Benjamin Braiman

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LinkedIn | Stack Exchange

Education

- **University of California, Berkeley** — *Aug 2025 - May 2030 (Estimated)*
  PhD, Mathematics — Berkeley, CA, USA
- **University of Wisconsin - Madison** — *Aug 2021 - May 2025 (Expected)*
  B.S., Mathematics (with Honors) and Computer Science — Madison, WI, USA
  - *Advisor: Sebastien Roch*
  - *GPA: 3.92/4.00*

Preprints and Publications

[1] "The Hausdorff distance and metrics on toric singularity types." November 2024. Joint work with A. Aitokhuehi, D. Cutler, R. Deaton, J. Horsley, J. Tang, P. Gupta, V. Pidaparthy, and T. Darvas. arXiv:2411.11246. *Submitted.*

Conference Talks

[1] "Hölder Estimates Between the Hausdorff Distance and a Quasi-Metric," The Young Mathematicians Conference, Columbus, Ohio, August 2024

[2] "Hölder Estimates for a Family of Quasi-Metrics on the Space of Convex Bodies," co-presented with R. Deaton. Joint Mathematics Meeting 2025, Seattle, Washington, January 2025

Projects and Research

- **Senior Honors Thesis** — *Aug 2024 - Present*
  Topic: Log-Concave Sampling
  - Advisor: Sebastien Roch
  - Investigating variants of the Euler-Mayurama scheme for generating samples from a Langevin diffusion with a log-concave potential.
  - The methods investigated are applied as Markov chain Monte Carlo algorithms in data science and statistics
- **University of Maryland, College Park Mathematics REU** — *June 2024 - July 2024*
  Project Title: Interaction Between Complex Geometry and Convex Geometry
  - Advisor: Tamás Darvas
  - Proved Hölder exponents comparing the Hausdorff metric to a quasi-metric on the space of convex bodies introduced in the works of Darvas-Di Nezza-Lu.
  - Resulted in a novel mathematics research paper that has been submitted for publication.
- **Directed Reading Project, University of Wisconsin - Madison** — *Aug 2021 - May 2024*
  Semester-long reading project in mathematics supervised by a graduate student
  - Each project culminated in a short talk given at the end of the semester.
  - Past projects: Geometric measure theory, ergodic theory, spline theory, mathematics for machine learning.
- **Madison Experimental Mathematics Lab** — *Jan 2022 - May 2022*
  Spring 2022 Project: "Equilibrium distributions of points on metric graphs"
  - Researched optimal distributions of points on graphs so that the total "resistance distance" is maximized.
  - Helped develop an algorithm to optimize the total resistance distance via polynomial interpolation.

Industry Experience

- **Slingshot Aerospace** — *June 2023 - Aug 2023*
  Space Surveillance and Tracking Intern — Fort Collins, CO, USA
  - Developed software for the Horus sensor, which tracks objects in low-earth orbit for space situational awareness tasks.
  - Developed programs in Python to improve detection accuracy.
  - Wrote and tested a Python program which eliminated up to **98%** more false positive detections than the existing method without eliminating true positives.
  - Developed and utilized a mathematical model to rapidly generate simulated telescope images, resulting in more efficient testing and an internal company paper.
- **Numerica Corporation (Acquired by Slinghot Aerospace August 2022)** — *May 2022 - Aug 2022*
  Research and Development Intern — Fort Collins, CO, USA
  - Performed initial R&D work for the Horus sensor.
  - Developed and tested a new method to extract thousands of stars from a large image in a few milliseconds.
  - Utilized the Python packages PyTorch and Torchvision to maximize computation power on GPUs.

Honors and Awards

- **Phi Beta Kappa** *Jan 2024*
  University of Wisconsin - Madison
- **Dean's List**
  University of Wisconsin - Madison
  ◦ Fall 2021, Spring 2022, Spring 2023, Fall 2023, Spring 2024

Campus Activities

- **Mathematics Club** *Aug 2021 - Present*
  University of Wisconsin - Madison
  ◦ Delivered a talk about finitely additive measures in Spring 2024 and another about optimal transport theory in Fall 2024
- **Mathematics Tutor** *Sep 2023 - Dec 2023*
  Greater University Tutoring Services, University of Wisconsin - Madison
  ◦ Held drop-in tutoring hours for math courses including calculus and probability theory

Other Skills

Programming Languages: Python (fluent), Java (fluent), C/C++ (intermediate), CUDA (beginner)
Other Tools: PyTorch, Torchvision, Numpy, SciPy, gRPC, Docker, LaTeX