Joseph Breda

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Education

University of Washington Sep. 2019 - Present
Ph.D. Student at Paul G. Allen School of Computer Science & Engineering

University of Massachusetts Amherst Sep. 2015 - May 2019
Graduated Magna cum Laude with Bachelor of Science in Computer Engineering & Minor in Computer Science **GPA**: 3.84/4.00

Conference Publications

- **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.

Projects

STIMA Lab: Using Smartphones to Determine Ambient Indoor Air Temperature Sep. 2018 - July 2019
- Published peer-reviewed research paper "Hot or Not: Leveraging Mobile Devices for Ubiquitous Temperature Sensing." as first-author
- Designed a system combining activity recognition and physical models in specific states to map battery temperature of mobile phones to indoor ambient air temperature
- Developed Android application for collecting data and making temperature estimates in real-time

UMass ECE Department: Senior Design Project '19: Automated Piano Tutor Sep. 2018 - May 2019
- Collaboratively built an Android tablet based piano teaching system with 3 other students as capstone
- Developed real-time note recognition program to determine piano key pressed using audio processing
- Developed scrolling sheet music UI and MIDI file parsing software to translate MIDI notes to quarter notes on staff paper and animate scrolling of notes as the user plays the appropriate notes

STIMA Lab & Lab11: OINK (Open INcentive Kit) Mar. 2018 – May 2018
- Developed open source API using JavaScript and Google Firebase for administering automated payments as incentives for in-app activities on a small team of engineers at UMass and UC Berkeley
- Designed queue for accepting HTTP requests and link to proper relational table

STIMA Lab: Undergraduate Researcher Sep. 2017 – Mar. 2018
- Published peer-reviewed research paper "Fancy That: Measuring Electricity Grid Voltage Using a Phone and a Fan" as first-author on system using mobile phones to measure electrical grid power quality to assist in brown-out detection in the developing world
- Created algorithm in Python & Matlab to analyze harmonic distortion in audio signal caused by nearby spinning fan blade to provide a proxy measurement for grid level voltage powering fan
- Presented research paper at ACM COMPASS 2018 conference on Computing and Sustainable Societies

Sustainable Computing Lab: Undergraduate Researcher May 2017 – Aug. 2017
- Published peer-reviewed, co-authored research paper "Staring at the Sun: A Physical Black-box Solar Performance Model" at ACM BuildSys conference 2018

- Developed Python data-mining script to web-scrape millions of weather forecast points and associated solar performance metrics using Beautiful Soup and XML queries
- Cleaned data and construct a database relating solar performance data to respective weather forecasts using Pandas

Industry

Staples Inc. Framingham, MA
Cloud Computing Software Engineering Intern May 2018 – Aug. 2018

- Designed and implemented a GUI to aggregate and display cost of cloud operation and present price estimates for provisioning resources to nontechnical co-workers using React and Flask
- Developed a full stack architecture with REST API to transfer state between client and server
- Retrieved cloud cost data from Microsoft Azure using Python web-scraping script and Azure API calls and stored price estimates using SQL in Cosmos DB

Awards & Honors

Graduated from Commonwealth Honors College May 2019
Graduated Magna Cum Laude May 2019
Commonwealth Honors College: Honors Research Grant December 2018

Skills

Skills & Interests: Statistical Learning, Secondary Sensing, Modeling, Signal Processing, Data Mining, Empirical Study, Ubiquitous Computing
Languages: Python, Java, JavaScript, C
Frameworks & Technologies: SKLearn, NumPy, Android, PyTorch, React, Flask, Git, Matlab, SQL, Linux, Bash