

# Julia M. Gersey

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## RESEARCH INTERESTS

Mobile & IoT Sensing, Embedded Systems, Ubiquitous Computing, Human-Computer Interaction.

## EDUCATION

**University of Michigan**, Ann Arbor, MI  
Ph.D. Student, Electrical & Computer Engineering  
Advisor: Pei Zhang

August 2024 - Present

**Baldwin Wallace University**, Berea, OH  
B.Sc., Computer Science  
B.Sc., Applied Mathematics  
GPA: 3.86/4.0, *Magna Cum Laude*

May 2024

## RESEARCH EXPERIENCE

**Fine-Grained Air Quality Sensing with Internet-of-Things** March 2022 - May 2024  
*Researcher & Developer*, Mobile and IoT for Planet and Society Research Group (MOPS)

- Interdisciplinary research project funded by the NSF that investigates fine-grained Air Quality sensing in urban environments using **low-power and low-cost IoT sensors**.
- Coded Raspberry Pi Pico W's, Zero W's, 3B's and Arduino M4 Airlift Lite boards with Plantower PMS5003 particulate matter and SGP30 TVOC/eCO2 volatile organic compound sensors to capture and **report air quality data** to our web server.
- Implemented a proof-of-concept **opportunistic sensing** via Apple's AirTag Protocol to provide connectivity to our sensors outside of WiFi or LoRa areas to still send AQ data via bluetooth.
- Partnered with PCForPeople to deploy our units in their wifi hotspot towers across East Cleveland to expand AQ coverage and **made our data publicly available** on our website.

**Campus Plate** March 2021 - May 2024  
*Lead iOS Developer*, Mobile and IoT for Planet and Society Research Group (MOPS)

- Interdisciplinary research project funded by the EPA's People, Prosperity, and Planet (P3) Grant to help reduce food waste, food insecurity, and student hunger on college campuses via a mobile application.
- Continued development of the **iOS application written in Swift**, utilizing REST web services and Git.
- Implemented a swipe-to-delete iOS function for users to cancel their food reservations.
- Refactored and **centralized web service URL** to support switching between prod and dev environment.
- Corrected **user permissions** (student, manager) to correctly hide/show certain parts of the application.

**EduSense: Classroom Sensing Towards Inclusive & Equitable Teaching** May 2023 - August 2023  
*NSF REU Intern*, Carnegie Mellon University Human-Computer Interaction Institute (HCII)

- Used **scikit-learn** and **imblearn** libraries to build and train **binary classification models** based on the manually coded video data annotations and the instructor gaze and location features from the EduSense classroom sensing system.
- Applied **Logistic Regression, Linear Regression, Decision Tree, and Random Forest** classification algorithms to create machine learning models for classroom activity recognition using video data.
- Implemented **AdaBoost and SMOTE algorithms** onto our imbalanced data set to improve model performance to **78.8%** and **76.4% accuracy** for the 'posing questions' and 'answering questions' codes.
- Tested the performance of our models with the leave one out cross validation (LOOCV) standard.

## DEVELOPMENT EXPERIENCE

### @\_buildspace nights&weekends s5

June 2024 - August 2024

*iOS App Developer*

- Selected to join season 5 of Buildspace's nights & weekends program and build my app, *Easy IoT*, aimed to teach students the fundamentals and hardware components of Internet-of-Things boards.
- Used **SwiftUI** and **Computer Vision** to allow for users to put a microcontroller in the camera view and identify the hardware components.

### Medical Mutual of Ohio

May 2022 - August 2022

*IT Software Development Intern, Brooklyn, OH*

- Tuned **SQL queries** for an admin search tool to **improve efficiency** when searching within 2 databases with thousands of rows and columns.
- Implemented a minimum requirement of 2 search parameters and a limited the query to fetch the first 50 rows only to **eliminate a 30-second timeout error**.
- Learned SQL Server Management Studio and IBM DB2 Database integration and maintenance skills.

### Qwickly, Inc.

January 2021 - May 2022

*Web & Application Development Intern, Brooklyn, OH*

- Completed a cross-platform mobile application using **C# and Xamarin**.
- Utilized Blackboard, Canvas, and D2L **REST API's** for an attendance-taking proof of concept to scan a generated QR code in a large lecture on a mobile device.
- Developed an internal video management system to more efficiently upload video guides to clients.
- Created a course-pinning feature to allow clients to pin their top preferences across our products.

## PEER-REVEIWED PUBLICATIONS

- [3] **Julia Gersey**, Brian Krupp, Jonathon Fagert. "Pilot Study of Deploying IoT Micro Air Quality Sensors in an Urban Environment: Lessons Learned". 2023 ACM Consortium for Computing Sciences in Colleges Midwestern Conference. (Accepted)
- [2] Brian Krupp, **Julia Gersey**, Jonathon Fagert, Tony Mlady. "Towards Fine-Grained Air Quality Sensing in Urban Environments". 2022 ACM Conference on Embedded Networked Sensor Systems (SenSys 2022). (Accepted) (Poster)
- [1] Brian Krupp, **Julia Gersey**, Franklin Lebo. "Campus Plate: Connecting Students on College Campuses to Reduce Food Waste and Food Insecurity". 2022 International Conference on Research in Adaptive and Convergent Systems (ACM RACS 2022). (Accepted)

