Adam Lechowicz

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Education

University of Massachusetts Amherst, *Ph.D. in Computer Science* 2022 –
Supported by DOE Computational Science Graduate Fellowship, 2023 –
Advised by: Mohammad Hajiesmaili and Prashant Shenoy

University of Massachusetts Amherst 2019 – 2022
B.S. Computer Science & B.A. Political Science, summa cum laude
Phi Beta Kappa, 21st Century Leader. GPA: 3.99 / 4.0
Honors Thesis (Advisor: Cameron Musco): Edge Dynamics and Opinion Polarization in Social Networks

Research Interests

I work at the intersection of theory and systems, with an emphasis on problems that hold implications for energy, equity, and climate change. From a theoretical perspective, I am interested in designing algorithms for online optimization, particularly of the learning-augmented or provably fair types. On the application side, I am especially interested in novel system designs which promote the decarbonization of energy systems and computing infrastructure.

Experience

Research Assistant **Amherst, Mass.**
Manning College of Information and Computer Sciences Jun. 2022 –
- Designing fair algorithms for online problems such as knapsack and online search
- Working on topological optimization of residential heating decarbonization in a small city
- *Areas: Online Optimization, Online Fairness, Energy Analytics*

Undergraduate Honors Thesis Research **Amherst, Mass.**
- Explored mechanics behind opinion polarization in social networks, using simulation and spectral graph theory. Using local edge dynamics and an opinion dynamics model, answered questions about the topologies which correspond with the emergence of polarization. Mar. 2021 – Aug. 2022

Course Assistant **Amherst, Mass.**
Intro to Machine Learning (CS 389) – College of Information and Computer Sciences Jan. 2022 – May 2022

REU Internship **Amherst, Mass.**
Laboratory for Advanced System Software Jun. 2021 – Dec. 2021
- Assisted with projects designing sensor systems for indoor air health and HVAC efficiency.
- *FlowSense* is an applied ML sensing system that filters and feeds smartphone microphone signals through supervised learning models to sense the presence and magnitude of airflow.

Publications and Academic Papers

Adam Lechowicz, Nicolas Christianson, Jinhang Zuo, Noman Bashir, Mohammad Hajiesmaili, Adam Wierman, and Prashant Shenoy
The Online Pause and Resume Problem: Optimal Algorithms and An Application to Carbon-Aware Load Shifting
In submission, 2023.

Adam Lechowicz, Noman Bashir, John Wamburu, Mohammad Hajiesmaili, and Prashant Shenoy
Equitable Network-Aware Decarbonization of Residential Heating at City Scale
ACM International Conference on Future Energy Systems (e-Energy), 2023.

Nikita Bhalla, Adam Lechowicz, and Cameron Musco
Local Edge Dynamics and Opinion Polarization
ACM International Conference on Web Search and Data Mining (WSDM), 2023.

Bhawana Chhaglani, Camellia Zakaria, Adam Lechowicz, Jeremy Gummeson, and Prashant Shenoy
FlowSense: Monitoring Airflow in Building Ventilation Systems Using Audio Sensing
Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), March 2022.

Honors and Awards

U.S. Department of Energy: Computational Science Graduate Fellowship Fall 2023
Energy Transition Institute: NSF ELEVATE Fellowship Fall 2022

UMass Amherst: Class of 2022 – 21st Century Leader Award — Spring 2022
Manning CICS: Outstanding Undergraduate Achievement Award — Spring 2022
UMass Amherst: 2021-2022 UMass Amherst Rising Researcher — Spring 2022
Manning CICS: Senior Leadership Award — Spring 2022
Manning CICS: Outstanding Undergraduate Course Assistant Award — Spring 2022
UMass Amherst: Inducted into Phi Beta Kappa & Phi Kappa Phi Honor Societies — Spring 2021
Massachusetts Department of Higher Education: John and Abigail Adams Scholarship — Fall 2018

Presentations

On the Necessary "Unfairness" of Competitive Online Algorithms — Nov. 2022
UMass CS Theory Seminar (Slides)

Edge Dynamics and Opinion Polarization in Social Networks — Apr. 2022
Honors Thesis Defense (Slides)

Machine Learning for Absolute Beginners – Mathematical Foundations of ML — Nov. 2021
Workshop @ HackUMass IX (Slides)

Research Advising and Mentorship

Oluwole Fabikun – *Undergraduate LSAMP Scholar* — 2023 –

Other Professional Experience

Student Trustee – *Board of Trustees, University of Massachusetts* — **Boston, Mass.**
- Serving as student representative of the Amherst campus on system-wide Board of Trustees. — Jul. 2022 –

Peer Advisor – *Manning College of Information and Computer Sciences* — **Amherst, Mass.**
- Advised students on course selection and offered guidance for struggling students. — Jan. 2021 – Jan. 2022

Web Developer – *Public Higher Education Network of Massachusetts (PHENOM)* — **Worcester, Mass.**
- Created new web UI & recruitment tools for a nonprofit in the higher education sector. — Dec. 2020 – Nov. 2021

Summer Engineering Intern – *Bin1 ATE* — **Ashland, Mass.**
- Intern at firm building automated test equipment for semiconductor manufacturing — May. 2019 – Aug. 2019

Side Projects

Venti – *macOS application, JavaScript & shell* — Winter 2023
A carbon-aware battery management tool for Apple Silicon MacBooks. Used to prolong battery health and defer charging to periods of time when grid electricity is sufficiently clean.

Backtrack – *iOS application, Swift & SwiftUI* — Summer 2021
A privacy-centric, open-source location logging solution that provides a history of location data for a personal device with minimal battery impact, leveraging deep API integration.

Béton3 Macro Pad – *Hardware and firmware design, C, CAD, Arduino* — Summer 2020
Created an Arduino-based open-source input device design hosted on GitHub. Custom firmware, hardware, CAD chassis, and concrete cast volume knob.

UMass Campus Architecture & Campus Tour – *iOS, watchOS application, SwiftUI* — Summer 2020
Created an interactive guide to highlight the architecture of the UMass campus. Also explored the feasibility of a tour app for prospective students, in collaboration with University Relations.

Service, Extracurriculars, and Memberships

– Program Committees –

Workshop on Learning-augmented Algorithms: Theory and Applications, SIGMETRICS 2023 — Jun. 2023

– Department & University Service –

MCICS New Building Committee — Jun. 2022 – ongoing

Committee Against Racism and for Equity – Structural Barriers to Academic Success — Sep. 2021 – ongoing

Flexible Learning Task Force & Implementation Committee – UMass Amherst — Jan. 2021 – May 2022

– Outreach & Volunteering –

Mentor & Instructor – UMass Turing Summer Program Jul. 2022 – Aug. 2022

Undergrad. Research Volunteer Program – College of Information and Computer Sciences Dec. 2020 – Jan. 2021

Founder & Editor-in-Chief – UMass Index Yearbook Aug. 2020 – Jul. 2022

- Led a successful effort to revive the university's yearbook – took project from conceptual stage to raising funds from scratch through preorders and delivering several hundred books.

Organizing Co-director – UMass CEPA Food Justice Campaign Sep. 2019 – May 2021

- Leadership role in a campaign focused on advocacy around food insecurity and sustainability

Senator, Secretary of Technology – UMass Student Government Association Sep. 2019 – May 2022

Skills

Python; C/C++; Swift; Java; Kotlin; JavaScript; MATLAB; SQL; HTML/CSS
NumPy; SciPy; NetworkX; pandas; scikit-learn; PyTorch; Anaconda; Xcode; Arduino; SolidWorks