at the moment is industry gifts, for which we are aiming for $50,000 per year (total). We are hoping to increase this.

We are also working to diversify our funds by applying for:

- Additional training grants (REU and Ph.D. level).
- Center-level grants.
- Additional private donor grants.

LOOKING FORWARD

IN THE LAST YEAR, CREATE HAS HAD SIGNIFICANT SUCCESS in adding definition to its translation and educational offerings as well as its communication plan. In addition, it has successfully gone through some significant transitions in leadership. From a funding perspective, we have worked very hard to raise a diverse set of funds in support of CREATE. Our successes include significant private donations and was the launch of the cross-campus collaboration on Race, Disability and Technology, which led to internal donations of $215,000 from the Allen School, the Race & Equity Initiative, and the Population Health Initiative. With this in mind, we have the following 1, 3 and 5 year plan.

▶ 1-YEAR PLAN

- Improve student sense of belonging through initiatives such as a meeting with the Director, and define Ph.D. student-facing services such as conference funding and participant engagement support.
- Know with some specificity the concerns of our members with disabilities.
- Establish a structure for core and affiliate faculty and postdocs that is not tied only to founding status and ensure that everyone who wants to engage in CREATE and CREATE faculty meetings feels welcome with explicit qualifications and service expectations.
- Improve transparency about how CREATE funds its faculty and who can apply.
- Submit one or more funding applications that add to the diversity of CREATE's funding base.
- Hire a staff Director of Operations.

▶ 3-YEAR PLAN

- Develop onboarding documents and plans.
- Establish procedures for inclusion of members with disabilities and other underrepresented groups.
- Develop a process for onboarding undergraduate researchers (possibly as part of a funded REU site).
- Develop programming that can bridge areas and encourage multidisciplinary collaboration, such as a "CREATE labs" tour. Explore options for creating an inclusive shared physical space for disability research on campus.
- Successfully bring in new money to CREATE that diversifies its funding base.
- Establish a clear process for CREATE faculty and student funding including expectations and values for who can apply, when to apply, and what will be competitive.

▶ 5-YEAR PLAN

- Formulate a robust and flexible plan for funding the center at $2M/year.
- Positively impact our members via our disability inclusion policies, with other disability-serving groups adopting them.
- Establish clear and ongoing support mechanisms for funding CREATE faculty research.
- Establish an endowed fund for encouraging participation in academia by people with disabilities.
- Delineate pathways for participation by undergraduate and graduate students, postdocs, and faculty who want to be part of CREATE.
- Cultivate an active community that bridges research, translation, policy, and social spheres.
- Secure an inclusive, shared physical space that furthers our mission and develops community.