

Alex Mariakakis
PhD Candidate
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July 4, 2018
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Research Statement

My dissertation work focuses on the creation of mobile apps that use built-in sensors to address diagnostic health and public safety. Applications in this space can have serious repercussions, so users would want guarantees about their applications performance. Smartphones are used in various environments with unknown and ever-changing lighting, background noise, and motion characteristics. Smartphones also have different hardware and software specifications. To make smartphone sensing more robust in these uncertain scenarios, my research often involves making compromises with hardware and software, such as requiring an inexpensive accessory or restricting sensing for a specific application. As a ubiquitous computing researcher, my work inherently incorporates many different disciplines within computer science, most notably computer vision, machine learning, signal processing, and human-computer interaction. My work is also interdisciplinary, as I often collaborate with local clinicians and researchers from other disciplines (Electrical Engineering, Informatics, Physics).

Education

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

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

Awards, Grants, and 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

Miscellaneous
HCIC 34th Place Award for Help with Counting Summer 2018
1st Place Microsoft Puzzleday (Paul G. Alien School) Summer 2017
1st Place Seattle Microsoft College Puzzle Challenge (Team Friends) Spring 2016, Spring 2017
1st Place Sporele Live Trivia (Flancrest Enterprises) Spring 2016

Teaching

University of Washington

EE PMP 590 A: Advanced Topics in Digital Computers Spring 2018
CSE 331: Software Design and Implementation (TA) Fall 2013, Winter 2013, Spring 2014

Online Courses

Microsoft edX: Introduction to Device Programming

Duke University

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

Mentoring

Undergraduate Research Advisees

Eric Chan Oct 2017–present
Megan Anne Banks (now at Oculus) Oct 2015–Jan 2018
Vardhman Mehta (now UW master’s) Oct 2016–May 2018
Andy Li (now at Facebook) Jan 2015–June 2015

High School Research Advisees

Surabhi Mundada (now Stanford undergrad) Jan 2016–Mar 2017
Veena Kollipara June 2016–Sep 2016
Angela Lee (now UC-Berkeley undergrad) June 2016–Sep 2016

Professional Service

Organizing Committees

CHI Video Previews Co-Chair 2018

Program Committees

International Workshop on Ubiquitous Personal Assistance 2018

Reviewer

ACM Applied Perception (SAP) 2016
ACM Computer Supported Cooperative Work (CSCW) 2018
ACM Human Factors in Computing System (CHI) 2016–2019
ACM Interactive, Mobile, Wearable, and Ubiquitous Technologies (IMWUT) 2017–2018
IEEE Pervasive Computing 2015
ACM Ubiquitous Computing (UbiComp) 2014–2016
IEEE Virtual Reality and 3D User Interfaces (VR) 2017
ACM User Interface Software and Technology (UIST) 2016

Other

Wedding Officiant (2 times) 2018

University Service

DUB graduate student coordinator	2017
Co-founder of DUB's doctoral colloquium	2017
CSE graduate student coordinator	2016
CSE PhD application reader	2016

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

At least 50 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	Spring 2018 Research Intern
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	Summer 2015 Research Intern
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	Summer 2014 Research Intern
HP Labs Palo Alto, CA Mentor: Souvik Sen Worked on enterprise-scale indoor localization system that combines Wi-Fi ranging and inertial dead reckoning	Summer 2013 Research Intern
Lutron Electronics Coopersburg, PA Mentor: Ryan Bedell Developed software for automatic PIR occupancy sensor tests and mass microcontroller programming	Summer 2010 Software Engineering Intern

