

CURRICULUM VITAE

NAME

Dr. Mariakakis, Alex Timothy

CONTACT INFORMATION

Telephone

Mobile +1 (919) 923-7399

Email

Work mariakakis@cs.toronto.edu

Website

Personal <https://mariakakis.github.io>

LANGUAGE SKILLS

English Read, Write, Speak, Understand, Peer Review

EDUCATION

Degrees

Doctorate, Doctor of Philosophy, Computer Science and Engineering, Making Medical Assessments Available and Objective Using Smartphone Sensors (Completed) Sep. 2015 - Jun. 2019

University of Washington, Washington, United States, Academic

Supervisors: Jacob Wobbrock (2014/2 - 2019/6), Shwetak Patel (2013/9 - 2019/6)

Master's Equivalent, Masters of Science, Computer Science and Engineering (Completed) Sep. 2013 - Jun. 2015

University of Washington, Washington, United States, Academic

Supervisors: Jacob Wobbrock (2014/2 - 2019/6), Shwetak Patel (2013/9 - 2019/6)

Bachelor's, Bachelor of Science, Computer Science (Completed) Aug. 2009 - Jun. 2013

Duke University, North Carolina, United States, Academic

Bachelor's, Bachelor of Science in Engineering, Electrical and Computer Engineering (Completed) Aug. 2009 - Jun. 2013

Duke University, North Carolina, United States, Academic

Credentials

Fellow

mHealth Training Institute

Jul. 2021

RECOGNITIONS

Prize / Award, Best Paper

Jul. 2021 - Jul. 2021

ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)

This award was given by the conference's program committee for my publication on "NkhukuProbe: Using a Sensor-Based Technology Probe to Support Poultry Farming Activities in Malawi", for which I was a contributing author

Prize / Award, Best Paper Runner-Up

Sep. 2020 - Sep. 2020

IEEE Pervasive Computing

This award was given by the journal editors for my first-author publication on "Challenges in Realizing Smartphone-based Health Sensing

Prize / Award, Best Paper Finalist

Apr. 2019 - Apr. 2019

IEEE International Conference on Radio-Frequency Identification (RFID)

This award was given by the conference's program committee for my publication on "IDCam: Precise Item Identification for AR-Enhanced Object Interactions", for which I was a contributing author

Distinction, Gaetano Borriello Outstanding Student Award

Oct. 2018 - Oct. 2019

ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)

This award is given to a graduate student "who has made outstanding research contributions to the field of ubiquitous computing". The awardee is selected by the conference's Steering Committee based on their publication records, service to the community, and a submitted research statement

Distinction, Top 10 Innovations from the University of Washington's Paul G. Allen School That's Making the World a Better Place

Mar. 2018

Vulcan

Vulcan, an investment company founded by Microsoft co-found Paul Allen, published a list of the top 10 innovations from the School of Computer Science that they saw as having the biggest potential to change the world for the better. One of my projects on scleral jaundice screening with a smartphone (BiliScreen) is #5 on that list

Citation, Geek of the Week

Sep. 2017

GeekWire

The Seattle-centric technology news site GeekWire "profiles the characters of Pacific Northwest tech, science, games, innovation, and more

Prize / Award, Honorable Mention

Sep. 2015 - Sep. 2015

ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)

This award was given by the conference's program committee for my publication on "HyperCam: Hyperspectral Imaging for Ubiquitous Computing Applications", for which I was a contributing author

Distinction, Graduation Cum Laude

Jun. 2013

Duke University, North Carolina, United States, Academic

Latin Honors are given to undergraduate students who maintain a high GPA throughout all four years of their studies. In the case of graduation cum laude, a student must have a GPA within the top-25% relative to the GPA distribution of the previous year's class

Distinction, Graduation with Departmental Distinction

Jun. 2013

Duke University, North Carolina, United States, Academic

Departmental Distinction is awarded to students who complete a faculty-supervised independent study project during their senior year and present that work in written and oral forms to the department's faculty. Furthermore, students who attain this distinction must also maintain a cumulative GPA of at least 3.5

Distinction, Tau Beta Pi

Apr. 2013

Duke University, North Carolina, United States, Academic

Tau Beta Pi is the oldest engineering honor society in the United States, honoring students who have shown significant academic achievement and commitment to personal and professional integrity

Prize / Award, Outstanding Teaching Assistant Award in Electrical and Computer Engineering Jan. 2013

Duke University, North Carolina, United States, Academic

This award is given to undergraduate teaching assistants each semester who receive exceptional praise from their peers and supervising faculty

EMPLOYMENT

Academic Work Experience

Assistant Professor, Assistant Professor (Full-time)

Aug. 2020

Computer Science, St. George Campus, University of Toronto, Ontario, Canada, Academic

As a new tenure-track faculty member, I will be responsible for leading my own research program. This responsibility includes, but is not limited to, completing publications from my postdoc, establishing an independent research agenda, supervising students, applying for grants, and teaching courses

Postdoctoral Researcher (Full-time)

Sep. 2019 - Jul. 2020

Computer Science and Engineering, Seattle, University of Washington, Washington, United States, Academic

I conducted research involving the use of passive sensing (via smartphones, smartwatches, and Bluetooth beacons) to detect significant life events. I also led the writing of an NSF Smart & Connected Health grant proposal on the detection of heavy-drinking episodes using a similar approach to my work on significant life events. That grant was rejected, but we have plans of adapting that grant to other domains

Professional Master's Program Lecturer, Lecturer (Part-time)

Mar. 2018 - Jun. 2018

Electrical Engineering, Seattle, University of Washington, Washington, United States, Academic

I taught an introductory course on ubiquitous computing to ~35 students who were studying for their Master's degree while working in industry. The course was held 1 day a week for 3 hours. Beyond providing lectures, leading discussions, and grading assignments, I also redesigned the course so that the assignments had greater cohesion. In addition, I updated the curriculum to include more lectures on machine learning and discussions on newer topics in ubiquitous computing

Teaching Assistant (Full-time)

Sep. 2013 - Jun. 2014

Computer Science and Engineering, Seattle, University of Washington, Washington, United States, Academic

I provided supplemental lectures to ~100 undergraduate students on topics related to software design and implementation (e.g., event-driven programming, program structure, program correctness). I delivered the same 1-hour lecture 3 times a week to cover all of the students. In some cases, I was asked to reinforce what was taught in the main lectures; in other cases, I was asked to teach new content that was required for the homework assignments

Non-academic Work Experience

Postdoctoral Researcher

Sep. 2019 - Jul. 2020

Sage Bionetworks, Research

Sage Bionetworks often runs open competitions called "challenges" where researchers attempt to achieve the best accuracy on a particular machine learning challenge. One such challenge with the Michael J. Fox Foundation aims to quantify the severity of Parkinsonian symptoms using motion sensor data. I helped verify that there was useful signal in the challenge's two datasets by producing a baseline machine learning model. In addition, I have been leading the creation of a study that would produce the largest dataset of continuous at-home gait in the world. With this dataset, we will create and validate various algorithms for estimating gait parameters (e.g., step cadence, speed) for an eventual large-scale deployment through the National Institutes of Health. This dataset will eventually be open-sourced along with datasets from other gait researchers to form a standard in that research community

Research Intern**Jan. 2018 - Sep. 2018***Microsoft Research, Private Sector*

I helped an interdisciplinary team of chemists, computer scientists, and designers create chemical sensor patches that produce colorimetric readouts of ultraviolet radiation. Beyond informing the design of these sensors and catering this research to a computer science audience, I created a smartphone app that automatically interprets the sensor patches' colors regardless of the ambient lighting conditions. his work led to a conference publication

Research Intern**Jun. 2015 - Sep. 2015***FX Palo Alto Laboratory, Private Sector*

I helped create a web interface that surfaces coincidences and similarities in egocentric video collections. The interface merges segments of geo-tagged videos using location and visual similarity to automatically generated time-lapses of commonly viewed places during a person's daily commute

Research Intern**Jun. 2014 - Sep. 2014***Samsung Research America, Private Sector*

