

Julia Gersey

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RESEARCH INTERESTS

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

EDUCATION

Baldwin Wallace University, Berea, OH

Expected May 2024

B.Sc., Computer Science

B.Sc., Applied Mathematics

GPA: 3.84/4.0

Core Coursework: Software Engineering, System Requirements & Testing, Data Structures, Database: Theory, Application, & Administration, Operating Systems, Algorithm Design & Analysis, Internet-of-Things, Web & Mobile Programming, Comparative Programming Languages

RESEARCH EXPERIENCE

Fine-Grained Air Quality Sensing with Internet-of-Things March 2022 - Present
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 PCsForPeople 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.

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.

Campus Plate March 2021 - May 2022
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 code by centralizing our web service URL to support an easy switch between the live and development environments for easier testing.
- Fixed error to correctly hide/show certain parts of the application based on user permissions.

PROFESSIONAL EXPERIENCE

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 requirement minimum of 2 search parameters, **eliminating a 30-second timeout error** and limiting the query to fetch the first 50 rows only.
- Learned SQL Server Management Studio and IBM DB2 Database integration and maintenance skills.

Qwickly, Inc.

January 2021 - May 2022

Application Development Intern, Cleveland, OH

- Completed a **cross-platform mobile application** using Xamarin and C#.
- 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.

PUBLICATIONS

Peer-Reviewed

- [3] **Julia Gersey**, Brian Krupp, Jonathon Fagert. "Pilot Study of Deploying IoT Micro Air Quality Sensors in an Urban Environment: Lessons Learned". *ACM Journal of Computing Sciences in Colleges* 39, 4 (October 2023), 74-83.
- [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).
- [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).

Other

- [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

- NASA Ohio Space Grant Consortium (OSGC) Scholarship (2023 - 2024)
- NASA Ohio Space Grant Consortium (OSGC) Scholarship (2022 - 2023)
- ACM SenSys 2022 Travel Grant

Internal

- Women for Baldwin Wallace Giving Circle Award (2022-2023)
- URCS Travel Grant (October 2022)
- The Lauria STEM Research Competition 2022 (2nd Place)

SCHOLARSHIPS & AWARDS

- CIO Tomorrow Student Scholarship (July 2023)
- Academic All-Ohio Athletic Conference Award (April 2023)
- Jacket Scholar Award (April 2023)
- Upsilon Pi Epsilon Honor Society (Inducted April 2023)
- Outstanding Computing Student (April 2023)

- National Residence Hall Honorary (Inducted March 2023)
- Academic All-Ohio Athletic Conference Award (April 2022)
- Chi Alpha Sigma Honor Society (Inducted April 2022)
- Jacket Scholar Award (April 2022)
- Kappa Mu Epsilon Honor Society (Inducted April 2022)
- Anthony & Patricia Lauria Scholarship in Computer Science (April 2022)
- Toni & Max Dehn Scholarship for Mathematics (April 2022)
- The Christopher J. Sullivan and Frank & Margaret Schmidt Scholarship (April 2021)
- Center for Innovation & Growth Ratcliffe Student Fellow (2021-2022)
- Dean's List (Fall 2020, Spring 2021, Fall 2021, Spring 2023)
- Choose Ohio First STEM Scholarship (August 2020 - Present)

TEACHING EXPERIENCE

CSC-210: Computer Science 1: Programming & Application August 2023 - Present

- Assist in class sessions, providing support, instruction, and code debugging for Python lab assignments.
- Serve as a Teaching Assistant for Dr. Christine Strunk and Dr. Viviane Nguyen's course sections.

FYE-100: First Year Experience (STEM) August 2021 - May 2023

- Instructed on course registration, mental health awareness, and navigating STEM courses in college.
- Conducted individual check-ins with 25 students per semester, offering academic and personal support.
- Collaborated with Professor Nanette Canfield to create lesson plans and facilitate group discussions.

STUDY ABROAD

Computing in Guatemala, **Baldwin Wallace University**

- Tested and deployed a medical software system built by Baldwin Wallace Senior Software Engineering students for Mission Guatemala's Clinic.
- Lead a class activity using Micro:bit controllers to teach binary coding to seventh, eighth and ninth grade students (using a Spanish/English translator).
- Assisted students in making 'binary bracelets' by translating Spanish words into binary, so they could make a bracelet using different colored beads to represent their chosen word in ones and zeros.

SELECTED PRESENTATIONS & TALKS

[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

EXTRACURRICULAR & LEADERSHIP ACTIVITIES

- ACM XRDS Magazine, LABZ Department Editor
- National Residence Hall Honorary (NRHH) Member
- Kappa Mu Epsilon Secretary
- ACM-W President
- STEM Scholars Peer Mentor
- Students for Environmental Action Founder
- Freshman Year Experience (FYE) Peer Leader
- Lead Resident Assistant
- CS+ Outreach Group Development Facilitator
- Computer Science & Math Peer Tutor
- Varsity Softball Athlete

PROFESSIONAL AFFILIATIONS

- 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.

REFERENCES

Dr. Amy Ogan, Associate Professor, Human-Computer Interaction Institute, Carnegie Mellon University
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Dr. Brian Krupp, Associate Professor, Computer Science Department, Baldwin Wallace University
(440) 826-2200, bkrupp@bw.edu

Dr. Rachelle Hippler, Associate Professor, Computer Science Department, Baldwin Wallace University
(440) 826-3584, rhippler@bw.edu