## OTHER PUBLICATIONS

- [2] **Julia Gersey**. "MOPS Research Group Empowers Communities: Baldwin Wallace University". ACM XRDS 30, 1 (Fall 2023), 74–75. (<https://dl.acm.org/doi/pdf/10.1145/3625396>)
- [1] Brian Krupp and **Julia Gersey**. 2023. "Privacy Focused Companies, How Focused Are They?". SIGCAS Computing Society 51, 3 (December 2022), 10. (<https://doi.org/10.1145/3585060.3585064>)

## RESEARCH GRANTS

### *External*

- 2023-24 NASA Ohio Space Grant Consortium Scholarship (\$3,500)
- 2022-23 NASA Ohio Space Grant Consortium Scholarship (\$3,500)
- ACM SenSys 2022 Travel Grant (\$1,000)

### *Internal*

- Women for Baldwin Wallace Giving Circle Award (\$2,000)
- URCS Travel Grant (\$500)
- The Lauria STEM Research Competition 2022 (2nd Place - \$500)

## SELECTED SCHOLARSHIPS & AWARDS

- Charles & Elsie Little Graduate Award (\$2,000)
- Outstanding Computer Science Senior Award
- NSF Graduate Research Fellowship Program Honorable Mention
- Baldwin Wallace Woman of Achievement Award
- NCWIT Aspirations in Computing Honorable Mention (\$100)
- CIO Tomorrow Student Scholarship (\$3,590)
- Upsilon Pi Epsilon Honor Society
- Outstanding Computing Student (\$625)
- National Residence Hall Honorary
- Academic All-Ohio Athletic Conference Award
- Chi Alpha Sigma Honor Society
- Kappa Mu Epsilon Honor Society
- Anthony & Patricia Lauria Scholarship in Computer Science (\$750)
- Toni & Max Dehn Scholarship for Mathematics (\$250)
- The Christopher J. Sullivan and Frank & Margaret Schmidt Scholarship (\$250)
- Center for Innovation & Growth Ratcliffe Student Fellow
- Choose Ohio First STEM Scholarship (\$5,000 annually)

## SELECTED PRESENTATIONS & TALKS

- [12] SIGCAS Works in Progress Webinar, (Virtual) Zoom Spring 2024  
 Title: Air Quality Sensing with Internet-of-Things  
 Authors: **Julia Gersey**
- [11] NASA Ohio Space Grant Consortium Symposium, Ohio Aerospace Institute Spring 2024  
 Title: Air Quality Sensing with Internet-of-Things  
 Authors: **Julia Gersey**
- [10] Choose Ohio First STEM Scholar Showcase, Ohio Statehouse Spring 2024  
 Title: Towards Fine-Grained Air Quality Sensing in Urban Environments  
 Authors: Brian Krupp, **Julia Gersey**, Jonathon Fagert, Tony Mlady
- [9] Midwest Consortium for Computing Sciences in Colleges, University of Indianapolis Fall 2023  
 Title: Pilot Study of Deploying IoT Micro Air Quality Sensors in an Urban Environment  
 Authors: **Julia Gersey**, Brian Krupp, Jonathon Fagert
- [8] HCII REU Poster Session, Carnegie Mellon University Summer 2023  
 Title: What's happening in the classroom? Automated recognition of classroom activity for scalable multimodal learning analytics  
 Authors: **Julia Gersey**, Angela Gui, Lucia Fang
- [7] NASA Ohio Space Grant Consortium Symposium, Ohio Aerospace Institute Spring 2023  
 Title: Towards Fine-Grained Air Quality Sensing in Urban Environments  
 Authors: Brian Krupp, **Julia Gersey**, Jonathon Fagert, Tony Mlady
- [6] Cleveland Big Data Group Meet-Up, Cleveland, OH Spring 2023  
 Title: Using IoT to Measure Air Quality  
 Authors: **Julia Gersey**
- [5] Ohio Celebration of Women in Computing (OCWiC), Huron, OH Spring 2023  
 Title: Using IoT to Measure Air Quality  
 Authors: **Julia Gersey**

- [4] ACM SenSys 2022, Boston, MA Fall 2022  
Title: Towards Fine-Grained Air Quality Sensing in Urban Environments  
Authors: Brian Krupp, **Julia Gersey**, Jonathon Fagert, Tony Mlady
- [3] OurCS Research Conference, Carnegie Mellon University Fall 2022  
Title: Congestion Control with TCP Hybla  
Authors: **Julia Gersey**, Audrey Kim, Vasu Ramanujam, Lisa Shen
- [2] The Lauria STEM Research Competition, Baldwin Wallace University Spring 2022  
Title: Fine-Grained Air Quality Sensing with IoT  
Author: **Julia Gersey**
- [1] Computing, Engineering, Mathematics & Science Showcase, Baldwin Wallace University Fall 2021  
Title: Campus Plate  
Authors: Terrell McDowell, **Julia Gersey**, Leighton Medved

### **PROFESSIONAL SERVICE & AFFILIATIONS**

- ACM XRDS Magazine Department Editor. August 2023 - Present.
- ACM SIGCHI Member. June 2023 - Present.
- ACM SIGCAS Member. March 2023 - Present.
- ACM-W Student Member. February 2022 - Present.
- ACM Student Member. January 2022 - Present.
- CincyHacks Hackathon Mentor. February 2021.