

Katherine Miner

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I am a Ph.D. student in Computational and Applied Mathematics at the University of Chicago.

Education

University of Chicago 2024 – Present

- Ph.D. in Computational and Applied Mathematics

Massachusetts Institute of Technology (GPA: 5.0/5.0) 2020 – 2024

- B.S. Mathematics
- Minors in Computer Science and Political Science

Research Experience

UChicago Graduate Research with Matthew Stephens May 2025 – Present

- Working in biostatistics on using Empirical Bayes Normal Means model in understanding gene expression

MIT Mathematics UROP with Jörn Dunkel Sep. 2023 – May 2024

- Examined how to compress spatial data regarding how DNA is structured within the nucleus of a cell.
- Explored how to create an optimal wavelet to compress 2D and 3D space-filling curves.

MIT Mathematics UROP with Jörn Dunkel Sep. 2022 – Sep. 2023

- Used Virtual Metabolic Human to create a comprehensive network of published biological chemical reactions.
- Built sub-networks based on different metrics such as connectivity, and tested these networks with biological sanity checks.

Imperial College REU with Nick Jones Summer 2023

- Built on existing literature and researched various 3 phase probabilistic models for mitochondrial DNA and their mutation patterns.
- Studied changes in mutation behavior given different starting conditions or intervention methods.

Directed Reading Program Mentee Jan. 2023

- Read "Hopf Monoids and Generalized Permutahedra" by Marcelo Aguiar and Federico Ardila
- Presentation on Hopf monoids of graphs, matroids, and posets, and the calculation of the antipode under mentor Colin Defant

Directed Reading Program Mentee Jan. 2022

- Read chapters from "Statistical Mechanics of Lattice Systems" by S. Friedli and Y. Velenik with mentor Roger Van Peski
- Presentation with Josh Kuffour on the representation of magnetic systems via the Ising and Curie-Weiss models

MIT AeroAstro UROP Summer 2021 & Summer 2022

- Worked in a team of 10 undergraduates to implement and beta test sensors on an aquatic data buoy in Cape Cod.
- Implemented 360 degree above and underwater camera, as well as depth sensor to monitor tidal trends.

Mentoring and Teaching

- UChicago Math Department** Teaching Fellow September 2025 – Present
- Grading homeworks and leading review sessions under the mentorship of a math department professor
- MIT Single and Multivariable Calculus** Teaching Assistant Jan. 2023 - May 2024
- Designed recitations, problem sets and practice exams for students, as well as led office hours and recitations.
 - In Spring 2024, I received an overall rating of 6.7/7.0.
- MIT Single and Multivariable Calculus** Undergraduate Assistant Fall 2022
- Held weekly office hours and review sessions before exams, as well as monitored the online question forums for a class of over 300 students.
- MIT Freshman Associate Advisor** Sep. 2021 – May 2024
- Advised a group of 5+ incoming MIT freshmen on classes, extracurriculars, and maintaining a healthy workload.
 - Attended monthly training sessions and communicated with other advisors when conflict arose.

Activities and Programs

- UChicago CAM Pre-Orientation** Student Organizer September 2025
- Coordinating Q&A sessions for incoming Ph.D. students on undergraduate coursework and transitioning to graduate-level mathematics
- UChicago CAM & Stats Student Seminar** Co-chair Aug. 2025 – Present
- Organizing and overseeing weekly student-led seminars to provide opportunities for academic presentation practice
- MIT Council for Math Majors (CoMM)** Co-chair and Discussion Forums Lead Aug. 2021 – Jan 2024
- Co-organized the advocacy group for math majors at MIT with Paige Bright
 - Worked to build the Course 18 [Underground Guide](#), as well as wrote a proposal for starting student social events in the Undergraduate Lounge
 - Worked to create [roadmaps](#) of recommended courses for first and second year math majors
- MIT German House** President & Treasurer Aug. 2021 – Jan 2024
- Organized biweekly house and leadership meetings, created and monitored payment system for house meal plan, and communicated with Graduate Resident Advisor and New House team to resolve any conflicts and advocate for students.

Selected Awards and Skills

- Charles and Holly Housman Award** 2024
- For skill and dedication in undergraduate teaching
- Associate Advisor of the Year** 2023
- PEO and Lockport College Women's Club Scholarship Recipient** 2020
- Programming Languages:** Python, MATLAB, Julia, R, JavaScript