EDWARD JAY WANG

My research focuses on **developing new sensing techniques for monitoring a person's health more continuously, conveniently, and cheaply with a goal of ultimately bringing clinical sensing out of the clinic.** I am actively creating new solutions in health monitoring with my expertise in mobile and embedded system prototyping, signal processing, machine learning, and a strong command of medical knowledge. I've transformed smartphones into medical devices without any hardware add-ons to screen for anemia and measure blood pressure; developed novel wearable devices that continuously track blood pressure and user context; and explored new ways to charge wearable devices right through the body. The next generation of medical sensing needs to leave the confines of labs and clinics to be truly usable by everyone. This has to start at even the earliest prototypes, something I strive for in all of my work. Towards this goal, I have tested technologies in patient rooms, performed in-the-wild studies where users take our prototypes home, and even partnered with various NGOs to perform true user testing in places like the Peruvian jungle. **At UCSD, I direct the Ubiquitous Data & Computing Lab as a faculty of ECE & Design.**

Assistant Professor
Electrical & Computer Engineering
The Design Lab
University of California, San Diego
San Diego, CA

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ACADEMIC EMPLOYMENT

Assistant Professor	University of California, San Diego (UCSD) Electrical & Computer Engineering (Tenure-Track), 2019-Present Design Lab (FTE), 2019-Present Computer Science & Engineering (Affiliate), 2020-Present Center for Wireless & Populational Health Systems (School of Public Health, Affiliate), 2019-Present
Board of Director	Center for Mental Health Technologies, 2021-Present

EDUCATION

PhD 2013 – 2019	Electrical & Computer Engineering, University of Washington Advisor: Shwetak Patel Research Topic: Bringing Medical Health Sensing Out of the Clinic
BS 2008 - 2012	Engineering (Concentration in Bioengineering), Harvey Mudd College Advisor: Elizabeth Orwin

PEER-REVIEWED PUBLICATIONS

P11 Challenges in Realizing Smartphone-Based Health Sensing.
Alex Mariakakis, **Edward J. Wang**, Shwetak Patel, Mayank Goel. **IEEE Pervasive Computing** 2019

P10 CASPER:Capacitive Serendipitous Power Transfer for Through-Body Charging of Multiple Wearable Devices.
Edward J. Wang, Manuja Sharma, Yiran Zhao, Shwetak Patel. **ISWC** 2018

P9 Seismo: Blood Pressure Monitoring using Built-in Smartphone Accelerometer and Camera
Edward J. Wang, Junyi Zhu, Mohit Jain, Tien-Jui Lee, Elliot Saba, Lama Nachman, Shwetak Patel
CHI 2018 Best Paper Honorable Mention (Top 5%)

P8 Carpacio: Repurposing Capacitive Sensors to Distinguish Driver and Passenger Touches on In-Vehicle Screens.
Edward J. Wang, Jake Garrison, Eric Whitmire, Mayank Goel, Shwetak Patel. **UIST** 2017

P7 Glabella: Continuously Sensing Blood Pressure Behavior using an Unobtrusive Wearable Device
Christian Holz and **Edward J. Wang. IMWUT Vol 1 Issue 3 Article 58 (UbiComp** 2017) Best Paper Award (Top 1%)

P6 Noninvasive Hemoglobin Measurement using Unmodified Smartphone Camera and White Flash
Edward J. Wang, Junyi Zhu, William Li, Rajneil Rana, Shwetak Patel. **IEEE EMBC 2017**

P5 HemaApp: Noninvasive Blood Screening of Hemoglobin using Unmodified Smartphones
Edward J. Wang, William Li, Doug Hawkins, Terry Gernsheimer, Colette Norby-Slycord, Shwetak Patel
UbiComp 2016 Best Paper Award (Top 1%)

P4 A Smartphone-Based System for Assessing Intraocular Pressure
Alex Mariakakis, **Edward J. Wang**, Shwetak Patel, Joanne Wen. **IEEE EMBC 2016**

P3 MagnifiSense: Inferring Device Interaction using Wrist-worn Passive Magneto-Inductive Sensors
Edward J. Wang, Tien-Jui Lee, Alex Mariakakis, Mayank Goel, Sidhant Gupta, Shwetak Patel. **UbiComp 2015**

P2 Skin Drag Displays: Dragging a Physical Tactor across the User's Skin Produces a Stronger Tactile Stimulus than Vibrotactile. Alexandra Ion, **Edward J. Wang**, Patrick Baudisch. **CHI 2015**

P1 Design Considerations for Leveraging Over-familiar Items for Elderly Health Monitors
Edward J. Wang, Samantha Ipser, Patrick Little, Benjamin Liu, Noah Duncan, Shinsaku Nakamura. **HCII 2013**

HONORS & AWARDS

2020 IEEE Pervasive Computing Best Paper Runner Up
2018 Distinguished Paper Award (Equivalent to Best Paper Award) at UbiComp 2018 for Glabella
UbiComp Gaetano Borrielo Outstanding Student Award Finalist
Heidelberg Laureate Forum Young Researcher
Best Paper Honorable Mention at CHI 2018 for Seismo
2016 Best Paper Award at UbiComp 2016 for HemaApp
2015 Finalist at Qualcomm Innovation Fellowship
2014 NSF Graduate Research Fellowship
2013 ARCS (Achievement Rewards for College Scientists) Fellowship
2011-2012 President of Tau Beta Pi CA-W Chapter
2010 J.R Phillips Award

INDUSTRY EXPERIENCE

Summer 2015 Microsoft Research Medical Devices Group, Redmond, WA
Research Intern. Mentor: Gabe Cohn, Desney Tan
Exploratory research into using bio-impedance to monitor cardiovascular symptoms.

