

# KATHERINE MAYO

ARTIFICIAL INTELLIGENCE (AI) RESEARCHER

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## RESEARCH INTERESTS

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I apply methods from artificial intelligence to gain insights into complex interactions in financial networks.

[AI]: computational economics, multi-agent systems, empirical game theory, applications of machine learning

[Finance]: real-time payments, fraud, systemic risk

## EDUCATION

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### University of Michigan Ann Arbor

PH.D IN COMPUTER SCIENCE & ENGINEERING

Ann Arbor, MI

Sept 2019 – May 2024

- *Advisor*: Michael P. Wellman
- *Committee Members*: Peter Adriaens, Atul Prakash, Jeffery Zhang
- *Dissertation*: A Strategic Agent-Based Analysis of Economic and Technological Changes in Financial Networks

### University of Michigan Ann Arbor

M.S. IN COMPUTER SCIENCE & ENGINEERING

Ann Arbor, MI

Sept 2019 – April 2021

- *Selected Coursework*: Electronic Commerce; Advanced Data Mining; International Finance; Reinforcement Learning Theory; Advanced Artificial Intelligence

### University of Massachusetts Amherst

B.S. COMPUTER SCIENCE, B.A. ECONOMICS, MINOR IN CHINESE

Amherst, MA

Sept 2015 – Feb 2019

- *Honors*: cum laude, Honors College with great distinction and multidisciplinary honors, Phi Kappa Phi honor society
- *Selected Coursework*: Neural Networks: A Modern Introduction (graduate level)
- *Honors Thesis*: Predicting Unemployment Rates Using Google Trends Data (advised by Brendan O'Connor and Arindrajit Dube)

## PROFESSIONAL EXPERIENCE

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### University of Michigan, Computer Science & Engineering Department

GRADUATE STUDENT RESEARCH ASSISTANT – STRATEGIC REASONING GROUP

Ann Arbor, MI

Sept 2019 – May 2024

- Studied strategic decision-making in financial payment networks using agent-based modeling and empirical game-theoretic analysis (EGTA)
- Developed the Strategic Feature Gains Assessment
- Mentored 2 undergraduate researchers

### Michigan Medicine, Department of Radiation Oncology

RESEARCH ASSISTANT

Ann Arbor, MI/Remote

Feb 2019 – Aug 2019

- Analyzed more than 15 factors in a data set of adult cancer patients as possible predictors of emergency room (ER) visits using InterpretML
- Applied machine learning models (random forest, logistic regression, support vector machines, and naive Bayes) to predict ER visits

## Systems & Technology Research

INTELLIGENCE TOOLS AND ANALYTICS INTERN

Woburn, MA

Jun 2018 – Aug 2018

- Identified users of interest (UOI) based on analysis of social media usage patterns
- Applied Hidden Markov Models to social media data of UOI to predict La Liga soccer matches

## University of Massachusetts, Department of Economics

RESEARCH ASSISTANT

Amherst, MA

Oct 2016 – Dec 2017

- Gathered and cleaned meta-data for Computer Science papers submitted to arXiv.org from 2005 to 2014
- Matched arXiv papers with accepted papers to major CS conferences to form a data set for research purposes

## Michigan Medicine, Department of Radiation Oncology

RESEARCH ASSISTANT

Ann Arbor, MI

May 2017 – Aug 2017

- Integrated a non-linear optimizer (IPOPT) with the current system operating in Variance Eclipse for optimizing cancer treatment plans

## Michigan Medicine, Department of Radiation Oncology

RESEARCH ASSISTANT

Ann Arbor, MI

May 2016 – Aug 2016

- Migrated cancer patient data to an SQL database
- Created dose-volume histograms from patient data to support research on radiation cancer treatment

## TEACHING EXPERIENCE

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### University of Michigan, Computer Science & Engineering Department

PRIMARY INSTRUCTOR – EECS 110: DISCOVER COMPUTER SCIENCE

Ann Arbor, MI

Aug 2022 – Dec 2022

- Prepared and delivered weekly lessons and labs (1 hour each) to 62 undergraduate students
- Conducted administrative duties such as grading, holding office hours, scheduling guest presentations, and overseeing a teaching assistant

## PROFESSIONAL SERVICE & VOLUNTEERING

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2024	Prospective PhD Student Visit Day volunteer
2023	Student Application Support Program volunteer
2022	Mentor for EECS 110 Discover CS
2022	CS Kickstart presenter
2019	AI Symposium volunteer

## MENTORING & ADVISING

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2023 – 2024	Nicholas Grabill	(undergraduate)
2020 – 2022	Shaily Fozdar	(undergraduate)

## INVITED TALKS

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1. “Flagging Payments for Fraud Detection: A Strategic Agent-Based Model”.  
*Young Scholars Conference on Machine Learning in Economics and Finance at the Philadelphia Federal Reserve, December 2023*

## CONFERENCE PUBLICATIONS

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1. **K. Mayo**, N. Grabill, and M.P. Wellman. “**Fraud Risk Mitigation in Real-Time Payments: A Strategic Agent-Based Analysis**”. In *33rd International Joint Conference on Artificial Intelligence*, August 2024.
2. **K. Mayo** and M.P. Wellman. “**A Strategic Analysis of Portfolio Compression**”. In *2nd ACM International Conference on AI in Finance*, November 2021.
3. **K. Mayo**, S. Fozdar, and M.P. Wellman. “**An Agent-Based Model of Strategic Adoption of Real-Time Payments**”. In *2nd ACM International Conference on AI in Finance*, November 2021.

## JOURNAL PUBLICATIONS

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1. M.P. Wellman and **K. Mayo**. “**Navigating in a Space of Game Views**”. In *Journal for Autonomous Agents and Multi-Agent Systems*, July 2024.
2. M. Mierzwa, C. Mayo, P. Yalamanchi, J. Evans, F. Worden, R. Medlin, M. Schipper, C. Schonewolf, J. Shah, M. Spector, P. Swiecicki, **K. Mayo**, K. Casper. “**Machine Learning Model of Emergency Department Use for Patients Undergoing Treatment for Head and Neck Cancer Using Comprehensive Multifactor Electronic Health Records**”. In *JCO Clinical Cancer Informatics*, January 2023.

## WORKSHOPS

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1. **K. Mayo**, S. Fozdar, and M.P. Wellman. “**Flagging Payments for Fraud Detection: A Strategic Agent-Based Model**”.  
*AAAI Workshop on Modeling Uncertainty in the Financial World (MUFin)*, February 2023