Alex Mariakakis

Postdoctoral Researcher
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Summary

I study how health screening and safety tools can be made useful for ordinary people. This includes adding real-time guidance to testing procedures, leveraging passive sensing to improve the test results, and helping developers ensure their tests will be well-received. My dissertation work focused on the application of machine learning and computer vision on smartphone sensor data to create mobile apps that improve access to health screening and safety tools.

Education

University of Washington and Sage Bionetworks (Seattle, WA) Sept 2019–present
Post-Doctorate
Advisors: Dr. Anind Dey and Dr. Larsson Omberg

University of Washington (Seattle, WA) Sept 2015–June 2019
Computer Science and Engineering PhD
Advisors: Dr. Shwetak Patel and Dr. Jacob Wobbrock

University of Washington (Seattle, WA) Sept 2013–June 2015
Computer Science and Engineering MS
Advisors: Dr. Shwetak Patel and Dr. Jacob Wobbrock

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

Awards, Grants, and Honors

University of Washington

- Gaetano Borriello Outstanding Student Award for UbiComp . . . . . Fall 2018
- 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

Peer-Reviewed Publications

[1] Xuhai, X., Shi, H., Yi, X., Liu, W., Yan, Y., Shi, Y., **Mariakakis, A.**, Mankoff, J., Dey, A. K., "EarBuddy: Enabling On-Face Interaction via Wireless Earbuds". In: *To appear in Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. CHI '20. 2020.

[2] Li, H., Whitmire, E., **Mariakakis, A.**, Chan, V., Sample, A., Patel, S., "IDCam: Precise Item Identification for AR-Enhanced Object Interactions". In: *2019 IEEE International Conference on RFID (RFID)* (2019). DOI: 10.1109/RFID.2019.8719279. URL: https://doi.org/10.1109/RFID.2019.8719279.

[3] **Mariakakis, A.**, Wang, E., Patel, S., Goel, M., "Challenges in Realizing Smartphone-Based Health Sensing". In: *IEEE Pervasive Computing* 18.2 (Apr. 2019), pp. 76–84. ISSN: 1536-1268. DOI: 10.1109/MPRV.2019.2907007. URL: https://ieeexplore.ieee.org/document/8794692/.

[4] McGrath, L. B., Eaton, J. C., Law, A., **Mariakakis, A.**, Patel, S., Levitt, M. R., "Mobile Digital Pupillometry for Rapid Triage of Patients With Severe Traumatic Brain Injury". In: *Neurosurgery* 66.Supplement_1 (2019), nyz310_844. DOI: 10.1093/neuros/nyz310_844. URL: https://doi.org/10.1093/neuros/nyz310_844.

[5] **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. URL: http://doi.acm.org/10.1145/3173574.3173808.

[6] **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. URL: http://doi.org/10.1145/3131896.

[7] **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. URL: http://doi.org/10.1145/3131896.

[8] **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. URL: http://doi.org/10.1145/2968219.2971354.

[9] **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. URL: http://doi.org/10.1109/PERCOMW.2016.7457171.

[10] **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. URL: http://doi.org/10.1109/EMBC.2016.7591691.

[11] Goel, M., Whitmire, E., **Mariakakis, A.**, Saponas, T. S., Joshi, N., Morris, D., Guenter, B., Gavriliu, 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. URL: http://doi.org/10.1145/2750858.2804282.

[12] **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. URL: http://doi.org/10.1145/2702123.2702539.

[13] 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. URL: http://doi.org/10.1145/2750858.2804271.

[14] **Mariakakis, A.**, 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. URL: http://doi.org/10.1145/2594368.2594393.

Conference Talks

[15] *Drunk User Interfaces: Determining Blood Alcohol Level Through Everyday Smartphone Tasks*. CHI. Montreal, QC, Apr. 2018.

[16] *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. UbiComp. Maui, HI, Sept. 2017.

[17] *PupilScreen: Using Smartphones to Assess Traumatic Brain Injury*. UbiComp. Maui, HI, Sept. 2017.

