Thomas Ma

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Research Interest and Objective

MIT Sloan PhD student interested in the design and analysis of online marketplaces with the goal of improving user welfare

Education

Massachusetts Institute of Technology
PhD, Sloan School of Management (Information Technology group)
2024 - Present

Stanford University
Master's of Science, Management Science and Engineering (Computational Social Science focus)
2021 - 2023 CGPA: 4.06/4.00

University of Toronto
Bachelor of Science, Computer Science and Mathematics (Economics Minor)
2016 - 2021 CGPA: 3.99/4.00

Research

Department of Management Science and Engineering, Stanford University
Supervisors: Ramesh Johari, Michael Bernstein, Nikhil Garg Jan. 2022–Oct 2023

- Built a simulated marketplace to investigate how rating systems affect market efficiency and fairness
- Proved theoretical guarantees on trade-offs in efficiency and fairness within simulated marketplaces mediated by rating systems
- Wrote a workshop paper (accepted at KDD 2022) and a conference submission (to be presented at ICWSM 2025)

David R. Cheriton School of Computer Science, University of Waterloo
Supervisor: Kate Larson May 2020–Aug. 2020

- Worked on one-sided matching problems with ordinal information, funded by NSERC
- Proved theoretical upper and lower bounds on matching algorithms with queries
- Wrote a working paper on housing allocation and wrote simulations in Python using NetworkX and pandas, presented at IJCAI 2021

Computer Systems & Networks Group, University of Toronto
Supervisor: Peter Marbach May 2019–Aug. 2019

- Developed a model-based approach for finding core users of communities in social networks, proving model-based results with real analysis and implementing the algorithm using the Tweepy API for Python
- Funded by the Natural Sciences and Engineering Research Council of Canada

Department of Mathematics, University of Toronto
Supervisors: Joe Repka and Andrew Douglas May 2017–Aug. 2017

- Worked with a group of undergraduate students to construct a dictionary of isomorphisms between two different notations of Lie Algebras

Publications

Ma, Thomas, Johari, Ramesh, Bernstein, Michael, Garg, Nikhil. *Balancing Producer Fairness and Efficiency via Prior-Weighted Rating System Design*, to be presented at ICWSM 2025. https://arxiv.org/abs/2207.04369

Ma, Thomas, Menon, Vijay, Larson, Kate (2020). *Improving Welfare in One-sided Matching using Simple Threshold Queries*, presented at IJCAI 2021. https://arxiv.org/abs/2011.13977.

Bryenton, N., Davies, C., Douglas, A., Haque, S., Hauser... **Ma, T** ... Wu, M (2018). *A comparison of two classifications of solvable Lie algebras*, J. Math. Phys (Vol.59, issue 12). https://doi.org/10.1063/1.5050789.

Teaching Experience

OIT247, Optimization + Simulation Modeling, Sep. 2021–Dec. 2021
Stanford Graduate School of Business
Course Assistant

- Helped answer student questions about linear programming in Excel and graded final exams

MAT186: Calculus for Engineers, University of Toronto Sep. 2020–Dec. 2020
Teaching Assistant

- Helped mark student modelling projects and proposals

MAT223: Linear Algebra, University of Toronto Sep. 2019–Dec. 2019
Teaching Assistant

- Helped invigilate midterms and exams and supported instructors as a lecture TA to facilitate active learning
- Hosted office hours to help students with exam preparation

MAT157: Analysis I, University of Toronto Sep. 2018–Apr. 2019
First-Year Learning Community Peer Mentor

- Hosted weekly workshops and activities to help first-year students acclimate to university
- Hosted math talks and gave students math puzzles to get students more engaged with pure mathematics

Honours and Awards

Undergraduate Student Research Award, Natural Science and Engineering Research Council of Canada
David R. Cheriton School of Computer Science, University of Waterloo 2020
Department of Computer Science, University of Toronto 2019

Coxeter Scholarship in Mathematics, *Department of Mathematics*, *University of Toronto* 2020

Banker's Scholarship in Economics, *Department of Economics*, *University of Toronto* 2017–18

Dean's List Scholar, *University of Toronto* 2016–20

Work Experience

Amazon Jan. 2024-Aug. 2024
Software Development Engineer

- Worked on operational improvements to Amazon's internal checkout engine
- Helped expand and improve shadow testing for the checkout engine, as well as mitigate false-positive errors raised by the shadow testing

Amazon Web Services Jun. 2022-Sep. 2022
Software Development Engineering Intern

- Worked on adapting an Elasticsearch client for Python and pandas for AWS OpenSearch project
- Wrote new APIs for machine learning plugin for OpenSearch

Perpetua May 2021-Aug. 2021
Software Engineer Intern

- Helped design backend systems for ecommerce merchants on Perpetua's app using Python and Django Rest Framework
- Designed experiments on bidding strategy for first-price auctions
- Built data migration scripts and regression models using Jupyter Notebook, SQL, and scikit-learn

Capital One Canada May 2018–Aug. 2018
Business Analyst Intern

- Worked on updating and implementing credit risk models for the Credit Limit Increase Program
- Developed regression models using SQL, pandas, and scikit-learn

Rotman School of Management, University of Toronto Sep. 2018–Sep. 2019
Lab Assistant

- Wrote example algorithms for algorithmic trading cases in the Rotman Interactive Trader Simulator
- Helped run the algorithmic trading event at the Rotman International Trading Competition

Skills

Programming

- Languages: Python (numpy, pandas, sklearn, Django), Java, C#, Javascript (React), R
- Databases: MongoDB, SQL, DynamoDB
- Other Software: Git

Languages

- English (fluent)
- Mandarin Chinese (conversational)