I led an investigation of how the sensors on a smartwatch can be used to determine whether a person is a driver or passenger inside a vehicle. In this investigation, I explore both motion sensing (accelerometer) and scene recognition (camera) could be used to achieve high classification accuracy. This work led to a conference workshop publication. I also helped with the development of other smartwatch sensing modules for activity recognition, such as a module for detecting eating and gait episodes

Research Intern**Jun. 2013 - Aug. 2013***HP Labs, Private Sector*

I helped create an indoor localization system that only requires a person's smartphone to be near a single wireless access point. While my mentor was responsible for implementing a way of estimating the distance between a person's smartphone and an access point using wireless signal processing, I implemented a holistic dead-reckoning system that leveraged the smartphone's inertial measurement unit to estimate a person's instantaneous speed and heading. This work led to multiple patents and a conference publication

Affiliations**Affiliate Scientist****Jul. 2021***Techna, Health***RESEARCH FUNDING HISTORY****Principal Investigator, Fellowship, Automatic Seizure Detection, Prediction, and Mitigation Using Minimally Invasive Implantable Bioelectrical Sensors (Awarded)****May 2022 - Aug. 2022**

Project Description: Recent advances in neural implants by companies like NerveX Neurotechnologies have enabled the effective treatment of epilepsy. Identification and prediction of seizures from biosignals such as electroencephalography (EEG) data in real-time has high relevance to epilepsy management. Learning general representations of EEG data using unsupervised methods and then feeding these representations into classifiers that are specific to the individual could boost the performance of seizure detection and prediction. Combined with sampling techniques to address data imbalance problems, applying this method to machine learning classifiers such as a gradient tree boosting machine (GTBM) could improve existing seizure detection pipelines. This has significant applications for algorithms governing mobile anti-seizure implants

Other Investigators: O'Leary, Gerard (Principal Investigator)

Funding Sources

- Mitacs Accelerate Total: \$40,000.00 (Canadian dollar)

Principal Investigator, Grant, Capillary Refill Time Measurement Utilizing Mobile Application (Cap App) in Children (Awarded) Jan. 2022 - Apr. 2023

Project Description: Our primary aim is to develop technology that provides an objective measure of capillary refill time through a mobile smartphone application. This application would quickly and accurately calculate the capillary refill time from the finger of the patient by using the smartphone camera and computer to record video of a fingertip and calculate the capillary refill time. The software will measure increments of change more accurately, precisely, and consistently than the human eye can distinguish when healthcare providers perform this test subjectively

Other Investigators: Strutt, Jonathan (Principal Investigator), Thompson, Matthew (Co-investigator), Patel, Shwetak (Principal Investigator)

Funding Sources

- University of Minnesota: Pediatric Device Innovation Consortium Total: \$34,621.00 (United States dollar)

Principal Investigator, Contract, Accessible Women's Health (Awarded) Dec. 2021 - Dec. 2022

Project Description: The excitement surrounding technology-mediated health tracking has led to the creation of designs that help menstruators track important aspects of their cycle to promote health awareness and intervention. However, multiple studies have identified design gaps such as prediction inaccuracy, gendered design, and a lack of promoting menstrual literacy. Our overarching goal is to create accurate and inclusive designs for menstrual tracking technologies. Our objectives to achieve this goal are as follows: (1) to create a framework with which we can create predictive models for key aspects of menstruation using physiological and self-reported data; and (2) to identify important design considerations for menstrual trackers that leverage the aforementioned data

Other Investigators: Truong, Khai (Principal Investigator)

Funding Sources

- Google: Unrestricted Gift Total: \$200,000.00 (Canadian dollar) Received: \$200,000.00 (Canadian dollar)

Principal Investigator, Grant, Continuous Passive Sensing for Bayesian Diagnostics in Mobile Health (Awarded) Sep. 2021 - Sep. 2023

Project Description: The long-term goal of my research program is to demonstrate that the combination of continuous passive sensing and explicit clinical assessments can produce proactive mHealth systems that are more accurate and efficient than mHealth systems employing either component on its own. Over the two-year term of this award, my research team will pursue a series of investigations, user studies, and deployments to create novel techniques that continuously track a person's behavior, symptoms, and physiology. We will innovate new ways of using passively sensed information to both trigger and improve the accuracy of clinical tests across health domains, such as stress and Parkinson's disease. Furthermore, we will be able to develop models that combine estimates from such tools to generate a holistic representation of the user's health in support of long-term disease management and adaptive interventions

Funding Sources

- University of Toronto: Connaught New Researcher Award Total: \$20,000.00 (Canadian dollar) Received: \$20,000.00 (Canadian dollar), (competitive)

Principal Applicant, Grant, Earbuds as a Sensing Platform for Physical and Mental Wellbeing (Awarded) Jun. 2021 - Jun. 2023

Project Description: In this proposal, we seek to utilize earbuds as a convenient endpoint through which we can support people's physical and mental wellbeing. Newer models of earbuds include sensors for enhancing the user experience: proximity sensors for in-ear detection, accelerometers for orientation sensing, and microphones for active noise cancellation. We will explore how these sensors can be leveraged for portable physiological sensing and activity recognition. Our primary focus will be on utilizing the earbuds' microphones to record body sounds like coughing and tidal breathing. Continuous cough detection will enable us to report key symptoms related to influenza-like diseases like cough rate and productivity. Beyond using body sounds as continuous vital sign measurements, we will also monitor tidal breathing to provide guidance during meditation sessions. Lastly, we will use the earbuds' accelerometers for continuous posture sensing and to provide guidance during neck exercises

Other Investigators: Wang, Yuntao (Principal Applicant)

Funding Sources

- University of Toronto: University of Toronto – Tsinghua University Joint Research Fund Total: \$40,000.00 (Canadian dollar) Received: \$20,000.00 (Canadian dollar), (competitive)

Principal Investigator, Grant, Continuous Passive Sensing for Bayesian Diagnostics in Mobile Health (Awarded) Apr. 2021 - Apr. 2026

Project Description: The long-term goal of my research program is to demonstrate that the combination of continuous passive sensing and explicit clinical tests can produce proactive mHealth systems that are more accurate and efficient than mHealth systems with either component on its own. Over the next five years, my research team will pursue a series of investigations, user studies, and deployments to create novel techniques that continuously track a person's behavior, symptoms, and physiology. We will innovate new ways of using passively sensed information to both trigger and improve the accuracy of clinical tests across health domains, including stress, Parkinson's disease, and infectious respiratory illnesses. Furthermore, we will be able to develop models that combine estimates from such tools to generate a holistic representation of the user's health for long-term disease management and adaptive interventions

Funding Sources

- Natural Sciences and Engineering Research Council of Canada (NSERC): Discovery Grant (Early Career Researcher) #RGPIN-2021-03457 Total: \$132,500.00 (Canadian dollar) Received: \$132,500.00 (Canadian dollar), (competitive)

Principal Investigator, Grant, Extending the Use of Time-of-Flight Cameras for Mobile Health (Awarded) Nov. 2020 - Nov. 2022

Project Description: Research in mobile health (mHealth) has primarily focused on the sensors that have been on standard smartphones over the past decade: IMUs, microphones, and cameras. The goal of this proposal is to leverage the time-of-flight (ToF) sensor embedded in Huawei's newest smartphones for mHealth. The ToF camera provides rich spatial information that can overcome many limitations of past computer vision-based apps. This proposal will produce two mHealth applications that highlight different strengths of the ToF camera. The first application will leverage the fact that the ToF camera can objectively measure length, area, and volume to detect instances of craniosynostosis—skull deformation that can happen during infant development. The second application will leverage the ability of ToF cameras to track 3D motion to quantify the severity of Parkinsonian tremor. These approaches will be generalizable to other problem settings, enabling new applications for the latest smart-phone technologies

Other Investigators: Brudno, Michael (Principal Investigator), Taati, Babak (Principal Investigator)

Funding Sources

- Huawei Technologies: Huawei-University of Toronto: Mobile AI Innovation Lab Total: \$193,000.00 (Canadian dollar) Received: \$45,000.00, (competitive)

Principal Applicant, Contract, University of Toronto Startup Funds (Awarded)

Aug. 2020 - Aug. 2025

Funding Sources

- University of Toronto: Startup Funds Total: \$600,000.00 Received: \$600,000.00