[18] *Ocular Symptom Detection Using Smartphones*. UbiComp Doctoral School. Heidelberg, Germany, Sept. 2016.

[19] *SwitchBack: Improving Interaction with Mobile Devices*. CHI. Seoul, South Korea, Apr. 2015.

Guest Lectures

[20] "Diagnostic Smartphone Apps". CSE 599 N1: Modern Mobile Systems. Seattle, WA, Oct. 2018.

[21] "Diagnostic Smartphone Apps". BIME 591: Research Colloquium. Seattle, WA, Nov. 2017.

[22] "Ubiquitous Computing". CSE Direct Admits Seminar. Seattle, WA, Aug. 2017.

[23] "Using Mobile Devices to Quantify Traditionally Qualitative Health Measures". HalfMoon Education: Internet of Things Workshop. Seattle, WA, Sept. 2017.

[24] "Ubiquitous Computing". CSE Direct Admits Seminar. Seattle, WA, Aug. 2016.

Invited Talks

[25] *Objectifying Subjective Medical Assessments Using Smartphone Sensors*. Georgia Tech. Atlanta, GA. Mar. 2019.

[26] *Objectifying Subjective Medical Assessments Using Smartphone Sensors*. University of Virginia. Charlottesville, VA. Feb. 2019.

[27] *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. mHealth Symposium at Fred Hutchinson Cancer Research Center. Seattle, WA. Nov. 2018.

[28] *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. Quantified Self Meetup. Seattle, WA. Nov. 2017.

[29] *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. UW CSE Industry Affiliates. Seattle, WA. Nov. 2017.

[30] *A Smartphone-based System for Assessing Intraocular Pressure*. Microsoft Student Summit on Mobility, Systems, and Networking. Petaluma, CA. Feb. 2016.

[31] *Ocular Symptom Detection Using Smartphones*. UW CSE Industry Affiliates. Seattle, WA. Oct. 2016.

[32] *SwitchBack: Improving Interaction with Mobile Devices*. UW CSE Industry Affiliates. Seattle, WA. Oct. 2014.

Posters

[33] *Mobile Sensing for Health and Public Safety*. UW CSE Affiliates. Seattle, WA, Nov. 2018.

[34] *Mobile Sensing for Health and Public Safety*. HCIC 2018. Pajaro Dunes, CA, June 2018.

[35] *A Smartphone-Based System for Assessing Intraocular Pressure + Non-invasive Approach*. UW CSE Affiliates. Seattle, WA, Nov. 2017.

[36] *BiliScreen: Smartphone-Based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. UW CSE Affiliates. Seattle, WA, Nov. 2017.

[37] *A Smartphone-based System for Assessing Intraocular Pressure*. EMBC 2016. Orlando FL, Aug. 2016.

[38] *Ocular Symptom Detection Using Smartphones*. UW CSE Affiliates. Seattle, WA, Nov. 2016.

[39] *RePOV: Using Sensors and Vision to Facilitate Discoveries in Egocentric Videos*. UW CSE Affiliates. Seattle, WA, Nov. 2015.

[40] *SwitchBack: Using Focus and Saccade Tracking to Guide Users' Attention for Mobile Task Resumption*. UW CSE Affiliates. Seattle, WA, Nov. 2014.

Patents

[41] 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.

[42] Taylor, J., Patel, S., **Mariakakis, A.,** "BiliCam for Adults". U.S. Provisional Patent Application No. 62/513,825. 2017.

[43] **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.

[44] **Mariakakis, A.**, Srinivasan, V., Rachuri, K., Mukherji, A., "WatchUDrive: Differentiating Drivers and Passengers Using Smartwatches". 2016.

[45] **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.

[46] Sen, S., **Mariakakis, A.**, Lee, J.-G., "Localization Using Access Point". U.S. Patent 9883342B2. 2014. URL: https://patents.google.com/patent/US9883342B2.

