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
- CSE 331: Software Design and Implementation . . . . Fall 2013, Winter 2013, Spring 2014

Duke University
- ECE 559: Advanced Digital System Design . . . . . . . . . . . . . . . . . . . . . . . . . . Spring 2013
- 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 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Spring 2012
### Service

Reviewer for CHI (3 years), UbiComp (3 years), UIST (2 years), ACM SAP (1 year), IEEE VR (1 year), IEEE Pervasive Computing (1 year)

Graduate school application reader (1 year)

Co-head organizer of DUB’s inaugural Doctoral Colloquium

Student volunteer for DUB organization

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

At least 75 lab tours and demos for politicians (Senator Maria Cantwell), military officials (Gen. Kevin Chilton), visiting faculty (Andy van Dam, Raj Reddy), K-12 teachers, and countless undergrads, grads, and high schoolers.

### Industry Experience

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Time</th>
<th>Role</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX Palo Alto Laboratory</td>
<td>Palo Alto, CA</td>
<td>Summer 2015</td>
<td>Research Intern</td>
<td>Developed interface that facilitates the discovery of coincidences and similarities in collections of egocentric videos</td>
</tr>
<tr>
<td>Samsung Research America</td>
<td>San Jose, CA</td>
<td>Summer 2014</td>
<td>Research Intern</td>
<td>Explored the application of inertial and image sensing in smartwatches for driving and eating detection</td>
</tr>
<tr>
<td>HP Labs</td>
<td>Palo Alto, CA</td>
<td>Summer 2013</td>
<td>Research Intern</td>
<td>Worked on enterprise-scale indoor localization system that combines Wi-Fi ranging and inertial dead reckoning</td>
</tr>
<tr>
<td>Lutron Electronics</td>
<td>Coopersburg, PA</td>
<td>Summer 2010</td>
<td>Software Engineering Intern</td>
<td>Developed software for automatic PIR occupancy sensor tests and mass microcontroller programming</td>
</tr>
</tbody>
</table>

### 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.
**Drunk User Interface (DUI)**
Using typing behavior, speech, memory, and other measures on a smartphone to estimate if a smartphone user is inebriated.

**Press**

**UW CSE News:** 10th Anniversary of UW CSEs CS4HS

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

**Invited Talks**


**Accepted Papers**


Patents


