Danielle Bragg

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Research Interests

Human-Computer Interaction; Applied Machine Learning; Accessibility

Education

Ph.D., M.S., University of Washington, Seattle, WA   2013-2018
    Computer Science & Engineering.
    Dissertation: "Expanding Information Access Through Data-Driven Design"
    Advisor: Richard Ladner

A.B., Harvard University, Cambridge, MA   2006-2010
    Applied Mathematics, *cum laude*.
    Honors thesis: "Quantification and Display of Emotions in Music"

Positions

Microsoft Research, New England Cambridge, MA   2018-present
Senior Researcher   (Feb 2020-present)
Postdoctoral Researcher   (Jul 2018-Feb 2020)
Leading a set of projects to improve information access, especially for users with disabilities. Managed multiple engineers and mentored interns and younger researchers. Partnered with academics, local communities, and Microsoft's research and product divisions.

University of Washington, Computer Science & Engineering Seattle, WA   2013-2018
Research Assistant
Designed, developed, and analyzed novel systems to make information more accessible to people with disabilities, in particular sign language users and low-vision readers.

Microsoft Research, New England Cambridge, MA   summers 2015 & 2016
Research Intern
Designed, implemented, and evaluated radically new letterforms, some involving animation, to improve text legibility for low vision. Used participatory design and crowdsourcing to iterate on and optimize designs. Proposed new methods for evaluating legibility and learnability.

Microsoft, Bing Bellevue, WA   summer 2014
PM Intern
Improved autosuggest results for app queries. Responsibilities included understanding infrastructure, analyzing opportunity, partnering with other teams, and designing and executing a solution.

Princeton University, Department of Computer Science Princeton, NJ   2011-2012
Research Assistant
Led several computer music projects, including development of end-user tools for building customized digital musical instruments, and modeling and analysis of scheduling algorithms for data flow within digital musical instruments.

George Washington University, Computer Science Networking Lab Washington, DC   2010-2011
Research Assistant
Designed and analyzed graph algorithms, including event detection protocols for networks with limited resources, data transmission scheduling between sensor nodes and base stations, and modeling and solving relationships between students and mastered topics for an e-learning system.

University of Southern California, Department of Computer Science Los Angeles, CA   summer 2009
Undergraduate Research Assistant
Selected to participate in an NSF REU program. Improved system performance of heterogeneous peer-to-peer networks for video-on-demand. Designed and analyzed schemes directing data requests.

Honors

Project Funding, Microsoft AI for Accessibility & Microsoft Research Outreach ($199k)   2021
  Awarded in support of a citizen science platform designed to collect state-of-the-art sign language datasets while providing direct benefits to the community.

Honorable Mention, ACM CHI   2021
  Awarded to a first-author paper publication. Given to "honor the top 5% of conference submissions" to the premier HCI computer science conference.

Best Paper, ACM ASSETS   2019
  Awarded to a first-author paper publication. Given to a single group of co-authors "judged by an awards committee to have written the best paper appearing in the ASSETS conference proceedings."

Site Category Winner, Microsoft Hackathon   2019
  Won the NERD site award "We'll all be working for you someday" with a group of high school interns.

Innovation Award Winner, Microsoft Ability Summit   2019
  Cross-company award in recognition of "the highest bar for leadership, advocacy and passion for accessibility and inclusion." Selected for one of 5 awards, out of 146 nominated projects.

First Place, New England Machine Learning Accessibility Hackathon   2018
  Led a team on an ASL Scattergories game to collect a sign language translation database, which won first place. Provided the project idea for a second team, which won the "People's Choice Award."

National Center for Women & Information Technology (NCWIT) Collegiate Award ($2.5k)   2017
   Awarded to women in computer science for technical contributions to creative, impactful projects.

Harlan Hahn Endowment Fund Grant ($2.5k)   2017
   Awarded to students/faculty at UW in support of work intersecting with Disabilities Studies.

Judith M. Runstad - Wells Fargo Washington Women's Roundtable Scholarship ($6.5k)   2017
   Awarded to 1 female UW graduate student in science/business showing commitment to the community.

Microsoft Research Graduate Women's Scholarship ($17k)   2012
   Awarded to 10 female PhD students in North America in support and recognition of studies and work.

Harvard College Research Program Award   2009
   Stipend in recognition and support of honors thesis research.