Principal Applicant, Fellowship, Qualcomm Innovation Fellowship (Completed)

Sep. 2016 - Sep. 2017

Other Investigators: Li, Hanchuan (Principal Applicant)

Funding Sources

- QUALCOMM Incorporated (USA): Innovation Fellowship Total: \$100,000.00 (United States dollar) Received: \$50,000.00, (competitive)

Principal Applicant, Fellowship, National Science Foundation Graduate Research Fellowship (Completed) Sep. 2015 - Sep. 2018

Funding Sources

- National Science Foundation (USA): Graduate Research Fellowship Total: \$102,000.00 (United States dollar) Received: \$102,000.00, (competitive)

ACTIVITIES

TEACHING ACTIVITIES

Courses Taught

Instructor, Winter CSC 2526: Topics in HCI and Ubiquitous Computing: Mobile Health Jan. 10, 2022 - Apr. 11, 2022

Computer Science, University of Toronto, Ontario, Canada, Academic Graduate

Lecture Hours Per Week: 2

Instructor, C4M: Computing for Medicine

Sep. 9, 2021 - Apr. 11, 2022

Medicine, University of Toronto, Ontario, Canada, Academic College

Lecture Hours Per Week: 3

Instructor, Winter CSC 318: The Design of Interactive Computational Media

Jan. 11, 2021 - Apr. 9, 2021

Computer Science, University of Toronto, Ontario, Canada, Academic

Undergraduate, Number of Students: 113

Lecture Hours Per Week: 1, Lab Hours Per Week: 2

Instructor, Spring EE 590A: Advanced Topics in Ubiquitous Computing

Mar. 29, 2018 - Jun. 7, 2018

Electrical Engineering, University of Washington, Washington, United States, Academic

Ubiquitous computing, Graduate, Number of Students: 35

Lecture Hours Per Week: 2, Tutorial Hours Per Week: 1

Course Development

Course Developer, Advanced Topics in Ubiquitous Computing

Mar. 29, 2018

Electrical Engineering, University of Washington, Washington, United States, Academic

The aim of this class is to introduce students to ubiquitous computing (ubicom). The content focuses on how traditional topics of computing have evolved to support the vision of a connected, portable, and human-centric computing environment. Because ubicomp is an applied field, the course covers contributions across various fields: human-computer interaction, embedded computing, computer vision, distributed systems, machine learning, and electrical engineering. Students gain practical experience in developing sensing systems for activity recognition and gestural interaction. The course is a combination of lectures, tutorials, class discussions, and demonstrations. Occasional tutorials on necessary skills are provided in the first half of the class-time (e.g., Android and Arduino programming). The rest of the class time is used for discussions on the required readings, Co-developers: Wang, Edward

SUPERVISORY ACTIVITIES**Student/Postdoctoral Supervision**

Principal Supervisor: Salaar Liaqat, Health Sensing using Smartwatches and Smartphones: Implications of Data Collection Design, (PhD Student)

Sep. 2022

Doctorate, In Progress

University of Toronto, Student Canadian Residency Status: Canadian Citizen

Other Supervisors

- de Lara, Eyal (Co-Supervisor)

Principal Supervisor: Filip Miscevic, Automatic Seizure Detection, Prediction, and Mitigation Using Minimally Invasive Implantable Bioelectrical Sensors, (MScAC Student)

Mar. 2022 - Dec. 2022

Master's Thesis, In Progress

University of Toronto

Student Country of Citizenship: Canada

Other Supervisors

- O'Leary, Gerard (Co-Supervisor)

Principal Supervisor: Dhruv Verma, Smartphone-Based Retinal Oximetry, (PhD Student) Sep. 2021 - Apr. 2026

Doctorate, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: India

Principal Supervisor: Sejal Bhalla, In-the-Wild Analysis of Inhalation Sounds for Continuous COPD Monitoring, (PhD Student) Sep. 2021 - Apr. 2026

Doctorate, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: India

Other Supervisors

- de Lara, Eyal (Co-Supervisor)

Principal Supervisor: Ken Christofferson, Automated Guidance for Robust Mobile Spirometry, (PhD Student) Sep. 2021 - Apr. 2025

Doctorate, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: United States

Other Supervisors

- Cafazzo, Joe (Co-Supervisor)

Co-Supervisor: Georgianna Lin, Accurate, Inclusive, and Accessible Menstrual Tracking, (PhD Student) Sep. 2021 - Apr. 2025

Doctorate, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: United States

Other Supervisors

- Truong, Khai (Co-Supervisor)

Co-Supervisor: Ian Ruffolo, Augmented Reality Guidance for Smartphone-based Motor Assessments, (MSc Student) Jun. 2021 - Apr. 2023

Master's Thesis, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: Canada

Other Supervisors

- Brudno, Michael (Co-Supervisor)

Co-Supervisor: Brenna Li, Design Considerations for Chatbots Facilitating Patient-Physician Conversations, (PhD Student) Aug. 2020 - Apr. 2024

Doctorate, In Progress

University of Toronto, University of Toronto

Student Country of Citizenship: Canada

Other Supervisors

- Truong, Khai (Principal Supervisor)

ADMINISTRATIVE ACTIVITIES

Event Administration

Co-Organizer, Workshop, Workshop on Emerging Devices for Digital Biomarkers (DigiBiom) (Jul. 2022 - Jul. 2022) Feb. 2022 - Jul. 2022

Primary Event Organizer: T Rahman, E Wang, and A Mariakakis

Online Conference Co-Chair, Conference, ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp) (Sep. 2020 - Sep. 2020)
Jun. 2020 - Sep. 2020

Video Preview Co-Chair, Conference, ACM Conference on Human Factors in Computing Systems (CHI) (Apr. 2019 - Apr. 2019)
Jan. 2019 - Apr. 2019

Founder and Co-Organizer, Workshop, DUB (Design, Use, Build) Doctoral Colloquium (Apr. 2017 - Apr. 2017)
Jan. 2017 - Apr. 2017

Organizer, Workshop, National Science Foundation Graduate Research Fellowship Information Session and Workshop (Sep. 2016 - Sep. 2018)
Sep. 2016 - Sep. 2018

ADVISORY ACTIVITIES

Mentoring Activities

Mentor
Aug. 2022 - Jun. 2023

University of Toronto, Ontario, Canada, Academic

Jose S, Kaur R, Kondoor A, Chan Z, Number of Mentorees: 4, Project advisor for Biomedical Incubator Capstone Project (JPM400Y)

Mentor
Aug. 2021 - Apr. 2022

University of Toronto, Ontario, Canada, Academic

Liu I; Maher A; Li B, Number of Mentorees: 3, Project advisor for Biomedical Incubator Capstone Project (JPM400Y)

ASSESSMENT AND REVIEW ACTIVITIES

Journal Review Activities

Reviewer (Blind)
Jul. 2021

Journal of Medical Internet Research (JMIR), Number of Works Reviewed / Refereed: 3

Reviewer (Double Blind)
Mar. 2019

ACM Transactions on Computer-Human Interaction (TOCHI), Number of Works Reviewed / Refereed: 1

Reviewer (Double Blind)
Feb. 2017

Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Number of Works Reviewed / Refereed: 37

Reviewer (Blind)
Oct. 2015

IEEE Pervasive Computing, Number of Works Reviewed / Refereed: 4

Reviewer (Blind)
Dec. 2019 - Dec. 2019

IEEE Sensors, Number of Works Reviewed / Refereed: 1

Reviewer (Double Blind)
Nov. 2018 - Nov. 2018

Biomedical Optics Express, Number of Works Reviewed / Refereed: 1

Reviewer (Double Blind)
May 2018 - Jul. 2018

ACM Conference on Computer Supported Cooperative Work (CSCW), Number of Works Reviewed / Refereed: 1

Conference Review Activities

Mariakakis, Alex

December 7, 2022

Reviewer, Double Blind

Jul. 2020

International Symposium on Wearable Computers (ISWC), Number of Works Reviewed / Refereed: 1

Reviewer, Double Blind

Jun. 2019

ACM Human-Computer Interaction with Mobile Devices and Services (MobileHCI), Number of Works Reviewed / Refereed: 16