Summer 2014 Intel Corporation, Santa Clara, CA
Research Intern. Mentor: Richard Chow
Developed a proof-of-concept privacy aware IoT framework that revolves around service declaration.

ADVISING AND MENTORING

PhD Varun Viswanath (ECE, Machine Learning & Data Science)
Jessica de Souza (ECE, Medical Device Systems)
Yinan (Tom) Xuan (ECE, Machine Learning & Data Science)
Colin Barry (ECE, Communication Theory & Systems)

Undergraduate Parker Ruth (Fall 2017 – Present) – Researching the use of smartphones to measure osteoporosis, 2018
Washington Research Foundation Fellowship, 2018 UW Mary Gates Research Scholarship

High School Students	Eshika Saxena (Spring 2015 – Spring 2019) – Undergraduate at Harvard University.
Past Students	Yiran Zhao (Fall 2017 – Spring 2019) – PhD student Cornell advised by Tanzeem Choundhury Junyi Zhu (Spring 2016 – Summer 2017) – PhD student at MIT CSAIL advised by Stefanie Mueller William Li (Fall 2015 – Spring 2018) – Apple Rajneil Rana (Winter 2017 – Fall 2018) –Microsoft

TEACHING EXPERIENCE

UC San Diego	ECE 16 Rapid Hardware Software Prototyping ECE 284 Mobile Health Device Design
University of Washington	EE-PMP Ubiquitous Computing (Co-Course Developer with Alex Mariakakis) Designed the course for the Electrical Engineering department's Professional Master's Program course on ubiquitous computing. CSE 467 Advanced Digital Logic (Lead Teaching Assistant for Gabe Cohn)
Microsoft Corporation (EdX)	Intro to Device Programming (Course Content Developer) Helped generate and screen content for the 2018 EdX course offered by Microsoft to introduce students about basic programming of embedded systems and use of circuit components.
Harvey Mudd College	Bio-signal Processing (Co-Instructor with Elizabeth Orwin, Lead Course Developer) Designed the first bio-signal processing course at Harvey Mudd College over the summer of 2011 and co-instructed the class in Fall 2011 and Fall 2012.

SELECTED INVITED TALKS

T9 "Smart Glasses for Unobtrusive Health Monitoring" Center for Wearable Sensors, San Diego, CA, 2019
T8 "Next Billion Medical Devices," UCSD ECE & Design Lab, San Diego, CA, 2019
T7 "Next Billion Medical Devices," Cornell Tech, New York City, NY, 2019
T6 "Next Billion Medical Devices," MIT CSAIL, Cambridge, MA, 2019
T6 "Next Billion Medical Devices," University of Chicago, Chicago, IL, 2019
T5 "Widespread Anemia Screening," UCSD Design Lab, University of California, San Diego, CA, 2018

T4 "Measuring Our Health like We Measure the Weather," TEDxSJI San Juan Islands, WA, 2017
T3 "Filling the Blind Spots of Modern Health Diagnostics using Mobile and IoT Technologies," UW Allen School MSR Summer Institute, Seattle, 2017
T2 "Ubiquitous, Continuous, and Predictive Health Monitoring," Art Institute of Seattle, Seattle, WA, 2016
T1 "MagnifiSense: Personalized Energy Disaggregation to Improve Sustainable Behaviors," UW Environmental Stewardship Committee, Seattle, WA, 2015

SERVICE

Reviewer	CHI 2016, 2018, 2019 (AC), 2020 IMWUT 2017, 2018, 2019, 2020 UIST 2018, 2019, 2020 IEEE Pervasive Computing Journal 2017 UbiComp 2016 ISWC 2016

IEEE Journal of Biomedical and Health Informatics 2014

Outreach /Diveristy
Faculty host of Power, Privilege, and Ethical Response series for UCSD Design @ Large 2021
Mentor at UbiComp 2018 Broadening Participation Workshop
UW Ubicomp Lab Industry Affiliation Demo Lead: 2013 - Present
UW Ubicomp Lab High School Program Mentor: 2015 – Present
Presentation to Washington state legislators about research in computer science and electrical engineering: 2015, 2017
UW College of Engineering Discovery Days Presenter 2013 - 2015

SELECTED PRESS

HemaApp
GetMobile June 2017 Volume 21 Issue 2. HemaApp: noninvasive blood screening of hemoglobin using smartphone cameras
MIT Technology Review. How to make a smartphone detect anemia
Engadget. HemaApp gives smartphones the power to detect anemia
medGadget. HemaApp accurately estimates hemoglobin in blood using standard smartphone
BeBright. Health Enablers 2017: Technological developments in Western healthcare

MagnifiSense
GeekWire. UW researchers build wearable sensor that could help people shrink their carbon footprint
Engadget. Wrist sensor logs the devices you use and your power consumption
BYU Radio. School Shootings, Carbon Footprint, Parent Previews
IEEE Spectrum. Wearables uses your local EM field to track your electronics use
King 5. New UW wearable helps track carbon footprint

REFERENCES

Shwetak Patel shwetak@cs.washington.edu
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Gregory Abowd abowd@gatech.edu
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Tauhidur Rahman trahman@cs.umass.edu
Ed Lazowska lazowska@cs.washington.edu
Nadir Weibel weibel@ucsd.edu