

Matthew Hase-Liu

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Mathematician in arithmetic geometry and number theory. Research Scientist and NSF Postdoctoral Fellow at MIT, with a Columbia Ph.D. and a Harvard S.M. in Computer Science. Interested in AI for mathematics, evaluation of mathematical reasoning, formalization, and post-training.

Experience

Mathematics Research Collaborator

Aug. 2026–

Google DeepMind via Mercor

- Designing research-level problems with rigorous grading rubrics to train and benchmark frontier models.
- Building evaluations of mathematical reasoning; auditing model outputs and automated grading verdicts.
- Providing structured feedback on the flaws and utility of model-generated proofs.

Research Scientist and NSF Postdoctoral Fellow

Aug. 2026–

Massachusetts Institute of Technology *Mentor: Bjorn Poonen*

Machine Learning Intern

Winter 2017, Summer 2018

Otter.ai

- Ran experiments to improve speaker diarization in the production transcription pipeline through refinements to the underlying clustering algorithm.
- Modified and trained an LSTM punctuation-prediction model to add capitalization support.

Education

Ph.D. in Mathematics

May 2026

Columbia University *Advisor: Will Sawin*

Thesis: Geometry of the moduli space of curves on a hypersurface via the circle method

S.M. in Computer Science

May 2021

Harvard University

A.B. in Mathematics

May 2021

Harvard College

GPA: 3.99/4.0, *summa cum laude* with highest departmental honors

Selected Publications

1. A converse to geometric Manin's conjecture for general low degree hypersurfaces. Submitted. [arXiv:2501.12506](#)
2. Terminal singularities of the moduli space of curves on low degree hypersurfaces and the circle method (with J. Glas). Submitted. [arXiv:2412.14923](#)
3. Non-smoothness of moduli spaces of curves on hypersurfaces (with A. Mattoo). Submitted. [arXiv:2412.04618](#)
4. A geometric approach to functional equations for general multiple Dirichlet series over function fields. **Algebra & Number Theory**, to appear. [arXiv:2405.18152](#)
5. A higher genus circle method and an application to geometric Manin's conjecture. **Algebra & Number Theory**, to appear. [arXiv:2402.10498](#)
6. Sum-product phenomena for planar hypercomplex numbers (with A. Sheffer). **European Journal of Combinatorics** **89** (2020). [arXiv:1812.09547](#)

17 invited talks and posters, including at Stanford, Johns Hopkins, Harvard–MIT, and Institut Mittag-Leffler.

Referee for *Algebraic Geometry*, *Journal of Number Theory*, and *Essential Number Theory*.

Awards

NSF Mathematical Sciences Postdoctoral Research Fellowship (2026–2030) · NSF Graduate Research Fellowship (2021–2026) · Putnam, Rank 107.5/4638 (2018) · USA Math Olympiad, Rank 37/280 (2017) · Phi Beta Kappa (2021)

Technical

Python, PyTorch, SageMath, Java, Linux, L^AT_EX, Lean 4. Languages: English (native), Japanese (fluent).