Professional Service

Program Committee

ACM Human Factors in Computing Systems, Late Breaking Work (CHI LBW) 2020
ACM User Interface Software and Technology (UIST) 2019
International Workshop on Ubiquitous Personal Assistance (UPA) 2018–2019

Reviewer (number of non-PC reviews)

Biomedical Optics Express . . . . . 1 article
ACM Computer Supported Cooperative Work (CSCW) . . . . . 1 article
ACM Human Factors in Computing Systems (CHI) . . . . . 15 papers
ACM Human Factors in Computing Systems, Late Breaking Work (CHI LBW) . . . . 5 papers
ACM Interactive, Mobile, Wearable, and Ubiquitous Technologies (IMWUT) . . . . . 15 articles
ACM Human-Computer Interaction with Mobile Devices and Services (MobileHCI) . . . 1 poster
IEEE Pervasive Computing . . . . . 2 articles
ACM Symposium on Applied Perception (SAP) . . . . . 1 article
IEEE Sensors . . . . . 1 article
ACM Transactions on Computer-Human Interaction (TOCHI) . . . . . 1 article
ACM Ubiquitous Computing (UbiComp) . . . . . 8 papers
ACM User Interface Software and Technology (UIST) . . . . . 4 papers
IEEE Virtual Reality and 3D User Interfaces (VR) . . . . . 1 paper

Outstanding reviews: CHI (1), UbiComp (5)

Organizing Committee

CHI Video Previews Co-Chair 2019

Other

UbiComp Broadening Participation Workshop Mentor 2018
UbiComp Student Volunteer 2014
MobiSys Student Volunteer 2014

University Service

NSF GRFP workshop coordinator 2016-2018
DUB graduate student coordinator 2017
Co-founder of DUB Doctoral Colloquium 2017
CSE graduate student coordinator 2016
CSE PhD application reader 2016

Active participant in the University of Washington's DawgBytes and Engineering Discovery Days programs for K-12 outreach

At least 50 lab tours and demos for a variety of visitors, including:

- Politicians (Senator Maria Cantwell)
- Military officials (General Kevin Chilton)
- Visiting faculty
- National Center for Women & Information Technology (NCWIT)
- Countless undergraduates and high schoolers

Industry Experience

Sage Bionetworks Post-Doctoral Researcher (Seattle, WA) Fall 2019–present
Mentor: Larsson Omberg
Creating and validating passive gait analysis algorithms for continuous at-home monitoring

Microsoft Research Research Intern (Redmond, WA) Spring–Summer 2018
Mentors: Gonzalo Ramos, Asta Roseway
Developed a smartphone app that interprets chemical sensor patches that exhibit colorimetric changes

FX Palo Alto Laboratory Research Intern (Palo Alto, CA) Summer 2015
Mentor: Daniel Avrahami
Designed a web interface that surfaces coincidences and similarities in egocentric video collections

Samsung Research America Research Intern (San Jose, CA) Summer 2014
Mentors: Vijay Srinivasan, Kiran Rachuri, Evan Welbourne
Explored the application of inertial and image sensing in smartwatches for driving and eating detection

HP Labs Research Intern (Palo Alto, CA) Summer 2013
Mentor: Souvik Sen
Created a indoor localization system that combines Wi-Fi ranging and inertial dead reckoning

Lutron Electronics Software Intern (Coopersburg, PA) Summer 2010
Mentor: Ryan Bedell
Developed software for automatic PIR occupancy sensor tests and mass microcontroller programming

Selected Press

GeekWire: Geek of the Week: Duke grad Alex Mariakakis finds a home at UW and a vision for continued success
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

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 (Module 2) 2017

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

Hung Ngo . . . . . Aug 2019–present
Eric Chan . . . . . Oct 2017–June 2018
Megan Anne Banks (now at Oculus) . . . . . Oct 2015–Jan 2018
Vardhman Mehta (now at Google) . . . . . 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 (now UPenn undergrad) . . . . . June 2016–Sep 2016
Angela Lee (now UC-Berkeley undergrad) . . . . . June 2016–Sep 2016