

Emily Y. Zhang

emilyy Zhang.github.io ◊ (913) · 486 · 0898 ◊ eyzhang@mit.edu

Education

Massachusetts Institute of Technology

Ph.D. Student in Operations Research, GPA: 4.9/5.0

Advised by Prof. Georgia Perakis and Prof. Retsef Levi

Cambridge, MA

September 2021 – Present

Massachusetts Institute of Technology

B.S. in Computer Science & Mathematics, GPA: 5.0/5.0

Cambridge, MA

September 2017 – June 2021

Papers

1. **Heterogeneous Treatment Effects in Panel Data.**

Retsef Levi, Elisabeth Paulson, Georgia Perakis, Emily Zhang. Submitted, 2024.

2. **Reducing Food Waste through a Reservation Scheme.**

Retsef Levi, Georgia Perakis, Emily Zhang. Submitted, 2024.

3. **On the Broadcast Dimension of a Graph.**

Emily Zhang, *Australasian Journal of Combinatorics* **85**(3) (2023), 313–339.

4. **An Upper and Lower Bound for the Convergence Time of House-Hunting in *Temnothorax* Ant Colonies.**

Emily Zhang, Jiajia Zhao, and Nancy Lynch, *Journal of Computational Biology* **29**(4) (2022), 344–357.

5. **CDFShop: Exploring and Optimizing Learned Index Structures.**

Ryan Marcus, Emily Zhang, and Tim Kraska, *ACM SIGMOD* 2020.

6. **Extremal Pattern-Avoiding Words.**

Natalya Ter-Saakov and Emily Zhang, [arXiv:2009.10186 \[math.CO\]](#), 2020.

Research Experience

MIT Operations Research Center (ORC)

Doctoral Research Assistant

Cambridge, MA

Sept 2021 – Present

- Developing new analytical methods aimed at reducing food waste and optimizing food subsidy programs.
- Designing interventions for social good.

MIT Computer Science & Artificial Intelligence Laboratory (CSAIL)

Undergraduate Researcher in the Theory of Distributed Systems Group

Cambridge, MA

Aug 2020 – Aug 2021

- Analyzed the house-hunting process in ant colonies from a distributed computing perspective to inspire swarm robotics research.
- Proved theoretical guarantees on the consensus time and conformity of an agent-based model for house-hunting.
- Presented results at the 8th workshop on Biological Distributed Algorithms.

Duluth Research Experience for Undergraduates (REU)

Undergraduate Researcher

Duluth, MN

Summer 2020

- Derived an asymptotically optimal lower bound on the broadcast dimension of acyclic graphs and proved that edge deletion can both increase and decrease broadcast dimension by an arbitrarily large amount.

- Presented results at the 2020 American Mathematical Society Fall Virtual Sectional Meetings.

MIT CSAIL

Undergraduate Researcher

Cambridge, MA

Sept 2019 – Dec 2019

- Explored the potential of the recursive model index (RMI), a learned index structure tuned to a user's data by machine learning, to outperform traditional index structures in the task of searching over sorted data.
- Built an RMI optimizer on top of the existing RMI codebase.

Georgia Tech Mathematics REU

Undergraduate Researcher

Atlanta, GA

Summer 2019

- Researched accelerated gradient-based convex optimization algorithms, based on discretizing continuous-time curves converging to the optimum.
- Presented results at the 2019 Young Mathematicians Conference.

MIT Media Lab

Undergraduate Researcher in the Molecular Machines Group

Cambridge, MA

Jan 2019 – Feb 2019

- Parsed the scientific citation network to extract features that indicate early signs of highly-impactful ideas.
- Created visualizations to understand how infectious ideas are spread across communities.

MIT Media Lab

Undergraduate Researcher in the Personal Robots Group

Cambridge, MA

Summer 2018

- Designed and developed literacy games using Unity and C#.
- Implemented a data tracking system that tracks children's learning performance and interaction history with a social robot and the literacy games.

Teaching Experience

- **Teaching Assistant** at MIT Sloan School of Management Summer 2024
Introduction to Operations Management (15.734) for MIT Executive MBAs
- **Grader** at MIT Department of Mathematics Spring 2020
Probability and Random Variables (18.600)
- **Laboratory Assistant** at MIT Department of EECS Fall 2019
Introduction to Machine Learning (6.036)

Professional Service

MIT ORC Seminar Series

Coordinator

Cambridge, MA

Fall 2024

MIT ORC Independent Activities Period (IAP) Seminar

Coordinator

Cambridge, MA

IAP 2024

MIT Undergraduate Society of Women in Mathematics (USWIM)

Publicity Chair

Cambridge, MA

2019 – 2021

MIT Society of Women Engineers (SWE)

Board Member & Technology Chair

Cambridge, MA

2019 – 2020