Annabel Ma

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EDUCATION

Harvard University • Bachelor's in Mathematics and Bachelor's in Computer Science Cambridge, MA • Aug 2023 - May 2027

• **GPA:** 3.98/4.00; **Courses:** CS/Statistics: STAT 210: Probability (Grad), CS 61: Systems Programming and Machine Organization, CS 124: Data Structures and Algorithms, CS 181: Machine Learning (TA), MIT 6.7920: Reinforcement Learning, MIT 6.7960: Deep Learning (Auditing), MIT 6.4610: Natural Language Processing, CS 121: Theoretical Computer Science Mathematics: MATH 55: Studies in Algebra and Group Theory, Real and Complex Analysis, MATH 267z: Posets (Grad), MATH 114: Measure Theory and Functional Analysis, MATH 137: Algebraic Geometry, APMTH 220: Geometric Methods in Machine Learning (Grad)
• **Activities:** AI Safety Team (Technical Fellow), Harvard Undergraduate Math Association, Harvard Undergraduate Quantitative Traders, Harvard Radio Broadcasting (Radio DJ, Music Director), The Advocate (Design Board), First Year Outdoor Program (Leader)
• **Honors:** John Harvard Scholar (2024; Top 5% of Class), Detur Book Prize (2025)

EXPERIENCE

Supervised Program for Alignment Research • AI Safety Research Fellow Remote • Sep 2025 - Present

• Researching unfaithful CoT in reasoning models using mechanistic interpretability with Owen Lewis and Jack Merullo at Goodfire

Harvard Kempner Institute of Intelligence • Machine Learning Researcher Cambridge, MA • Aug 2024 - Present

• Researching optimal transport in datasets with underlying symmetries; first author paper accepted to 2025 NeurIPS workshop
• Developed symmetry-aware notion of distance between datasets (applications to transfer learning) and implemented fast, parallel experiments showing increased class preservation accuracy by up to 200% on benchmarks with PyTorch, Pandas, NumPy

Jane Street • Trading Intern New York, NY • May 2025 - Aug 2025

• Statistical modeling of equity returns and correlated commodities using Pandas, SQL, and ML tools in Python

Harvard Radcliffe Institute of Advanced Study • Research Fellow Cambridge, MA • Aug 2024 - May 2025

• Offered edits and created diagrams for Professor Lauren Williams' forthcoming book on cluster algebras

Duluth Research Experience for Undergraduates • Mathematics Researcher Duluth, MN • Jun 2024 - Aug 2024

• Solved two unsolved problems in algebraic combinatorics and theoretical CS as one of 9 nationally selected to participate in program
• First sole-author paper posted to arXiv, pending revisions for publication; second paper forthcoming

MIT PRIMES-USA • Mathematics Researcher Cambridge, MA • Jan 2022 - Jan 2023

• Solved unsolved problem in factorization theory in high school, paper posted to arXiv

PUBLICATIONS

[1] Annabel Ma, Kaiying Hou, David Alvarez-Melis, and Melanie Weber. Bispectral OT: Dataset comparison using symmetry-aware optimal transport, 2025. `arXiv:2509.20678`.

[2] Annabel Ma. On the bivariate characteristic polynomial of the shuffle lattice, 2024. `arXiv:2409.17123`.

[3] Scott T. Chapman, Caroline Liu, Annabel Ma, and Andrew Zhang. On the factorization invariants of arithmetical congruence monoids, 2023. Authors listed in alphabetical order. `arXiv:2210.01224`.

AWARDS

Top 500 on Putnam Math Competition • Ranked 321st nationally out of 5000, Scored 33/120, Median Score 0 2023

Math Prize for Girls Olympiad Bronze Medal (Top 22) • 2x Qualifier (Top 250 women of 250,000 taking AMC in US) 2021, 2022

32nd on North American Computational Linguistics Olympiad (NACLO) • 2x Invitational Qualifier (Top 10% of 2000) 2021, 2022

USA Biology Olympiad Certificate of Merit • Top 225 of 10,000+ competitors 2022

Coca-Cola Scholarship Regional Finalist • 250 out of 91,000+ applicants (0.27%) 2023

4th Place Team at ARML Nationally • Captain of Chicago ARML Team A (Top 15 in Chicago), Highest Scorer on Team 2022

Science Olympiad National Champion • 7x National Medalist, Led team as captain to 8th, 9th Nationally 2021, 2022, 2023

4x AIME Qualifier • Top 2.5% of 250,000 2020, 2021, 2022, 2023

PROJECTS

NC-BNN: Non-Commutative Bispectral Neural Networks • PyTorch, e3nn Mar 2025 - May 2025

• Generalized 2023 ICLR group-invariant neural network to non-commutative groups with empirical classification results on MNIST

SKILLS

• **Languages:** Python, Java, SQL, Mathematica; **Technologies:** PyTorch, PythonOT, TorchVision, Pandas, NumPy, SKLearn, SciPy, SLURM, Git, HuggingFace; **Spoken Languages:** English, Spanish, Mandarin