

DANIELLE BRAGG (PHD CANDIDATE, UW CSE)

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Research Interests

Human-Computer Interaction; Accessibility; Crowdsourcing; Applied Machine Learning

Education

University of Washington, Seattle, WA
PhD student, Computer Science & Engineering. Apr 2013-present.

Princeton University, Princeton, NJ
PhD student, Computer Science. Sept 2011 - Jan 2013.

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

Research Positions and Projects

Research Intern, Microsoft Research New England, summers 2015 and 2016.

Smartfonts and Livefonts - 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.

Program Manager Intern, Microsoft - Bing Query Understanding Team, summer 2014.

Smart Search Autosuggest App Results - Improved autosuggest results for queries about applications. Responsibilities included understanding the existing infrastructure, providing opportunity analysis, coordinating with partnering teams, and designing and executing a solution.

Graduate Researcher, University of Washington, 2013-present.

ASL-Live - The first American Sign Language (ASL) writing system with animated letterforms. Pilot studies suggest appropriately designed animations enable people to understand the system without training.

ASL-Search - 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.

ASL-Flash (<http://www.aslflash.org>) - A site that both helps people learn ASL and provides featural data on signs. The featural data gathered helps build the ASL-Search dictionary (above).

Listening Rates Study - The first large, inclusive study on human listening rates. Results suggest that visually impaired people have higher listening rates, and inform synthetic speech optimization and inclusive crowdsourcing design.

Sound Detection App - Designed and developed an app to detect and classify sounds to alert deaf people about important audio events. Combines interface design, signal processing, and machine learning.

Interactive Structure Learning - Developed an interactive machine learning tool to support biologists doing structure learning for gene regulatory networks. Users select algorithms, input knowledge, and view visualized results.

Graduate Researcher, Princeton University, 2011-2013.

Digital Musical Instrument Construction Tool - Developed an end-user tool for building digital musical instruments with customized mappings between manual inputs and sonic outputs.

Data Flow Optimization for Digital Musical Instruments - Presented a graph-theoretic model of digital musical instruments' data flow. Used the model to analyze data flow scheduling algorithms.

Research Assistant, George Washington University, 2010-2011.

Cyber Physical Systems Protocols - Designed and analyzed event detection protocols for networks with limited resources, like battlefield or hospital sensor networks.

Data Scheduling Algorithms - Developed and analyzed algorithms to optimize data transmission scheduling between sensor nodes and base stations considering transmission change penalties.

E-learning System - Developed real-time algorithms for an e-learning system to assess student knowledge. Represented student knowledge as a bipartite graph, which we converted to a SAT problem.

Undergraduate Research Assistant, NSF REU at University of Southern California, 2009.

Load-balancing for Peer-to-Peer Networks - Improved system performance of heterogeneous peer-to-peer networks for video-on-demand. Designed and analyzed schemes directing data requests.

Honors

National Center for Women & Information Technology (NCWIT) Collegiate Award (\$2,500), 2017.

Awarded to women in computer science for technical contributions to creative, impactful projects.

Harlan Hahn Endowment Fund Grant (\$2,500), 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 (\$6,500), 2017.

Awarded to 1 female graduate student at UW studying technology, innovation, business, engineering, health and/or real estate who shows a commitment to the community.

Microsoft Research Graduate Women's Scholarship (\$17,000), 2012.

Awarded to 10 female PhD students in North America in support of their studies and in recognition of their work. Given in support of my work on human-computer interaction and machine learning.

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

NSF Research Experience for Undergraduates Participant, 2009.
Selected for a fully-funded research mentorship program, working in Prof. Leana Golubchik's networking lab at the University of Southern California.

Conference Papers

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

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

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

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

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

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

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

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

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

Conference Posters

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

Invited Talks

"A User-Powered American Sign Language Dictionary." Invited talk at Google Kirkland, broadcast broadly within Google. 2015.

Teaching Experience

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

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

Service and Leadership

Peer Reviewer

- ACM CHI, Conference on Human Factors in Computing
- ACM ASSETS, Conference on Computers and Accessibility

Undergraduate mentor, 2013-present.

- Guiding undergraduates through the research process, with regular 1-on-1 meetings (6 students past/present).

Paws-On Science volunteer, 2013-present.

- Helps 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.

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).

Technical 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