NSF Research Experience for Undergraduates Participant   2009
   Fully-funded summer research program. Mentor: Prof. Golubchik at University of Southern California.

Conference Papers

1. D. Bragg, A. Glasser, F. Minakov, N. Caselli, W. Thies. "Building Representative Sign Language AI Datasets: A Citizen Science Approach." In submission.

2. E. Maris, K. Wagman, R. Bergmann, D. Bragg. "InterAct: A Social Thinking Tool for Tech Workers." In submission.

3. K. Mack, M. Das, D. Jain, D. Bragg, J. Tang, A. Begel, E. Beneteau, J. Davis, A. Glasser, J. Park, V. Potluri. "Mixed Abilities and Varied Experiences: A Group Auto-Ethnography of a Virtual Summer Internship." ASSETS 2021.

4. D. Bragg, N. Caselli, J. W. Gallagher, M. Goldberg, C. Oka, W. Thies. "ASL Sea Battle: Gamifying Sign Language Data Collection." CHI 2021. **Honorable Mention**.

5. A. Sarkar, S. Rintel, D. Borowiec, R. Bergmann, S. Gillett, D. Bragg, N. Baym, A. Sellen. "The Promise and Peril of Parallel Chat in Video Meetings for Work." CHI 2021.

6. J. Park, D. Bragg, E. Kamar, M.R. Morris. "Designing an Online Infrastructure for Collecting AI Data From People With Disabilities." FAccT 2021.

7. D. Bragg, O. Koller, N. Caselli, W. Thies. "Exploring Collection of Sign Language Datasets: Privacy, Participation, and Model Performance." ASSETS 2020.

8. L. Berke, W. Thies, D. Bragg. "Chat in the Hat: A Portable Interpreter for Sign Language Users." ASSETS 2020.

9. D. Bragg, M.R. Morris, C. Vogler, R. Kushalnagar, M. Huenerfauth, H. Kacorri. "Sign Language Interfaes: Discussing the Field's Biggest Challenges." CHI 2020.

10. K. Mack, D. Bragg, M. Morris, M. Boss, I. Albi, A. Monroy-Hernández. "Social App Accessibility for Deaf Signers." CSCW 2020.

11. D. Bragg, O. Koller, M. Bellard, L. Berke, P. Boudrealt, A. Braffort, N. Caselli, M. Huenerfauth, H. Kacorri, T. Verhoef, C. Vogler, M. Morris. "Sign Language Recognition, Generation, and Translation: An Interdisciplinary Perspective." ASSETS 2019. **Best Paper**.

12. D. Bragg, R. Kushalnagar, R. Ladner. "Designing an Animated Character System for American Sign Language." ASSETS 2018.

13. D. Bragg, C. Bennett, K. Reinecke, R. Ladner. "A Large Inclusive Study of Human Listening Rates." CHI 2018.

14. D. Bragg, S. Azenkot, K. Larson, A. Bessemans, and A. Kalai. "Designing and Evaluating Livefonts." UIST 2017.

15. D. Bragg, S. Azenkot, and A. Kalai. "Reading and Learning Smartfonts." UIST 2016.

16. D. Bragg, N. Huynh, and R. Ladner. "A Personalizable Mobile Sound Detector App Design for Deaf and Hard-of-Hearing Users." ASSETS 2016.

17. D. Bragg, K. Rector, and R. Ladner. "A User-Powered American Sign Language Dictionary." CSCW 2015.

18. D. Bragg "Synchronous Data Flow Modeling for DMIs." NIME 2013.

19. D. Bragg, M. Yun, H. Bragg, H.-A. Choi. "Intelligent Transmission of Patient Sensor Data in Wireless Hospital Networks." AMIA Symposium 2012.

20. M. Yun, D. Bragg, A. Arora, H.-A. Choi. "Battle Event Detection Using Sensor Networks and Distributed Query Processing." IEEE INFOCOM 2011.

21. Y. Zhou, D. Bragg, M. Yun, H.-A. Choi. "On Data Transmission Scheduling considering Switching Penalty in Mobile Sensor Networks." IEEE INFOCOM 2011.