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

Accepted Papers

- [1] **Mariakakis, A.**, Parsi, S., Patel, S. N., Wobbrock, J. O., “Drunk User Interfaces: Determining Blood Alcohol Level Through Everyday Smartphone Tasks”. In: *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. CHI ’18. Montreal QC, Canada: ACM, 2018, 234:1–234:13. ISBN: 978-1-4503-5620-6. DOI: [10.1145/3173574.3173808](https://doi.org/10.1145/3173574.3173808). URL: <http://doi.acm.org/10.1145/3173574.3173808>.
- [2] **Mariakakis, A.**, Banks, M. A., Phillipi, L., Yu, L., Taylor, J., Patel, S. N., “BiliScreen: smartphone-based scleral jaundice monitoring for liver and pancreatic disorders”. In: *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 1.2 (2017), p. 20. DOI: [10.1145/3131896](https://doi.org/10.1145/3131896). URL: <http://doi.org/10.1145/3131896>.
- [3] **Mariakakis, A.**, Baudin, J., Whitmire, E., Mehta, V., Banks, M. A., Law, A., McGrath, L., Patel, S. N., “PupilScreen: using smartphones to assess traumatic brain injury”. In: *Proceedings of the 2017 ACM Interactive, Mobile, Wearable, Ubiquitous Technologies* 1.3 (2017), p. 81. DOI: [10.1145/3131896](https://doi.org/10.1145/3131896). URL: <http://doi.org/10.1145/3131896>.
- [4] **Mariakakis, A.**, Patel, S., “Ocular symptom detection using smartphones”. In: *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct*. ACM. 2016, pp. 435–440. DOI: [10.1145/2968219.2971354](https://doi.org/10.1145/2968219.2971354). URL: <http://doi.org/10.1145/2968219.2971354>.
- [5] **Mariakakis, A.**, Srinivasan, V., Rachuri, K., Mukherji, A., “WatchUDrive: Differentiating drivers and passengers using smartwatches”. In: *2016 IEEE International Conference on Pervasive Computing and Communication Workshops (PerCom Workshops)*. IEEE. 2016, pp. 1–4. DOI: [10.1109/PERCOMW.2016.7457171](https://doi.org/10.1109/PERCOMW.2016.7457171). URL: <http://doi.org/10.1109/PERCOMW.2016.7457171>.
- [6] **Mariakakis, A.**, Wang, E., Patel, S. N., Wen, J. C., “A smartphone-based system for assessing intraocular pressure”. In: *Engineering in Medicine and Biology Society (EMBC), 2016 IEEE 38th Annual International Conference of the*. IEEE. 2016, pp. 4353–4356. DOI: [10.1109/EMBC.2016.7591691](https://doi.org/10.1109/EMBC.2016.7591691). URL: <http://doi.org/10.1109/EMBC.2016.7591691>.
- [7] Goel, M., Whitmire, E., **Mariakakis, A.**, Saponas, T. S., Joshi, N., Morris, D., Guenter, B., Gavriiliu, M., Borriello, G., Patel, S. N., “HyperCam: hyperspectral imaging for ubiquitous computing applications”. In: *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing*. ACM. 2015, pp. 145–156. DOI: [10.1145/2750858.2804282](https://doi.org/10.1145/2750858.2804282). URL: <http://doi.org/10.1145/2750858.2804282>.
- [8] **Mariakakis, A.**, Goel, M., Aumi, M. T. I., Patel, S. N., Wobbrock, J. O., “SwitchBack: Using Focus and Saccade Tracking to Guide Users’ Attention for Mobile Task Resumption”. In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM. 2015, pp. 2953–2962. DOI: [10.1145/2702123.2702539](https://doi.org/10.1145/2702123.2702539). URL: <http://doi.org/10.1145/2702123.2702539>.
- [9] Wang, E. J., Lee, T.-J., **Mariakakis, A.**, Goel, M., Gupta, S., Patel, S. N., “Magnifisense: Inferring device interaction using wrist-worn passive magneto-inductive sensors”. In: *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing*. ACM. 2015, pp. 15–26. DOI: [10.1145/2750858.2804271](https://doi.org/10.1145/2750858.2804271). URL: <http://doi.org/10.1145/2750858.2804271>.
- [10] **Mariakakis, A. T.**, Sen, S., Lee, J., Kim, K.-H., “SAIL: single access point-based indoor localization”. In: *Proceedings of the 12th annual international conference on Mobile systems, applications, and services*. ACM. 2014, pp. 315–328. DOI: [10.1145/2594368.2594393](https://doi.org/10.1145/2594368.2594393). URL: <http://doi.org/10.1145/2594368.2594393>.

Conference Talks

- [11] *BiliScreen: smartphone-based scleral jaundice monitoring for liver and pancreatic disorders*. UbiComp. Maui, HI, Sept. 2017.

