Joseph Breda

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Research Interest

Ubiquitous Computing, Urban Sensing, Sustainability, Energy Monitoring, Behavior Science

Education

University of Washington Sep. 2019 - Present

Ph.D., Computer Science & Engineering. Advisor: *Shwetak Patel*

University of Massachusetts Amherst (Honors) Sep. 2015 - May 2019

Bachelor of Science in Computer Engineering & Minor in Computer Science. Advisor: *Jay Taneja*

Magna cum Laude, **GPA**: 3.84/4.00

Industry

Google [Remote] Seattle, WA

Software Engineering Intern May 2020 – Sept. 2020

Research

- Developed MapReduce pipeline to construct a realistic agent-based synthetic population for evaluating the robustness of an urban simulation in a series of data coverage control experiments.

Health

- Developed an Android application with privileged APIs to sample battery temperature at high temporal resolution used to recover human core body temperature from battery temperature signal.

Staples Inc. Framingham, MA

Cloud Computing Software Engineering Intern May 2018 – Aug. 2018

- Designed and implemented full-stack internal UI application to convey cloud resource operational costs to nontechnical employees using React and Flask.

Academic Research Projects

Ubicomp Lab: Graduate Research Assistant Sep. 2019 - Present

- Developing a system for ubiquitously sensing core body temperature using smart devices for accessible fever detection as a response to Covid-19.
- Working in collaboration with a rideshare and food delivery company to study variation in user behavior as a function of neighborhood and socioeconomic status.

STIMA Lab: Undergraduate Research Assistant Sep. 2018 - July 2019

- developed a system to crowdsense ambient indoor air temperature using the battery temperature of smartphones to improve energy efficiency of HVAC systems with no extra hardware.

STIMA Lab: Undergraduate Research Assistant Sep. 2017 – Mar. 2018

- Developed a system for sensing electrical grid power quality from harmonic distortion in audio signals caused by household appliances during low-voltage events to assist in brown-out detection in developing areas.

Sustainable Computing Lab: Undergraduate Research Assistant May 2017 – Aug. 2017

- Data-mined and joined millions of weather forecast and solar performance metrics scraped from open source smart meters to create a training dataset for a weather based solar panel performance model.

Conference Publications

- Amee Trivedi, Phuthipong Bovornkeeratiroj, **Joseph Breda**, Prashant Shenoy, Jay Taneja, David Irwin "Phone-based Ambient Temperature Sensing Using Opportunistic Crowdsensing and Machine Learning" in Sustainable Computing: Informatics and Systems, November 2020.
- **Joseph Breda**, Amee Trivedi, Chulabhaya Wijesundara, Phuthipong Bovornkeeratiroj, David Irwin, Prashant Shenoy, Jay Taneja "Hot or Not: Leveraging Mobile Devices for Ubiquitous Temperature Sensing." In ACM BuildSys Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys 2019), November 2019.
- **Joseph Breda** and Jay Taneja "Fancy That: Measuring Electricity Grid Voltage Using a Phone and a Fan." In the First ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS 2018), June 2018.
- Dong Chen, **Joseph Breda**, and David Irwin "Staring at the Sun: A Physical Black-box Solar Performance Model." In the 5th International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2018), November 2018.

Workshop Publications

- **Joseph Breda**, Esther Jang, Kurtis Heimerl, Shwetak Patel "Hanging Gardens of Babylon: Reframing Urban Agriculture as an Opportunity for Social Engagement" in SelfSustaining CHI 2020.

Awards & Honors

Weil Family Endowed Fellowship in Computer Science & Engineering September 2019

Graduated from Commonwealth Honors College May 2019

Graduated Magna Cum Laude May 2019

Commonwealth Honors College: Honors Research Grant December 2018

Skills

Skills & Interests: Ubiquitous Computing, Big Data Analysis, Modeling, Machine Learning, Sensing, Digital Signal Processing, Data Mining, Behavior Science, Art

Languages: Python, Java, JavaScript

Frameworks & Technologies: Apache Beam, MapReduce, Android, SKLearn, Git, D3, Spark, PyTorch, Matlab, SQL, Linux, Bash

Other: Blender, Ableton, Photoshop