22. Y. Yang, A. Chow, L. Golubchik, D. Bragg. "Improving QoS in BitTorrent-like VoD Systems." IEEE INFOCOM 2010.

Journal Papers

23. D. Bragg, N. Caselli, J. Hochgesang, M. Huenerfauth, L. Katz-Hernandez, O. Koller, R. Kushalnagar, C. Vogler, R. Ladner. "The FATE Landscape of Sign Language AI Datasets: An Interdisciplinary Perspective." TACCESS 2021.

24. D. Bragg, K. Reinecke, R. Ladner. "Expanding a Large Inclusive Study of Human Listening Rates." TACCESS 2021.

Conference Posters

25. D. Bragg, J. Fogarty, S.-I. Lee. "Score-Based Structure Learning of Gene Regulatory Networks with Expert Biologist Input." WiML Workshop co-located with NIPS 2013.

26. D. Bragg, M. Yun, H. Bragg, H.-A. Choi. "Game Theoretical Approach to Scheduling Transmission of Data for Hospital Patients." Tel Aviv International Workshop on Game Theory 2011.

Technical Reports

27. S. Gillett, D. Bragg, N. Baym, R. Bergman, A. Sarkar, A. Sellen, S. Rintel. "Parallel Meeting Chat Guide for Moderators and Participants: Drawing on Findings from Microsoft Employees During Covid-19." Technical Report 2021-02-FOW-SIM2. Microsoft Research.

Theses

28. D. Bragg. "Expanding Information Access Through Data-Driven Design." Ph.D. Thesis. University of Washington, Computer Science & Engineering. 2018.

29. D. Bragg. "Quantification and Display of Emotions in Music." Undergraduate Honors Senior Thesis. Harvard University, Department of Applied Mathematics. 2010.

System & Demo Launches

1. **ASL Citizen** (`https://community.aslgames.org`) - A citizen science website that enables the community to contribute sign language videos to larger, more diverse corpora, to advance sign language recognition and translation.

2. **ASL-Search** (`https://asltoenglish.org`) - A feature-based ASL-to-English dictionary that learns from user queries. Experiments show ASL-Search improves with use and reliably finds signs for users with varied ASL fluency.

3. **ASL-Flash** (`https://aslflash.org`) - A website that both helps students learn ASL and provides featural data on signs. The featural data gathered helps build the ASL-Search dictionary (above).

4. **Smartfonts Demo** (`https://danibragg.com/smartfonts.html`) - A web demo of Smartfonts, radical new scripts that leverage shape, color, and animation to improve legibility, enhance privacy, and enrich the reading experience. Simulates low-vision to demonstrate potential legibility benefits.

5. **Animated SI5S Demo** (`https://danibragg.com/animated_si5s.html`) - A web demo of our Animated SI5S prototype, the first animated sign language character (writing/reading) system. Animation can more naturally represent sign movements, providing potential learning/reading benefits.

6. **Smartfonts Browser Extension** (retired) - A Chome/Chromium Edge browser extension that renders all browser text in the Smartfont of the user's choice. Supports multi-colored and animated scripts.

7. **Smartfonts Learning Game** (retired) - A web game to help people learn Smartfonts more easily, including multiple levels and varied learning activities.

Select Presentations

1. Talk: **Sign Language Projects at MSR-NE**   2021
   Microsoft Accessibility Roundtable
   Redmond, WA (virtual)

2. Panelist: **Hot Topics in Sign Language + Technology** 2021
   Gallaudet University, CREST FEST
   Washington, DC (virtual)

3. Talk: **Building Systems in Support of Sign Language Users and Low-Vision Readers** 2021
   SUITCEYES Deafblind Research Symposium
   European Union (multiple countries, virtual)

4. Panelist: **Bridging the Gap from Research to Product Development** 2021
   SUITCEYES Deafblind Research Symposium
   Redmond, WA (virtual)

5. Conversation mediator: **HCI Research at Microsoft – Scaling Impact and Building Tomorrow** 2021
   (with Kenton O'Hara & Jacki O'Neill)
   CHI Conference
   Yokohama, Japan (virtual)

6. Panelist: **Accessibility Work in the Industry** 2021
   University of Washington, Accessibility Seminar
   Seattle, WA (virtual)

7. Talk: **ASL Sea Battle: Gamifying Sign Language Data Collection** 2021
   Stanford University, HCI Seminar
   Palo Alto, CA (virtual)

