

Paige Bright

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Education

Massachusetts Institute of Technology	Ph.D. Mathematics (GPA: N/A)	2025 – 2030
University of British Columbia	M.Sc. Mathematics (GPA: N/A)	2024 – 2025
Massachusetts Institute of Technology	B.S. Mathematics (GPA: 5.0/5.0)	2020 – 2024
Fresno City College	A.S. Mathematics (GPA: 4.0/4.0)	2016 – 2020

Publications and Preprints

I am interested in geometric measure theory, harmonic analysis, and math education and pedagogy.

- [1] [A continuum Erdős–Beck theorem](#), with Caleb Marshall
- [2] [Radial projections in \$\mathbb{R}^n\$ revisited](#), with Yuqiu Fu and Kevin Ren
- [3] [On a radial projection conjecture in \$\mathbb{F}_q^d\$](#) , with Ben Lund and Thang Pham
- [4] [Improved bounds for embedding certain configurations in subsets of vector spaces over finite fields](#), with Xinyu Fang, Barrett Heritage, Alex Iosevich, & Maxwell Sun
- [5] [Generalized point configurations in \$\mathbb{F}_q^d\$](#) , with Xinyu Fang, Barrett Heritage, Alex Iosevich, Tingsong Jiang, Hans Parshall, & Maxwell Sun
- [6] [Exceptional set estimates in finite fields](#), with Shengwen Gan
- [7] [Exceptional set estimates for orthogonal and radial projections in \$\mathbb{R}^n\$](#) , with Shengwen Gan

Typed Notes, Expository Writing, and More

- [A study guide to "Kaufman and Falconer estimates for radial projections"](#), with Ryan Bushling, Caleb Marshall, & Alex Ortiz
- [\(Draft\) 18.S096: Matrix Calculus \(IAP '23\) typed notes](#) for Profs. Edelman and Johnson
- [18.S097/18.S190: Introduction to Metric Spaces \(IAP '22/'23\)](#) on OCW
- [18.100A: Real Analysis \(Fall '20\)](#) typed notes for Prof. Casey Rodriguez on OCW
- [A Proof of a Sobolev Inequality in \$\mathbb{R}^2\$](#) , with Yuqiu Fu
- [Chalk Radio](#) interview with Prof. Haynes Miller: [Communication is the Whole Game](#)

Talks and Presentations

- 01/2024 **AWM Special Session on "Recent Developments in Harmonic Analysis"**
– ["Recent Developments in Radial Projections"](#) at the JMM
- 01/2024 **AMS Special Session on "Harmonic Analysis, Geometric Measure Theory, and Fractals"**
– ["Exceptional Set Estimates for Orthogonal Projections"](#) at the JMM
- 11/2023 **Graduate Lecture Series in Analysis and PDEs at Brown (GLESPA)**
– ["From Discrete Geometry to Geometric Measure Theory"](#) and ["Exceptional Set Estimates"](#)
- 11/2023 **Online Undergraduate Research Seminar at UNC** with Alex Ortiz
– ["Incidences and Projections: Discrete and Continuous"](#)
- 05/2023 **MIT International Women in Math Day**
– ["Exceptional Set Estimates for Orthogonal and Radial Projections"](#)
- 11/2022 **MIT Undergraduate Mathematics Association**
– ["Topics in Orthogonal Projections in Euclidean Space"](#)

Research Experience

MIT Mathematics Undergraduate Research (UROP) Spring '21 – Spring '24

- Researched sets of hyperplanes generated by a set of points in \mathbb{R}^n with A. Ortiz and D. Zakharov
- Studied exceptional set estimates for projections in \mathbb{F}_q^n with Shengwen Gan resulting in [6]
- Studied extension theorems for homogeneous Sobolev spaces with Marjorie Drake
- Wrote an expository paper proving a Sobolev inequality in \mathbb{R}^2 with Yuqiu Fu, found [here](#)
- Explored relations between the side lengths and dihedral angles of a tetrahedron with Prof. Poonen

Williams SMALL REU Summer '23

- Studied point configurations in finite fields with Alex Iosevich, resulting in two papers: ([4], [5])

Summer Program in Undergraduate Research Mentee under Shengwen Gan Summer '22

- Proved two open conjectures on radial projections, as well as two classical exceptional set estimates for orthogonal projections on \mathbb{R}^n using new methods resulting in [7]

Mentoring and Teaching

Introduction to Metric Spaces Lecturer Jan. '22/'23

- Created and taught a bridge class between real analysis on \mathbb{R}^n and on a general metric space; recipient of MIT Mathematics Department Teaching and Learning Award; course can be found [here](#)

Undergraduate Assistant (UA) 18.101, 18.102 Fall '22 – Fall '23

- 18.101: Analysis and Manifolds (Fall '22/'23); 18.102: Functional Analysis (Spring '23)
- Held weekly office hours, graded problem sets, and typed problem set solutions

MIT OpenCourseWare Spring '21 – Spring '24

- Provided feedback and developing materials for courses being uploaded to OpenCourseWare

Activities and Programs

mathroots at MIT Academic and Residential Counselor Summer '24

- Mentoring for this two-week high school math program held at MIT

Fourier Analysis Reading Group with Larry Guth Fall '23 – Spring '24

- Participated in a reading group under Larry Guth studying recent results on the Furstenberg set problem and related work in geometric measure theory

UPenn Study Guide Writing Workshop Aug. '23

- Collaborated with Ryan Bushling, Caleb Marshall, and Alex Ortiz to write a [study guide](#) on a recent paper by Orponen–Shmerkin–Wang

PRIMES Circle Mentor Springs '22 – '24

- Met weekly with high school students reading math textbooks. Mentored papers which can be found [here](#), [here](#), and [here](#)

Council for Math Majors (CoMM) Co-chair and Project Lead Fall '21 – Spring '24

- Co-organized numerous projects based on gathered student feedback on the math department

Selected Awards and Honors

NSF GRFP Fellowship Awarded 2024

MIT Mathematics Department Teaching and Learning Award Recipient for 18.S097 2022