Reviewer, Double Blind

Nov. 2016

ACM Conference on Human Factors in Computing Systems (CHI), Number of Works Reviewed / Refereed: 30

Reviewer, Double Blind

Apr. 2015

ACM User Interface Software and Technology (UIST), Number of Works Reviewed / Refereed: 24

Reviewer, Double Blind

Jan. 2018 - Feb. 2020

ACM Conference on Human Factors in Computing Systems, Late Breaking Work (CHI LBW), Number of Works Reviewed / Refereed: 13

Reviewer, Double Blind

Aug. 2017 - Sep. 2017

IEEE Virtual Reality and 3D User Interfaces (VR), Number of Works Reviewed / Refereed: 1

Reviewer, Double Blind

Apr. 2016 - Apr. 2016

ACM Symposium on Applied Perception (SAP), Number of Works Reviewed / Refereed: 1

Reviewer, Double Blind

Apr. 2015 - May 2016

ACM Ubiquitous Computing (UbiComp), Number of Works Reviewed / Refereed: 8

Graduate Examination Activities

PhD Oral Exam Chair, Yasaman Rohanifar

Oct. 2022

Computer Science, University of Toronto, Ontario, Canada, Academic

PhD Oral Exam Chair, Caroline Malin-Mayor

Aug. 2022

Computer Science, University of Toronto, Ontario, Canada, Academic

PhD Oral Exam Member, Yi Zhu

Aug. 2022

Computer Science, Institut national de la recherche scientifique, Quebec, Canada, Academic

PhD Oral Exam Chair, Ananya Bhattacharjee

Mar. 2022

Computer Science, University of Toronto, Ontario, Canada, Academic

PhD Oral Exam Member, Sujay Nagaraj

Aug. 2021

Computer Science, University of Toronto, Ontario, Canada, Academic

PhD Oral Exam Member, Chunjong Park

Mar. 2021

Computer Science and Engineering, University of Washington, Washington, United States, Academic

Master's Oral Exam Chair, Sam Osia

Oct. 2021 - Nov. 2022

Biomedical Engineering, University of Toronto, Ontario, Canada, Academic

PhD Oral Exam Member, Saeid Alavi Naeini

Oct. 2021 - Sep. 2022

Biomedical Engineering, University of Toronto, Ontario, Canada, Academic

Master's Proposal Defense Member, Eric Lu

Jun. 2021 - Sep. 2021

Mariakakis, Alex

December 7, 2022

Computer Science, University of Toronto, Ontario, Canada, Academic

Master's Proposal Defense Chair, Navid Korhani

Jun. 2021 - Sep. 2021

Computer Science, University of Toronto, Ontario, Canada, Academic

Master's Oral Exam Chair, Minfan Zhang

Nov. 2020 - Apr. 2022

Computer Science, University of Toronto, Ontario, Canada, Academic

Research Funding Application Assessment Activities

Committee Member, Funder, Academic Reviewer

Sep. 2022

Mitacs

Accelerate Program, Number of Applications Assessed: 1

Knowledge and Technology Translation

Presenter

Mar. 2022 - Mar. 2022

Community Engagement, Pursue STEM, General Public

Outcome / Deliverable: My graduate students and I led a three-hour session related to applications of computer vision in health. The high school students had the chance to try out various image processing and deep learning techniques through catered code that was provided to them ahead of time. We also delivered two presentations related to our group's research and the intersection of health + CS more broadly

Activity Description: Pursue STEM is an outreach program that encourages and supports Black high school students interested in science, technology, engineering, and math (STEM). The program is delivered in partnership with the Lifelong Leadership Institute which offers the Leadership by Design (LBD) program. The LBD program provides innovative leadership development opportunities to promising Black youth in the Greater Toronto Area. Students enter the LBD program in their Grade 10 year and progress lockstep through subsequent grades as a distinct cohort. Hence, the LBD program is a multi-year and multi-layered program

Course Consultant

Oct. 2017 - Dec. 2017

Consulting for Industry, Microsoft, Industry/Business (>500 employees), <https://www.edx.org/course/introduction-to-device-programming>

Outcome / Deliverable: I helped create Microsoft edX's course called "Introduction to Device Programming". I provided input on many of the courses modules, but I specifically created Module 2 on basics of the C programming language

Activity Description: Microsoft offers introductory online courses for people who are interested in learning a new skill in computer science. I was recruited by Kasey Champion, a member of Microsoft's Learning Team, to provide input on a course related to device programming. This course includes overviews of Arduino, the C programming language, simple circuits, and integrating Arduino with Azure Cloud resources

Presenter / Mentor

Mar. 2017 - Mar. 2019

Community Engagement, National Center for Women & Information Technology, Academic Personnel, <https://www.aspirations.org/aspirations-community/washington-seattle-and-west>

Outcome / Deliverable: As a graduate student, I led our research group's involvement with the NCWIT. We had at least 5 female interns from middle or high school complete summer internships with our research group, and I specifically mentored three of those individuals. Additionally, I have provided demonstrations at the NCWIT award ceremonies, which taught students and their parents about applications of computer science

Activity Description: The National Center for Women & Information Technology (NCWIT) is a nonprofit designed to increase the meaningful participation of girls and women in computing. Our research group has worked with middle and high school women who have later received awards from the NCWIT. We have also provided demonstrations at the NCWIT award ceremony, which has both taught attendees about applied topics in computer science and allowed us to recruit talented girls and women for summer internships

Lecturer

Jul. 2016 - Jul. 2017

Community Engagement, Seattle-Area High School Teachers, Academic Personnel,
<https://news.cs.washington.edu/2016/07/10/10th-anniversary-of-uw-cses-cs4hs/> <https://cs4teachers.cs.washington.edu>

Outcome / Deliverable: I taught a lecture in the program that introduced the teachers to the fields of human-computer interaction and ubiquitous computing. The lectures also included demonstrations of concepts and technologies that could be reproduced in their classrooms

Activity Description: The University of Washington's CS4HS program is designed to teach local high school teachers about the importance of computer science and the help them identify ways that they could get exposure their students to the field before their students graduate

Presenter

Jun. 2016 - Jun. 2016

Community Engagement, Government Personnel, <https://news.cs.washington.edu/2016/06/18/sen-maria-cantwell-uw-cse>

Outcome / Deliverable: I provided demonstrations and presentations on applications of computer science for mobile health and interaction. The work included my own research as well as other projects from research group during my PhD

Activity Description: Senator Maria Cantwell visited the Department of Computer Science and Engineering to learn about how the state government's funding of the University of Washington has led to new innovations that have broad impacts outside of academia

Researcher

Feb. 2016 - Jul. 2017

Involvement in/Creation of Start-up, Senosis Health, Industry/Business-Small (<100 employees),
<https://www.geekwire.com/2017/exclusive-google-buys-seattle-health-monitoring-startup-senosis-bolstering-digital-health-push>

Outcome / Deliverable: Senosis Health was acquired by Google in July 2017. My project on scleral jaundice (BiliScreen) was part of the intellectual property included in the agreement

Activity Description: Senosis Health is a startup created by my PhD advisor for his research group's mobile health research. Senosis was acquired by Google in July 2017 to help with their endeavors in digital health

Presenter

Sep. 2015 - Sep. 2015

Community Engagement, University of Washington Foundation, Academic Personnel,
<https://news.cs.washington.edu/2015/09/15/changing-the-world-faculty-and-students-demonstrate-cses-impact-to-the-uw-foundation-board>

Outcome / Deliverable: I provided demonstrations and presentations on applications of computer science for mobile health and interaction. The work included my own research as well as other projects from research group during my PhD

Activity Description: The University of Washington Foundation is a group of alumni and other major donors to the University. The Department of Computer Science and Engineering held an event where graduate students working on particularly impactful projects were asked to present their work to members of the Foundation

Presenter

Nov. 2014 - Dec. 2018

Community Engagement, DawgBytes Program, General Public, <https://www.cs.washington.edu/outreach/k12>

Outcome / Deliverable: As a graduate student, I organized, led, and presented our research group's booth at the yearly DawgBytes Computing Open House event

