Adam Lechowicz

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Education

University of Massachusetts Amherst (Manning CICS), *Ph.D. 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

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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

Visiting Researcher **Pasadena, Calif.**
Computing and Mathematical Sciences, California Institute of Technology Summer 2023
○ Advised by Prof. Adam Wierman – *areas: Online Optimization, Carbon-aware Computing*

Research Assistant **Amherst, Mass.**
Manning College of Information and Computer Sciences Jun. 2022 – May 2023
○ Designed algorithms for online problems such as knapsack and online search, and worked on residential heating decarbonization in a small city
○ *areas: Online Optimization, Algorithmic Fairness, Energy Analytics*

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

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

Publications and Academic Papers

† – *indicates undergraduate I advised* ($\alpha-\beta$) – *indicates alphabetical author order*

Anupama Sitaraman, Adam Lechowicz, Noman Bashir, Xutong Liu, Prashant Shenoy, and Mohammad Hajiesmaili
Online Learning of Dynamic Incentive Allocation for City-scale Deep Decarbonization
In submission, 2024.

Adam Lechowicz, Nicolas Christianson, Bo Sun, Noman Bashir, Mohammad Hajiesmaili, Adam Wierman, and Prashant Shenoy
Chasing Convex Functions with Long-term Constraints
In submission, 2024.

Roozbeh Bostandoost, Adam Lechowicz, Walid A. Hanafy, Noman Bashir, Prashant Shenoy, and Mohammad Hajiesmaili
LACS: Learning-Augmented Carbon-Aware Resource Scaling for Uncertain Demand
In submission, 2024.

Adam Lechowicz, Nicolas Christianson, Bo Sun, Noman Bashir, Mohammad Hajiesmaili, Adam Wierman, and Prashant Shenoy
Online Conversion with Switching Costs: *Robust and Learning-augmented Algorithms*
ACM SIGMETRICS, 2024.

Adam Lechowicz, Rik Sengupta, Bo Sun, Shahin Kamali, and Mohammad Hajiesmaili
Time Fairness in Online Knapsack Problems
International Conference on Learning Representations (ICLR), 2024.

Julia Köhlke, Adam Lechowicz, Oluwole Fabikun[†], Noman Bashir, Abel Souza, Prashant Shenoy, and Sebastian Lehnhoff
Riding towards sustainability: Examining the adoption of electromobility concepts across social contexts for energy transition
In submission, 2024.

Mohammadreza Daneshvaramoli, Helia Karisani, Adam Lechowicz, Bo Sun, Cameron Musco, and Mohammad Hajiesmaili
Online Fractional Knapsack with Predictions
In submission, 2024.

Lily Davoren[†], Adam Lechowicz, Noman Bashir, Mohammad Hajiesmaili, and Prashant Shenoy
Shining a Light on Solar Equity: *Photovoltaic Potential Across Socio-economic Diversity*
In submission, 2024.

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*
ACM SIGMETRICS, 2024. Also in Proceedings of the ACM on Measurement and Analysis of Computing Systems, Dec. 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 $(\alpha-\beta)$
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. of Michigan, Georgia Tech, UC San Diego: 2023 NextProf Pathfinder Workshop (invited)	Fall 2023
Manning CICS: Dr. C. Mohan Graduate Scholarship	Fall 2023
U.S. Department of Energy: Computational Science Graduate Fellowship	2023-2027
ACM SIGIR: Student Travel Grant (for ACM WSDM 2023)	Spring 2023
National Science Foundation: Student Travel Award (for ACM WSDM 2023)	Spring 2023
Energy Transition Institute: NSF ELEVATE Fellowship	2022-2024
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

Presentations

Fresh Challenges for Online Problems: new directions motivated by practice *RSRG / FALCON Lunch Seminar @ Caltech* (Slides)	Jun. 2023
On the Necessary "Unfairness" of Competitive Online Algorithms *UMass CS Theory Seminar* (Slides)	Nov. 2022
Edge Dynamics and Opinion Polarization in Social Networks *Honors Thesis Defense* (Slides)	Apr. 2022
Machine Learning for Absolute Beginners – Mathematical Foundations of ML *Workshop @ HackUMass IX* (Slides)	Nov. 2021

Research Advising and Mentorship

Anisha Prathi *(UG, UMass)* – Undergraduate Honors Thesis	2023 –
Kaosisochukwu Nwosu *(UG, UMass)* – Undergraduate Research Assistant	2023 –
Lily Davoren *(UG, Bryn Mawr)* – Computing for an Equitable Energy Transition REU	Summer 2023
Coo Katsuno, Saif Masoud, Riley Kim Connell *(UG, UMass)* – URV Program @ MCICS	Summer 2023
Oluwole Fabikun *(UG, UMass)* – Undergraduate LSAMP Scholar	2023 –

Other Professional Experience

Student Trustee – *Board of Trustees, University of Massachusetts* **Boston, Mass.**
○ Served as student representative of the Amherst campus on system-wide Board of Trustees. Jul. 2022 – Jul. 2023

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.

Service

– Program Committees –

Workshop on Learning-augmented Algorithms: Theory and Applications, SIGMETRICS '23 Jun. 2023

– Department & University Service –

Grad Student Social Committee – Manning CICS Sep. 2023 – ongoing

New PhD Student Committee – Manning CICS Sep. 2023 – ongoing

New Building Committee – Manning CICS 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 –

Judge – HackUMass XI (hackathon) Nov. 2023

Mentor – Undergraduate Research Volunteers (URV) Program Summer 2023

Mentor & Instructor – UMass Turing Summer Program Summer 2022 & 2023

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