Research Statement

My dissertation is on creating smartphone apps that systematize and automate the ways that doctors use their senses - sight, hearing, touch, smell, and taste - to detect symptoms more accurately, precisely, and consistently. My graduate work has focused on diagnosing conditions that manifest through symptoms in the eye, including jaundice for pancreatic cancer and non-responsive pupils for traumatic brain injuries. I also have a line of work that addresses situational impairments: environmental factors that affect a person’s ability to use technology once it moves away from the desktop scenario. My projects cover a wide array of skills, including machine learning, computer vision, signal processing, and user interface design.

Education

University of Washington
Computer Science and Engineering MS, PhD
Advisors: Dr. Shwetak Patel and Dr. Jacob Wobbrock
Seattle, WA
2013 - 2019 (expected)

Duke University
Electrical and Computer Engineering BSE, Computer Science BS
Advisor: Dr. Romit Roy Choudhury
Durham, NC
2009 - 2013

Teaching

University of Washington
EE PMP 590 A: Advanced Topics in Digital Computers . . . . . . . . . . . . . . . . . . . . . Spring 2018
CSE 331: Software Design and Implementation (teaching assistant) Fall 2013, Winter 2013, Spring 2014

Duke University
ECE 559: Advanced Digital System Design (teaching assistant) . . . . . . . . . . . . . . Spring 2013
ECE 54/280: Introduction to Signals and System (teaching assistant) Spring 2011, Spring 2012, Fall 2012
ECE 52: Introduction to Digital Systems (teaching assistant) . . . . . . . . . . . . . . . . Fall 2011
EGR 224: Electrical Fundamentals of Mechatronics (teaching assistant) . . . . . . . . . Spring 2013
EGR 53/103: Computational Methods in Engineering (teaching assistant) Fall 2010, Fall 2011, Fall 2012

Awards, Grants & Honors

University of Washington
Qualcomm Innovation Fellowship . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Fall 2015
NSF Graduate Research Fellowship . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Fall 2014

Duke University
Graduation Cum Laude . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Spring 2013
Graduation with Departmental Distinction . . . . . . . . . . . . . . . . . . . . . . . Spring 2013
Tau Beta Pi . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Spring 2013
Outstanding Teaching Assistant Award (ECE) . . . . . . . . . . . . . . . . . . . . . Spring 2012
Pratt Research Fellowship . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Fall 2012

**Service**

Reviewer for CHI (4 years), UbiComp (4 years), UIST (3 years), ACM SAP (1 year), IEEE VR (1 year), IEEE Pervasive Computing (1 year)

Graduate school application reader (1 year)

Graduate student coordinator for DUB organization and UW CSE

Co-founder of DUB’s Doctoral Colloquium

Active participant in the University of Washington’s DawgBytes and Discover Days programs

At least 100 lab tours and demos for a variety of visitors, including politicians (Senator Maria Cantwell), military officials (General Kevin Chilton), visiting faculty (Andy van Dam, Raj Reddy), K-12 teachers, and countless undergrads, grads, and high schoolers.

**Industry Experience**

**Microsoft Research**
Redmond, WA
Mentors: Gonzalo Ramos, Asta Roseway
To be disclosed later

**FX Palo Alto Laboratory**
Palo Alto, CA
Mentor: Daniel Avrahami
Developed interface that facilitates the discovery of coincidences and similarities in collections of egocentric videos

**Samsung Research America**
San Jose, CA
Mentors: Vijay Srinivasan, Kiran Rachuri, Evan Welbourne
Explored the application of inertial and image sensing in smartwatches for driving and eating detection

**HP Labs**
Palo Alto, CA
Mentor: Souvik Sen
Worked on enterprise-scale indoor localization system that combines Wi-Fi ranging and inertial dead reckoning

**Lutron Electronics**
Coopersburg, PA
Mentor: Ryan Bedell
Developed software for automatic PIR occupancy sensor tests and mass microcontroller programming

**Ongoing Projects**
**PupilScreen**
Using the smartphone camera to get an absolute measurement of a patient's pupil size and pupillary response for the diagnosis of head trauma.

**BiliScreen**
Using the smartphone camera to estimate the amount of jaundice that appears in the sclera of a patient's eye for predicting pancreatic cancer.

**Mobile Tonometer**
Using the smartphone camera and minimal instrumentation to replicate fixed-force tonometry for the measurement of intraocular pressure, which eventually leads to the diagnosis of glaucoma.

**Diagnostic Smartphone App Survey**
Conducting surveys and interviews to determine how diagnostic smartphone apps may or may not affect a person's course of action.

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**Selected Press**

Paul G. Allen: 1 Year, 10 Innovations From UW's Paul G. Allen School That's Making the World a Better Place

*Newsweek*: This new app detects concussions just by looking into your eyes

*BBC News*: Selfie app “spots early signs of pancreatic cancer”

*UW CSE News*: 10th Anniversary of UW CSE’s CS4HS

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**Accepted Papers**


Invited Talks