Activity Description: The DawgBytes Program is the official K-12 outreach program for the School of Computer Science and Engineering at the University of Washington. One of the events that DawgBytes holds every year is the Computer Open House where children and their parents can come on campus to learn more about computer science

Presenter

Apr. 2014 - Apr. 2018

Community Engagement, Engineering Discovery Days Program, General Public,
<https://www.engr.washington.edu/about/k12/discovery-days>

Outcome / Deliverable: As a graduate student, I organized, led, and presented our research group's booth at the yearly Engineering Discovery Days event

Activity Description: The Engineering Discovery Days Program is the official K-12 outreach program for the School of Engineering at the University of Washington. Every April, the program organizes a 2-day event where students visit the campus to learn about and experience real-world applications of different disciplines in engineering

International Collaboration Activities

Co-Lead Organizer and Mentor

Jul. 2020 - Sep. 2020

China

I helped co-create and organize the Access Computing Summer Program, a program sponsored by the Global Innovation Exchange as part of a long-term collaboration between the University of Washington and Tsinghua University. The program is targeted towards senior undergraduate and junior graduate students in the United States and China who are interested in developing research skills in ubiquitous computing and human-computer interaction. The students in this program not only receive guidance on a summer project, but also regularly attend group meetings, guest lectures, and workshops to expand their knowledge base (virtually due to COVID-19)

Mentor

Sep. 2018 - Oct. 2018

Singapore

The Broadening Participation Workshop at the ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp) aims to increase the involvement of women, all researchers from developing countries, as well as underrepresented minorities, including persons with disabilities, in the field of ubiquitous and wearable computing

MEMBERSHIPS

Committee Memberships

Co-chair, Editorial Board

Apr. 2022

Digital Public Health Surveillance: Methods, Approaches and Challenges (Digital Frontiers Issue), Academic

Committee Member, Health Program Subcommittee

Sep. 2022 - Jan. 2023

ACM Conference on Human Factors in Computing Systems (CHI), Academic

Committee Member, Workshop Program Committee

Jul. 2022 - Nov. 2022

Workshop on Urban Sensor Networks (USN), Academic

Workshop held at ACM Conference on Embedded Networked Sensor Systems (SenSys)

Committee Member, Posters/Demo Program Committee

Jul. 2022 - Nov. 2022

ACM Conference on Embedded Networked Sensor Systems (SenSys), Academic

Committee Member, Workshop Program Committee

Jul. 2022 - Sep. 2022

Workshop on Computing for Well-Being (Wellcomp), Academic

Workshop held at ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)

Co-chair, Posters & Notes Committee

Feb. 2022 - Jul. 2022

ACM SIGCAS Computing and Sustainable Societies (COMPASS), Academic

Committee Member, Workshop Program Committee

May 2021 - Jun. 2021

Workshop on Emerging Devices for Digital Biomarkers (DigiBiom), Academic

Workshop held at ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)

Committee Member, Editorial Board

Feb. 2021 - Feb. 2023

Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Academic

Mariakakis, Alex

December 7, 2022

Committee Member, Editorial Board

Jan. 2021 - May 2022

ACM International Conference on Mobile Human-Computer Interaction (MobileHCI), Academic

Committee Member, Interaction Techniques Program Subcommittee

Sep. 2020 - Dec. 2020

ACM Conference on Human Factors in Computing Systems (CHI), Academic

Committee Member, Late-Breaking Works Program Committee

Jan. 2020 - Feb. 2020

ACM Conference on Human Factors in Computing Systems (CHI), Academic

Committee Member, Program Committee

Apr. 2019 - Jul. 2019

ACM Symposium on User Interface Software and Technology (UIST), Academic

Committee Member, Workshop Program Committee

Jul. 2018 - Aug. 2019

International Workshop on Ubiquitous Personal Assistance (UPA), Academic

Workshop held at ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)

Other Memberships

Member

Dec. 2020

Temerty Centre for Artificial Intelligence Research and Education in Medicine (T-CAIREM), Academic

T-CAIREM seeks to establish world-class educational programs in AI in medicine, fund research opportunities that bring together experts from a range of disciplines, and create a secure data platform to house datasets for applied AI learning and research

MOST SIGNIFICANT CONTRIBUTIONS

1. Mariakakis, Alex. (2022, January). Health Concept Surveying.
Although rapid prototyping methods are useful for projecting the adoption and acceptability of a health intervention technology (HIT), they rarely provide usable evidence that can contribute to our broader understanding of HITs. As a postdoctoral researcher, I proposed a method called Health Concept Surveying (HCS) for untangling the causal relationships that people develop around conceptual HITs. In HCS, investigators gather reactions to design concepts through a scenario-based survey instrument. As the investigator manipulates HIT characteristics, the survey instrument also measures proximal cognitive factors according to a behavior change model to project how HIT design decisions may affect the adoption and acceptability of a HIT. Responses to the survey instrument are analyzed using path analysis to untangle the causal effects of these factors on outcome variables. I published this work with my colleagues in the JMIR Human Factors journal
2. Mariakakis, Alex. (2020, December). RDTScan.
Rapid diagnostic tests are inexpensive chemical tests that produce a colorimetric output depending on the viral load in a biological sample. RDTs are becoming more widely available for screening diseases like malaria and COVID-19, yet one concern is that untrained people may misinterpret their RDT's colorimetric output. As a postdoctoral researcher, I supervised a graduate student in the development of an open-source software library called RDTScan that supports automatic RDT interpretation with the smartphone's camera. Using real-time image processing and computer vision, the library provides guides users to capture a high-quality photograph of their completed RDT and then analyzes the photograph to interpret the test's results on their behalf. We have helped three global health organizations integrate RDTScan into their workflows, which has resulted in publications to venues such as the ICTD Conference, ACM IMWUT, and BMJ Open
3. Mariakakis, Alex. (2020, July). EcoPatches.
Year-round ultraviolet (UV) exposure silently causes skin damage that goes unnoticed until sunburn. As an intern at Microsoft Research, I was part of a team composed of chemists, designers, and computer scientists tasked with supporting personal UV monitoring. We created inkjet-printable chemical stickers

called EcoPatches that change their color in response to UV radiation over time. We designed EcoPatches to be human-readable so that people can notice large changes throughout the day. We also made EcoPatches interpretable with computer vision to help people with low color acuity. My specific contributions to this project included deciding the specifications of the EcoPatches' color response and creating a computer vision algorithm to interpret the EcoPatches' color change. We published this work at ACM DIS

4. Mariakakis, Alex. (2017, September). PupilScreen.

One biosignal that physicians use to screen a person for a traumatic brain injury is the pupillary light reflex (PLR) — the involuntary change in a person's pupil size in response to a light stimulus. As a graduate student, I led a project called PupilScreen to investigate whether a smartphone's camera could be used to measure a person's PLR. The PupilScreen app constricts a person's pupils with the smartphone's flash and records a video of the pupils' response. The app then processes the video using a fully convolutional neural network and signal processing to report key metrics like pupil constriction velocity. We published our work in ACM IMWUT and a journal called Neurosurgery. After I presented our findings at ACM UbiComp, we further disseminated our work through interviews with news outlets like Newsweek and Voice of America News. We filed a patent for our technology, and I maintain an advisory role for a startup that my clinical collaborators are pursuing around this project

5. Mariakakis, Alex. (2017, September). BiliScreen.

One of the perceptible symptoms of pancreatic cancer is jaundice — the yellowing of the skin and eyes due to excess bilirubin in the blood. Although jaundice is obvious in severe cases, the ability to identify subtle instances of jaundice could lead to earlier detection of pancreatic cancer. As a graduate student, I led a project called BiliScreen that investigated whether a photograph from a smartphone's camera could be used to identify subtle cases of scleral jaundice. In brief, the underlying algorithm uses image processing to summarize the color of a person's sclera as a feature vector that is fed into a machine learning model to estimate a person's bilirubin level. We published our work to ACM IMWUT, presented our results at ACM UbiComp, and subsequently filed a patent. We also disseminated our findings through media outlets like the BBC and Reuters. This project was one of many that formed a startup led by my PhD advisor called Senosis, which has since been acquired by Google