8. Session chair: **Responsible Gaming** 2021
   Microsoft AI Gaming Research Summit
   Redmond, WA (virtual)

9. Talk: **What has research uncovered so far in AI and sign language?** 2020
   (joint with Chris Sano)
   Gallaudet University
   Washington, DC (virtual)

10. Talk: **Building Accessible Information Systems: A Data-Driven Approach** 2019
    Microsoft Research New England, Colloquium
    Cambridge, MA

11. Talk: **Building Accessible Information Systems: A Data-Driven Approach** 2019
    Tufts University, Computer Science Colloquium
    Boston, MA

12. Panelist: **Interdisciplinary AI: Bringing AI to New Domains** 2019
    New England Women in AI Workshop, IBM Research
    Cambridge, MA

13. Keynote & live demo: **Sign Language Recognition & Translation Overview** 2019
    (joint with Mary Bellard)
    Microsoft Ability Summit, Main Stage
    Redmond, WA

14. Talk: **Where are we going next?** 2019
    Microsoft Ability Summit, Breakout Session on Innovating Through the Lens of Disability
    Redmond, WA

15. Talk: **Crowdsourcing Sign Language Data through Educational Resources and Games** 2019
    Microsoft AI for Accessibility Sign Language Recognition & Translation Workshop
    Redmond, WA

16. Talk: **Crowdsourcing Sign Language Data through Educational Resources and Games** 2019
    Gallaudet University
    Washington, DC

17. Talk: **ASL-Search: A User-Powered American Sign Language Dictionary** 2019
    University of Chicago Automatic Recognition & Analysis of American Sign Language Workshop
    Chicago, IL

18. Booth (demo & poster): **Accessible Information Systems: A Data-Driven Approach** 2019
    Microsoft TechFest, a selective yearly cross-company research show
    Redmond, WA

19. Talk: **Expanding Access to Language through Data-Driven Design** 2018
    Hungarian Academy of Sciences, Computer Science Institute
    Budapest, Hungary

20. Talk: **Building Accessible Information Systems: A Data-Driven Approach** 2018
    UC San Diego, Design@Large series
    San Diego, CA

21. Talk: **Building Accessible Information & Communication Systems: A Challenge to Tradition** 2018
    Adobe Research
    Seattle, WA

22. Talk: **Building Accessible Information Systems: A Data-Driven Approach** 2018
    Microsoft Research New England
    Cambridge, MA

23. Talk: **Reimagining Communication: A Data-Driven Approach** 2018
    Snap Research
    Los Angeles, CA

24. Talk: **A User-Powered American Sign Language Dictionary** 2015
    Google Kirkland
    Kirkland, WA

Teaching Experience

University of Washington CSE 441 - HCI teaching assistant 2018
Led labs, guided student projects, and graded assignments for UW's undergraduate advanced human-computer interaction (HCI) course.

University of Washington CSE 446 - ML teaching assistant 2013
Helped teach and prepare materials for CSE 446, UW's undergraduate Machine Learning (ML) course.

Princeton COS 436 - HCI course designer 2012
Helped design and create materials for Princeton's first human-computer interaction (HCI) course.

Professional Activities

Program Committee member (AC)
ACM CHI, Conference on Human Factors in Computing 2021
ACM ASSETS, Conference on Computers and Accessibility 2019, 2020, 2021
ACM UIST, Symposium on User Interface Software and Technology 2019

Peer reviewer 2015-present
ACM CHI, Conference on Human Factors in Computing
ACM ASSETS, Conference on Computers and Accessibility
ACM UIST, Symposium on User Interface Software and Technology
ACM TACCESS, Transactions on Accessible Computing
IFIP INTERACT, International Conference on Human-Computer Interaction
IEEE Transactions on Image Processing
Elsevier Computers & Graphics

Grant proposal reviewer 2018-present
Help evaluate proposals to AI for Accessibility, Productivity Research, and other programs.

ASL + AI: A Future-Casting Competition 2020
Proposed and co-organized a student competition on the future of AI for signing communities, in collaboration with Microsoft AI for Accessibility and Gallaudet University.

Microsoft AI for Accessibility Sign Language Recognition & Translation Workshop 2019
(Joint with Mary Bellard and Meredith Ringel Morris)
Co-organized a large academic workshop with interdisciplinary leaders. Resulted in a Best Paper publication, and Ability Summit award.

