Dongming (Merrick) Hua

California Institute of Technology
Department of Mathematics
Division of Physics, Mathematics, and Astronomy

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Research Interests

I am interested in high-dimensional geometry, convex geometry, and geometric analysis. I am also interested in AI governance and safety, with a current focus on compute verification.

Education

California Institute of Technology

Sep. 2025 to Present (Expected Spring 2030)

- Ph.D. in Mathematics. Advisor: Antoine Song

University of California, Santa Barbara

Sep. 2021 to Mar. 2025

- B.S. Mathematics, College of Creative Studies. GPA: 3.95/4.00, Major GPA: 4.00/4.00

Research Visits

Fields Institute, Centre for Mathematical AI

Oct. 2026 to Nov. 2026.

- Studied mathematical perspectives on mechanistic interpretability; attended the Fields Academy Shared Graduate Course on Mathematics for AI Safety. Host: Yevgeny Liokumovich.

Honors and Awards

- Scott Russell Johnson Excellence in First-Year Graduate Studies Award (2026)
- NSF Graduate Research Fellowship Honorable Mention (2025)
- Raymond L. Wilder Award (2025) (Awarded to "an outstanding graduating senior.")

Publications and Preprints

1. **On Talagrand's Convexity Conjecture**, with Antoine Song and Stefan Tudose.
   Preprint. (https://arxiv.org/abs/2605.10908) (Featured in Scientific American.)

Pre-Graduate Work

3. **Volume Entropy Rigidity for Random Groups at Low Densities**.
   Preprint. (https://arxiv.org/abs/2505.23364)

2. **Extremal hypergraphs for the Erdös-Selfridge theorem using labelings of binary trees**, with Kathryn Grossmann, Benjamin Pagano, Hannah Sheats, Eric Sundberg, Ann Thompson, and Sireesh Vinnakota.
   Involve, a Journal of Mathematics, 17(5), 845–899 (2024). (DOI: https://doi.org/10.2140/involve.2024.17.845.)

[1] Updated October 31, 2026

1. **Local behavior of the Eden model on graphs and tessellations of manifolds**, with Fedor Manin, Tahda Queer, and Tianyi Wang.
   J Appl. and Comput. Topology, 8, 1607–1647 (2024). (https://arxiv.org/abs/2212.14146)

Teaching

California Institute of Technology

- Teaching Assistant, Math 1a. Calculus of One and Several Variables and Linear Algebra (Fall 2026)
- Teaching Assistant, Math 1c Analytical. Calculus of One and Several Variables and Linear Algebra (Spring 2026)
- Teaching Assistant, Math 3. Introduction to Probability and Statistics (Winter 2026)
- Teaching Assistant, Math 1a. Calculus of One and Several Variables and Linear Algebra (Fall 2025)

Service and Organization

- Co-organizing a Math and AI safety reading seminar at Caltech (Fall 2026)
- Led an AI and Math town hall discussion about near-future AI capabilities in the Caltech math department (May 2026)
- Caltech PMA Undergraduate-Graduate Mentorship Program, Mentor (Spring 2026, informally Fall 2026)
- Stanford Mathematics Camp, Residential Counselor and Instructor (Summer 2023)