CONTRIBUTIONS

1. Mariakakis, Alex T.. (2022, August). *Making Medical Assessments Available and Objective Using Smartphone Sensors*. Toronto Human-AI Interaction Summer Research School, Toronto, Canada.
2. Mariakakis, Alex T.. (2022, May). *Making Medical Assessments Available and Objective Using Smartphone Sensors*. Human-Machine Interaction Lab, Huawei Canada, Toronto, Canada.
3. Mariakakis, Alex T.. (2022). *Making Medical Assessments Available and Objective Using Smartphone Sensors*. Institute for Biomedical Engineering, Science and Technology (iBest), Ryerson University, Toronto, Canada.
4. Mariakakis, Alex T.. (2020, October). *Making Medical Assessments Available and Objective Using Smartphone Sensors*. Consumer Business Group, Huawei Canada, Toronto, Canada.
5. Mariakakis, Alex T.. (2020). *EcoPatches: Maker-Friendly Chemical-Based UV Sensing*. ACM Conference on Designing Interactive Systems (DIS), Eindhoven, Netherlands.
6. Mariakakis, Alex T.. (2020). *Objectifying Subjective Medical Assessments Using Smartphone Sensors*. University of Toronto Department of Computer Science Lecture Series, Toronto, Canada.
7. Mariakakis, Alex T.. (2019). *Objectifying Subjective Medical Assessments Using Smartphone Sensors*. University of Virginia Department of Computer Science Lecture Series, Charlottesville, United States.
8. Mariakakis, Alex T.. (2019). *Objectifying Subjective Medical Assessments Using Smartphone Sensors*. Georgia Tech School of Interactive Computing Lecture Series, Atlanta, United States.
9. Mariakakis, Alex T.. (2018). *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. mHealth Symposium, Seattle, United States.
10. Mariakakis, Alex T.. (2018). *Drunk User Interfaces: Determining Blood Alcohol Level Through Everyday Smartphone Tasks*. ACM Conference on Human Factors in Computing Systems (CHI), Montreal, Canada.

11. Mariakakis, Alex T.. (2017). *PupilScreen: Using Smartphones to Assess Traumatic Brain Injury*. ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp), Maui, United States.
12. Mariakakis, Alex T.. (2017). *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. Seattle Quantified Self Meetup, Seattle, United States.
13. (2017). *Using Mobile Devices to Quantify Traditionally Qualitative Health Measures*. HalfMoon Education: Internet of Things Workshop, Seattle, United States.
14. Mariakakis, Alex T.. (2017). *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp), Maui, United States.
15. Mariakakis, Alex T.. (2017). *BiliScreen: Smartphone-based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders*. University of Washington Computer Science and Engineering Industry Affiliates, Seattle, United States.
16. Mariakakis, Alex T.. (2016). *Ocular Symptom Detection Using Smartphones*. University of Washington Computer Science and Engineering Industry Affiliates, Seattle, United States.
17. Mariakakis, Alex T.. (2016). *Ocular Symptom Detection Using Smartphones*. ACM International Joint Conference on Pervasive and Ubiquitous Computing, Doctoral School (UbiComp DS), Heidelberg, Germany.
18. Mariakakis, Alex T.. (2016). *A Smartphone-based System for Assessing Intraocular Pressure*. Microsoft Student Summit on Mobility, Systems, and Networking, Petaluma, United States.
19. Mariakakis, Alex T.. (2015). *SwitchBack: Improving Interaction with Mobile Devices*. ACM Conference on Human Factors in Computing Systems (CHI), Seoul, Korea, Republic of.
20. Mariakakis, Alex T.. (2014). *SwitchBack: Improving Interaction with Mobile Devices*. University of Washington Computer Science and Engineering Industry Affiliates, Seattle, United States.

INTERVIEWS AND MEDIA RELATIONS

Broadcast Interviews

1. Mariakakis, Alex. (2017, November 22 - 2017, November 22). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. NSF Science Now. The National Science Foundation.
2. Mariakakis, Alex. (2017, September 13 - 2017, September 13). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. Science & Health. VOA News.
3. Mariakakis, Alex. (2017, September 8 - 2017, September 8). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. KIRO 7 News. KIRO 7.
4. Mariakakis, Alex. (2017, September 7 - 2017, September 7). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. KOMO News. KOMO 4.
5. Mariakakis, Alex. (2017, September 3 - 2017, September 3). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. KING 5 News. KING 5.
6. Mariakakis, Alex. (2017, September 1 - 2017, September 1). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. BBC News. BBC.
7. Mariakakis, Alex. (2017, August 30 - 2017, August 30). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. KIRO 7 News. KIRO 7.
8. Mariakakis, Alex. (2017, August 30 - 2017, August 30). *BiliScreen: smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. KUOW Public Radio. KUOW - NPR Seattle Affiliate.
9. Mariakakis, Alex. (2017, August 28 - 2017, August 28). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. KTLA 5 News at 10. KTLA 5.

Text Interviews

1. Mariakakis, Alex. (2020, August 30). *The future of mobile health*. To Vima (Greek newspaper).
2. Mariakakis, Alex. (2020, July 21). *Colorimetric chemical sensors for detecting environmental hazards*. New Scientist.

3. Mariakakis, Alex. (2017, October 9). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. NVIDIA.
4. Mariakakis, Alex. (2017, September 22). *Feature profile as "Geek of the Week"*. Geekwire.com.
5. Mariakakis, Alex. (2017, September 11). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. Newsweek.
6. Mariakakis, Alex. (2017, September 7). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. New Atlas.
7. Mariakakis, Alex. (2017, September 6). *PupilScreen: a smartphone app for measuring the pupillary light reflex as an indicator of traumatic brain injury*. Xconomy.
8. Mariakakis, Alex. (2017, August 31). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. IEEE Spectrum.
9. Mariakakis, Alex. (2017, August 30). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. USA Today.
10. Mariakakis, Alex. (2017, August 28). *BiliScreen: a smartphone app for measuring scleral jaundice as an early screening tool for pancreatic cancer*. United Press International.

PUBLICATIONS

Journal Articles

1. Mariakakis, Alex; Karkar, Ravi; Patel, Shwetak; Kientz, Julie; Fogarty, James; Munson, Sean. (2022, January). HCS: Health Concept Surveying for Eliciting Usable Evidence. *JMIR Human Factors*, 9(1), 1–21. Retrieved from doi:10.2196/30474
2. *Bhattacharjee A; *Pang J; *Liu A; Mariakakis A; Williams, JJ. (2022). Design Implications for One-Way Text Messaging Services that Support Psychological Wellbeing. *ACM Transactions on Computer-Human Interaction (TOCHI)*. Retrieved from doi:10.1145/3569888
3. *Bhattacharjee, Ananya; Williams, Joseph Jay; *Chou, Karrie; *Tomlinson, Justice; Meyerhoff, Jonah; Mariakakis, Alex; Kornfield, Rachel. (2022). I Kind of Bounce off It": Translating Mental Health Principles into Real Life Through Story-Based Text Messages. *Proceedings of the ACM ComputerSupported Cooperative Work and Social Computing (CSCW)*, 6(CSCW2). Retrieved from doi:10.1145/3555123
4. Sieberts, Solveig; Borzymowski, Henryk; Guan, Yuanfang; Huang, Yidi; Matzner, Ayala; Page, Alex; Bar-Gad, Izhar; Beaulieu-Jones, Brett; El-Hanani, Yuval; Goschenhofer, Jann; Javidnia, Monica; Keller, Mark S; Li, Yan-chak; Venuto, Charles; Saqib, Mohammed; Smith, Greta; Stanescu, Ana; Zielinski, Robbie; Jayaraman, Arun; Evers, Luc JW; Foschini, Luca; Mariakakis, Alex; Pandey, Gaurav; Shawen, Nicholas; Snyder, Phil; Omberg, Larsson. (2021, October). Developing better digital health measures of Parkinson's disease using free living data and a crowdsourced data analysis challenge. *Nature Digital Medicine*, preprint, 1–24. Retrieved from doi:10.1101/2021.10.20.21265298 (Submitted)
5. *Sklavounos, Alexandros; Lamanna, Julian; Modi, Dimpy; *Gupta, Sidharth; Mariakakis, Alex; Callum, Jeannie; Wheeler, Aaron. (2021, August). Digital Microfluidic Hemagglutination Assays for Blood Typing, Donor Compatibility Testing, and Hematocrit Analysis. *Clinical Chemistry*, 67(12), 1699–1708. Retrieved from doi:10.1093/clinchem/hvab180
6. *Park, Chunjong; *Ngo, Hung; *Lavitt, Libby Rose; Karuru, Vincent; Bhatt, Shiven; Lubell-Doughtie, Peter; Shankar, Anuraj; Ndwiga, Leonard; Osoti, Victor; Wambua, Juliana; Bejon, Philip; Ochola-Oyier, Lynette Isabella; Chilver, Monique; Stocks, Nigel; Lyon, Victoria; Lutz, Barry; Thompson, Matthew; Mariakakis, Alex; Patel, Shwetak. (2021). The Design and Evaluation of a Mobile System for Rapid Diagnostic Test Interpretation. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 5(1). Retrieved from doi:10.1145/3448106
7. *Liu, Xin; *Li, Yuang; *Fromm, Josh; Wang, Yuntao; Jiang, Ziheng; Mariakakis, Alex; Patel, Shwetak. (2021). SplitSR: An End-to-End Approach to Super-Resolution on Mobile Devices. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 5(1). Retrieved from doi:10.1145/3448104
8. Lyon, Victoria; Suchsland, Monica; Chilver, Monique; Stocks, Nigel; Lutz, Barry; Su, Philip; Cooper, Shawna; *Park, Chunjong; *Lavitt, Libby; Mariakakis, Alex; Patel, Shwetak; Graham, Chelsey; Rieder, Mark; LeRouge, Cynthia; Thompson, Matthew. (2020, November). Diagnostic accuracy of an app-