- [12] *Drunk User Interfaces: Determining Blood Alcohol Level Through Everyday Smartphone Tasks*. CHI. Montreal, QC, Apr. 2017.
- [13] *PupilScreen: using smartphones to assess traumatic brain injury*. UbiComp. Maui, HI, Sept. 2017.
- [14] *Ocular symptom detection using smartphones*. UbiComp Doctoral School. Heidelberg, Germany, Sept. 2016.
- [15] *SwitchBack: improving interaction with mobile devices*. CHI. Seoul, South Korea, Apr. 2015.

Guest Lectures

- [16] “Diagnostic smartphone apps”. BIME 591 seminar. Seattle, WA, Nov. 2017.
- [17] “Ubiquitous Computing”. CSE Direct Admits Seminar. Seattle, WA, Aug. 2017.
- [18] “Using mobile devices to quantify traditionally qualitative health measures”. HalfMoon Education: Internet of Things Workshop. Seattle, WA, Sept. 2017.
- [19] “Ubiquitous Computing”. CSE Direct Admits Seminar. Seattle, WA, Aug. 2016.

Invited Talks

- [20] *BiliScreen: smartphone-based scleral jaundice monitoring for liver and pancreatic disorders*. Quantified Self Meetup. Seattle, WA. Nov. 2017.
- [21] *BiliScreen: smartphone-based scleral jaundice monitoring for liver and pancreatic disorders*. UW CSE Industry Affiliates. Seattle, WA. Nov. 2017.
- [22] *A smartphone-based system for assessing intraocular pressure*. Microsoft Student Summit on Mobility, Systems, and Networking. Petaluma, CA. Feb. 2016.
- [23] *Ocular symptom detection using smartphones*. UW CSE Industry Affiliates. Seattle, WA. Oct. 2016.
- [24] *SwitchBack: improving interaction with mobile devices*. UW CSE Industry Affiliates. Seattle, WA. Oct. 2014.

Posters

- [25] *Mobile Sensing for Health and Public Safety*. HCIC 2018. Pajaro Dunes, CA, June 2018.
- [26] *A Smartphone-Based System for Assessing Intraocular Pressure + Non-invasive Approach*. UW CSE Affiliates. Seattle, WA, Nov. 2017.
- [27] *BiliScreen: Smartphone-Based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. UW CSE Affiliates. Seattle, WA, Nov. 2017.
- [28] *A smartphone-based system for assessing intraocular pressure*. EMBC 2016. Orlando FL, Aug. 2016.
- [29] *Ocular Symptom Detection using Smartphones*. UW CSE Affiliates. Seattle, WA, Nov. 2016.
- [30] *RePOV: Using Sensors and Vision to Facilitate Discoveries in Egocentric Videos*. UW CSE Affiliates. Seattle, WA, Nov. 2015.
- [31] *SwitchBack: Using Focus and Saccade Tracking to Guide Users’ Attention for Mobile Task Resumption*. UW CSE Affiliates. Seattle, WA, Nov. 2014.

Patents

- [32] McGrath, L., Law, A., Bly, R., Patel, S., **Mariakakis, A.**, Baudin, J., “Smartphone-based digital pupillometer”. U.S. Provisional Patent Application No. 62/513,808. 2017.
- [33] Taylor, J., Patel, S., **Mariakakis, A.**, “Bilicam for adults”. U.S. Provisional Patent Application No. 62/513,825. 2017.
- [34] **Mariakakis, A.**, Wang, E., Patel, S., Wen, J., “A smartphone-based system for assessing intraocular pressure”. U.S. Provisional Patent Application No. 62/289,755, 62/375,779. 2016.
- [35] **Mariakakis, A.**, Srinivasan, V., Rachuri, K., Mukherji, A., “WatchUDrive: Differentiating drivers and passengers using smartwatches”. 2016.
- [36] **Mariakakis, A.**, Goel, M., Aumi, M. T. I., Patel, S. N., Wobbrock, J. O., “SwitchBack: Using Focus and Saccade Tracking to Guide Users’ Attention for Mobile Task Resumption”. U.S. Provisional Patent Application No. 62/068,413. 2015.
- [37] **Mariakakis, A. T.**, Sen, S., Lee, J., Kim, K.-H., “SAIL: single access point-based indoor localization”. 2014.