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. 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

Duke University

Electrical and Computer Engineering BSE, Computer Science BS
Advisor: Dr. Romit Roy Choudhury

Teaching

University of Washington

CSE 190B: CSE Direct Admission Freshman Seminar (guest lecture) . . . . Fall 2016, Fall 2017
CSE 331: Software Design and Implementation . . . . . . . Fall 2013, Winter 2013, Spring 2014

Mentoring:
● Vardhman Mehta (undergraduate, future Master’s at UW): PupilScreen neural networks
● Megan Banks (undergraduate): BiliScreen and PupilScreen app development
● Surabhi Mundanda (high schooler, now at Stanford): Measuring tremor with a smartwatch

Duke University

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

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<th>Service</th>
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<tbody>
<tr>
<td>Reviewer for CHI (4 years), UbiComp (4 years), UIST (2 years), ACM SAP (1 year), IEEE VR (1 year), IEEE Pervasive Computing (1 year)</td>
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<td>Graduate school application reader</td>
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<tr>
<td>Graduate student coordinator for DUB organization and UW CSE</td>
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<tr>
<td>Co-head organizer of DUB’s inaugural Doctoral Colloquium</td>
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<td>Active participant in the University of Washington’s DawgBytes and Discover Days programs</td>
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<tr>
<td>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.</td>
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<th>Industry Experience</th>
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<tr>
<td><strong>FX Palo Alto Laboratory</strong></td>
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<tr>
<td>Palo Alto, CA</td>
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<tr>
<td>Mentor: Daniel Avrahami</td>
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<tr>
<td>Developed interface that facilitates the discovery of coincidences and similarities in collections of egocentric videos</td>
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<tr>
<td><strong>Samsung Research America</strong></td>
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<tr>
<td>San Jose, CA</td>
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<tr>
<td>Mentors: Vijay Srinivasan, Kiran Rachuri, Evan Welbourne</td>
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<td>Explored the application of inertial and image sensing in smartwatches for driving and eating detection</td>
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<tr>
<td><strong>HP Labs</strong></td>
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<tr>
<td>Palo Alto, CA</td>
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<tr>
<td>Mentor: Souvik Sen</td>
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<tr>
<td>Worked on enterprise-scale indoor localization system that combines Wi-Fi ranging and inertial dead reckoning</td>
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<tr>
<td><strong>Lutron Electronics</strong></td>
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<tr>
<td>Coopersburg, PA</td>
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<tr>
<td>Mentor: Ryan Bedell</td>
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<tr>
<td>Developed software for automatic PIR occupancy sensor tests and mass microcontroller programming</td>
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<th>Ongoing Projects</th>
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<tr>
<td><strong>PupilScreen</strong></td>
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<tr>
<td>Using the smartphone camera to get an absolute measurement of a patients pupil size and pupillary response for the diagnosis of head trauma</td>
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<tr>
<td><strong>BiliScreen</strong></td>
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</table>
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**

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

**GeekWire**: Univ. of Washington researchers developing smartphone app that can detect concussions

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

**UW CSE News**: Changing the world: Faculty and students demonstrate CSEs impact to the UW Foundation Board

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**Accepted Papers**


Invited Talks


Patents