guided, self-administered test for influenza among individuals presenting to general practice with influenza-like illness: Study protocol. *British Medical Journal Open (BMJ Open)*, 10(11), e036298. Retrieved from doi:10.1136/bmjopen-2019-036298

9. Mariakakis, Alex; Wang, Edward; Patel, Shwetak; Goel, Mayank. (2019). Challenges in Realizing Smartphone-Based Health Sensing. *IEEE Pervasive Computing*, 18(2), 76--84. Retrieved from doi:10.1109/MPRV.2019.2907007
Best Paper Runner-Up
10. McGrath, Lynn; Eaton, Jessica; Law, Anthony; Mariakakis, Alex; Patel, Shwetak; Levitt, Michael. (2019). Mobile Digital Pupillometry for Rapid Triage of Patients With Severe Traumatic Brain Injury. *Neurosurgery*, 66(Supplement), nyz310_844. Retrieved from doi:10.1093/neuros/nyz310_844
11. Mariakakis, Alex; Baudin, Jacob; Whitmire, Eric; *Mehta, Vardhman; *Banks, Megan A; Law, Anthony; McGrath, Lynn; Patel, Shwetak. (2017). PupilScreen: Using Smartphones to Assess Traumatic Brain Injury. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 1(3). Retrieved from doi:10.1145/3131896
12. Mariakakis, Alex; *Banks, Megan A; Phillipi, Lauren; Yu, Lei; Taylor, James; Patel, Shwetak. (2017). BiliScreen: Smartphone-Based Scleral Jaundice Monitoring for Liver and Pancreatic Disorders. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*, 1(2). Retrieved from doi:10.1145/3090085

Dissertations

1. (2019, June). *Making Medical Assessments Available and Objective Using Smartphone Sensors*. Retrieved from Retrieved from <http://hdl.handle.net/1773/44138>

Working Papers

1. Seto E, Berhane Russom M, Mattmiller M, Ranganathan V, Brown K, Vannucci P, Mariakakis A, Basha E, Khurshid S. (2020). *Democratizing Digital Solutions to Improve Public Health and Urban Air Quality*. Retrieved from Retrieved from https://www.microsoft.com/en-us/research/uploads/prod/2020/09/Public-Health_final.pdf
2. Mariakakis A, Chen S, Nguyen B, Bray K, Blank M, Lester J, Ryan L, Johns P, Ramos G, Roseway A. (2020). *Project Calico: Wearable Chemical Sensors for Environmental Monitoring*. Retrieved from Retrieved from <https://arxiv.org/abs/2006.15292>

Conference Publications

1. Zhu Y*, Mariakakis A, de Lara E, Falk T. (2022). How Generalizable and Interpretable are Speech-Based COVID-19 Detection Systems?: A Comparative Analysis and New System Proposal. In *IEEE International Conference on Biomedical and Health Informatics (BHI)*. Retrieved from doi:10.1109/BHI56158.2022.9926950
2. Liaqat S*, Falk T, To T, Andany N, Patel N, Wu R, Gershon A, Mariakakis A, de Lara E, Liaqat D*. (2022). Predicting Low Oxygen Saturation of COVID-19 Patients Using a Random Forest Classifier. In *American Thoracic Society (ATS)*. Retrieved from Retrieved from https://www.atsjournals.org/doi/pdf/10.1164/ajrccm-conference.2022.205.1_MeetingAbstracts.A3159
3. Gershon A, Patel N, Wu R, Liaqat S*, Liaqat D*, de Lara E, Mariakakis A, Simor A, Lam P, Masood S, Andany N, Daneman N, Chan A, To T, Falk T. (2022). Trends in Oxygen Level During Acute COVID-19 Infection in Patients Quarantining at Home. In *American Thoracic Society (ATS)*. Retrieved from Retrieved from https://www.atsjournals.org/doi/pdf/10.1164/ajrccm-conference.2022.205.1_MeetingAbstracts.A3169
4. Christofferson K*, Chen X*, Wang Z*, Mariakakis A, Wang Y. (2022). Sleep Sound Classification Using ANC-Enabled Earbuds. In *Human-Centered Computational Sensing (HCCS) Workshop at IEEE International Conference on Pervasive Computing and Communications (PerCom)*. Retrieved from doi:10.1109/PerComWorkshops53856.2022.9767394
5. Gupta S*, Sklavounos A*, Dahmer J*, Yong A*, Abdullah M*, Camacho G*, Morton K, Siu M, Labrecque J, Veres T, Wheeler A, Mariakakis A. (2022). Machine Learning to Automate the Visual Interpretation of Chemical Agglutination Tests. In *Workshop on Annotation of User Data for Ubiquitous Systems*