MSR-NE postdoc lunch organizer 2018-2019
Initiated and organized monthly lunches for MSR-NE postdocs to foster community.

Mentoring and Management

Students and interns
Soya Park (MIT, MSR PhD intern) 2021
Nina Tran (University of Washington, MSR undergrad intern) 2021
Federico Llarena (MSR Research Assistant) 2020-2021
Abraham Glasser (Rochester Institute of Technology, MSR PhD intern) 2020
Adina Bechhofer (MIT, MSR undergrad intern) 2020
Joon Park (Stanford University, MSR PhD intern) 2020
Brianna Bagdon (University of Washington, AccessComputing outreach program intern) 2020
Larwan Berke (Rochester Institute of Technology, MSR PhD intern) 2019
Kelly Mack (University of Washington, intern) 2018

Engineers managed
Fyodor Minakov (MSR contractor, 10+months, ongoing) 2020-2021
Swathi Tella (Microsoft AI for Accessibility contractor, 15 months) 2019-2020
John Gallagher (MSR contractor, 6 months) 2020
Jeremiah Long (MSR contractor, 3 months) 2019
Courtney Oka (MSR contractor, 5 months) 2019

ASSETS paper submission group mentor 2020
   Read paper drafts from a junior submission group, provided feedback and guidance.

TEALS (Technology Education and Literacy in Schools) Internship at Microsoft 2019
   Provided a project for a group of underprivileged high school students to work on during a summer internship. Helped mentor them during the internship. (5 interns)

Microsoft Garage intern team mentor 2019
   Successfully pitched a project for a group undergraduate product interns through a competitive process. Helped mentor them during the internship. (6 interns)

UW undergraduate mentor 2013-2018
   As a PhD student, guided undergraduates through the research process, with regular one-on-one meetings. (6 students)

Community Outreach

Outreach to local schools for the Deaf 2018-present
   Arranged visits to two schools, and provided educational exchange. Invited school representatives to visit the lab as part of our giving campaign.

Paws-On Science volunteer 2013-2018
   Helped expose young students to accessibility research through interactive activities.

Hour of Code volunteer 2014
   Helped a class of Deaf high school students learn programming basics through Hour of Code activities.

ADWAS (Abused Deaf Women's Advocacy Services) auction volunteer 2014
   Greeted guests, distributed auction tickets, and helped ensure that the auction ran smoothly.

DeafBlind Retreat at Seabeck, sponsored by The Lighthouse for the Blind, Inc. 2013
   Spent time with the deaf-blind community, and learned about relevant assistive technologies.

Computer music workshop volunteer 2012
   Taught basic programming and demoed computer music tools at Springside Chestnut Hill Academy.

Select Press

The Economist 2021
   The race to teach sign language to computers
   https://www.economist.com/science-and-technology/2021/03/04/the-race-to-teach-sign-language-to-computers

Microsoft Research Blog 2021
   CHI 2021: Redefining accessibility to build more inclusive technologies
   https://www.microsoft.com/en-us/research/blog/chi-2021-redefining-accessibility-to-build-more-inclusive-technologies/

Microsoft Research Blog 2021
CHI 2021: Making remote and hybrid meetings work in the new future of work
https://www.microsoft.com/en-us/research/blog/chi-2021-making-remote-and-hybrid-meetings-work
-in-the-new-future-of-work/

Microsoft Research Podcast 2020
Accessible systems for sign language computation with Dr. Danielle Bragg
https://www.microsoft.com/en-us/research/podcast/accessible-systems-for-sign-language-computation
-with-dr-danielle-bragg/

Microsoft New England Blog 2018
New England Machine Learning Accessibility Hackathon Designs for Inclusion
https://blogs.microsoft.com/newengland/2018/06/29/new-england-machine-learning-accessibility/

Other Skills

Programming Languages
General: Python, Java, C, C++, C#
Data Analysis: R, MATLAB
Web: Javascript, HTML
Database: SQL
iPhone: Objective-C
Visualization: Processing, D3
Sound: Chuck

Full-Stack Web Frameworks
web2py (sites with hundreds of users), Pyramid, Ruby on Rails

Orchestral, chamber, and solo bassoonist 2002-2010
Performances in the USA and abroad, including Carnegie Hall and the Kennedy Center. Teachers: Sue
Heineman (National Symphony Orchestra), Richard Ranti (Boston Symphony Orchestra).