- (*ARDUOUS*) at *IEEE International Conference on Pervasive Computing and Communications (PerCom)*. Retrieved from doi:10.1109/PerComWorkshops53856.2022.9767280
6. Sedaghat T*, Liaqat S*, Liaqat D*, Wu R, Gershon A, Son T, Falk T, Gabel M*, Mariakakis A, de Lara E. (2022). Unobtrusive Monitoring of COPD Patients using Speech Collected from Smartwatches in the Wild. In *Workshop on Sensing Systems and Applications Using Wrist Worn Smart Devices (WristSense) at IEEE International Conference on Pervasive Computing and Communications (PerCom)*. Retrieved from doi:10.1109/PerComWorkshops53856.2022.9767283
 7. Chidziwisano G*, Mariakakis A, Wyche S, Mafeni B, Banda E. (2021). NkhukuProbe: Using a Sensor-Based Technology Probe to Support Poultry Farming Activities in Malawi. In *ACM Conference on Computing and Sustainable Societies (COMPASS)*. Retrieved from doi:10.1145/3460112.3471962
Best Paper
 8. Sarda D*, Park C*, Ngo H*, Patel S, Mariakakis A. (2021). RDTCheck: A Smartphone App for Monitoring Rapid Diagnostic Test Administration. In *ACM Conference on Human Factors in Computing Systems: Late-Breaking Work (CHI LBW)*. Retrieved from doi:10.1145/3411763.3451821
 9. Park C*, Arian M*, Liu X*, Sasson L, Kahn J, Patel S, Mariakakis A, Althoff T. (2021). Online Mobile App Usage as an Indicator of Sleep Behavior and Job Performance. In *International World Wide Web Conference (WWW)*. Retrieved from doi:10.1145/3442381.3450093
 10. Zhang M*, Mariakakis A, Burke J, Wobbrock J. (2021). A Comparative Study of Lexical and Semantic Emoji Suggestion Systems. In *iConference*. Retrieved from doi:10.1007/978-3-030-71292-1_20
 11. Mariakakis A, Chen S, Nguyen B, Bray K, Blank M, Lester J, Ryan L, Johns P, Ramos G, Roseway A. (2020). EcoPatches: Maker-Friendly Chemical-Based UV Sensing. In *ACM Conference on Designing Interactive Systems (DIS)* (p. 1983–1994). Retrieved from doi:10.1145/3357236.3395424
 12. Park C*, Mariakakis A, Yang J, Lassala D, Djiguiba Y, Keita Y, Diarra H, Wasunna B, Fall F, Gaye M, Ndiaye B, Johnson A, Holeman I, Patel S. (2020). Supporting Smartphone-Based Image Capture of Rapid Diagnostic Tests in Low-Resource Settings. In *International Conference of Information and Communication Technologies on Development (ICTD)* (p. 1–11). Retrieved from doi:10.1145/3392561.3394630
 13. Xu X, Shi H, Yi X, Liu W, Yan Y, Shi Y, Mariakakis A, Mankoff J, Dey Anind. (2020). EarBuddy: Enabling On-Face Interaction via Wireless Earbuds. In *ACM Conference on Human Factors in Computing Systems (CHI)*. Retrieved from doi:10.1145/3313831.3376836
 14. Li H, Whitmire E, Mariakakis A, Chan V, Sample A, Patel S. (2019). IDCam: Precise Item Identification for AR Enhanced Object Interactions. In *IEEE International Conference on Radio-Frequency Identification (RFID)*. Retrieved from doi:10.1109/RFID.2019.8719279
Best Paper Finalist
 15. Mariakakis A, Parsi S*, Patel S, Wobbrock J. (2018). Drunk User Interfaces: Determining Blood Alcohol Level through Everyday Smartphone Tasks. In *ACM Conference on Human Factors in Computing Systems (CHI)*. Retrieved from doi:10.1145/3173574.3173808
 16. Mariakakis A, Patel S. (2016). Ocular Symptom Detection using Smartphones. In *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)* (p. 435–440). Retrieved from doi:10.1145/2968219.2971354
 17. Mariakakis A, Wang E, Patel S, Wen J. (2016). A Smartphone-based System for Assessing Intraocular Pressure. In *IEEE Engineering in Medicine and Biology Society (EMBC)* (p. 4353–4356). Retrieved from doi:10.1109/EMBC.2016.7591691
 18. Mariakakis A, Srinivasan V, Rachuri K, Mukherji A. (2016). WatchUDrive: Differentiating Drivers and Passengers using Smartwatches. In *Workshop on Sensing Systems and Applications Using Wrist Worn Smart Devices (WristSense) at IEEE International Conference on Pervasive Computing and Communications (PerCom)*. Retrieved from doi:10.1109/PERCOMW.2016.7457171
 19. Wang E, Lee T, Mariakakis A, Goel M, Gupta S, Patel S. (2015). MagnifiSense: Inferring Device Interaction using Wrist-worn Passive Magneto-inductive Sensors. In *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)* (p. 15–26). Retrieved from doi:10.1145/2750858.2804271
 20. Goel M, Whitmire E, Mariakakis A, Saponas S, Joshi N, Morris D, Guenter B, Gavrilu M, Borriello G, Patel S. (2015). HyperCam: Hyperspectral Imaging for Ubiquitous Computing Applications. In *ACM*

International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp) (p. 145–156). Retrieved from doi:10.1145/2750858.2804282

Honorable Mention

21. Mariakakis A, Goel M, Aumi M, Patel S, Wobbrock J. (2015). SwitchBack: Using Focus and Saccade Tracking to Guide Users' Attention for Mobile Task Resumption. In *ACM Conference on Human Factors in Computing Systems (CHI)* (p. 2953–2962). Retrieved from doi:10.1145/2702123.2702539
22. Mariakakis A, Sen S, Lee J, Kim K. (2014). SAIL: Single Access Point-Based Indoor Localization. In *ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)* (p. 315–328). Retrieved from doi:10.1145/2594368.2594393

INTELLECTUAL PROPERTY

Patents

1. Taylor J, Patel S, Mariakakis A. (2018, June 1). Bilirubin estimation using sclera color and accessories therefor Patent No. US20200121228A1.
Pancreatic cancer is one of the deadliest forms of cancer worldwide because it is often detected in later stages. One of the few characteristic symptoms of pancreatic cancer is jaundice — the yellowing of the skin and eyes due to the build-up of a compound called bilirubin. Although jaundice is obvious in severe cases, the ability to identify more subtle instances of jaundice could lead to earlier detection or continuous monitoring. This patent describes an algorithm that analyzes a photo of someone's eyes to estimate their bilirubin level. The algorithm uses computer vision to separate the sclera (the white part of the eye) from the rest of the image and summarize its color. A machine learning algorithm uses that color feature vector to report a bilirubin level. Ambient lighting can affect the appearance of colors in an image, so the patent describes two methods for color control: a 3D-printed box for color control or color references for calibration
2. McGrath L, Law A, Bly R, Patel S, Mariakakis A, Baudin J. (2018, May 31). Smartphone-based digital pupillometer Patent No. US20200129063A1.
There is no definitive way of diagnosing traumatic brain injuries (TBIs) — head injuries caused by an external force that leads to brain damage. Recent medical literature has posited that the pupillary light reflex — the involuntary change in a person's pupil size in response to a light stimulus — can be a useful biological signal for objective TBI assessment. Some hospitals have a clinical device called a pupillometer, which is able to measure a person's pupillary light reflex using an infrared camera; however, this device typically costs thousands of dollars and is thus not often used by paramedics. This patent describes how the smartphone can be used to produce similar measurements. The system uses a 3D-printed box to control the lighting around the eyes as the smartphone's flash provides a light stimulus. The smartphone's camera records the response, and the pupillary light reflex is measured using a deep learning
3. Wen J, Mariakakis A, Wang E, Warren N. (2017, February 1). Applanation tonometer Patent No. US20170215728A1.
Measuring intraocular pressure is an important test that ophthalmologists conduct to monitor cases of glaucoma. Ophthalmologists normally measure intraocular pressure using specialized and expensive equipment in a clinic, so patients often have to travel great distances for regular monitoring. This patent describes a system that allows ophthalmologists to measure intraocular pressure using only their smartphone and an unpowered smartphone accessory. The smartphone accessory gently applies pressure to the patient's eye, and the deformation of the eye is recording by the smartphone's camera. A computer vision algorithm is applied to the video to produce an intraocular pressure readout
4. Sen S, Lee J, Mariakakis A. (2019). Localization using access point Patent No. US10349214B2.
GPS does not work indoors, so many researchers have explored other sensing modalities for localizing a person inside a building. Indoor localization could help people find their way through unfamiliar buildings or provide people with personalized directions to their destination. The most common indoor localization techniques use people's smartphones to measure the wireless signal strength from nearby access points for triangulation or trilateration; however, these techniques often require coordination between many devices, which induces a significant overhead on the access points. This patent describes a way of providing indoor localization using just a smartphone and a single access point. The smartphone's sensors record the user's

steps and heading to infer their local trajectory, and the access point periodically estimates the user's distance from a known location. These measurements produce a geometrical problem that can be solved to infer the user's location

5. Sen S, Lee J, Mariakakis A. (2018). Localization using access point Patent No. US9883342B2.

GPS does not work indoors, so many researchers have explored other sensing modalities for localizing a person inside a building. Indoor localization could help people find their way through unfamiliar buildings or provide people with personalized directions to their destination. The most common indoor localization techniques use people's smartphones to measure the wireless signal strength from nearby access points for triangulation or trilateration; however, these techniques often require coordination between many devices, which induces a significant overhead on the access points. This patent describes a way of providing indoor localization using just a smartphone and a single access point. The smartphone's sensors record the user's steps and heading to infer their local trajectory, and the access point periodically estimates the user's distance from a known location. These measurements produce a geometrical problem that can be solved to infer the user's location

<https://uniweb.cs.toronto.edu/members/16>