

Sammy Luo

sammyluo@mit.edu

MIT Department of Mathematics
77 Massachusetts Ave, Room 2-174
Cambridge, MA 02139, USA

Postdoctoral Fellowships

Department of Mathematics, Massachusetts Institute of Technology (MIT)

NSF Postdoctoral Fellow 2023 – Present

Simons Laufer Mathematical Institute (SLMath)

Postdoctoral Fellow Spring 2025

Education

Stanford University

Ph.D. in Mathematics. Advisor: Jacob Fox Stanford, CA

2018 – 2023

Massachusetts Institute of Technology (MIT)

B.S. in Mathematics (Theoretical) Cambridge, MA

2014 – 2018

Selected Awards and Honors

NSF Postdoctoral Research Fellowship 2023 – Present

NSF Graduate Research Fellowship 2018 – 2023

MIT Jon A. Bucsela Prize in Mathematics 2018

William Lowell Putnam Mathematical Competition: N1 (rank 10 and 7) 2015, 2016

International Mathematical Olympiad: Gold Medal (rank 36) 2014

Research Interests

Combinatorics (additive, extremal, probabilistic) and graph theory

Teaching

Teaching at MIT

Instructor for 18.204 (Undergraduate Seminar in Discrete Mathematics) Spring 2024, Fall 2025

Instructor for 18.226 (Probabilistic Methods in Combinatorics) Fall 2024

Teaching at Stanford University

Course Assistant for Math 108 (Introduction to Combinatorics) Spring 2021

Teaching Assistant for Math 53 (Ordinary Differential Equations with Linear Algebra) Winter 2021

Course Assistant for Math 104 (Applied Matrix Theory) Fall 2019, Spring 2020

Teaching for high school students

Olympiad Math Tutor for Contest Math Tutoring 2021 – 2023

Grader / Lead TA for Math Olympiad Summer Program (MOP) June 2015, June 2018

TA for Worldwide Online Olympiad Training (WOOT) class at Art of Problem Solving 2014 – 2017

Service

MIT Richard P. Stanley Seminar in Combinatorics: Co-organizer (2024 – 2026)

MIT PRIMES: Mentor (2024 – 2025)

Stanford Math Department Directed Reading Program: Mentor (2021 – 2023)

Referee for:

Bulletin of the London Mathematical Society; Discrete Analysis;
Discrete & Computational Geometry; Discrete Mathematics;
Israel Journal of Mathematics; Journal of Combinatorial Theory, Series A;
Journal of Graph Theory; Mathematische Annalen;
Research in the Mathematical Sciences

Publications

19. Manik Dhar and Sammy Luo,
Iterated sumset expansion in F_p^n ,
[arXiv:2510.08857](https://arxiv.org/abs/2510.08857)
18. Travis Dillon, Junnosuke Koizumi, and Sammy Luo,
At most 10 cylinders mutually touch: a Ramsey-theoretic approach,
[arXiv:2510.03924](https://arxiv.org/abs/2510.03924)
17. Hannah Fox and Sammy Luo,
Monochromatic components with many edges in random graphs,
[arXiv:2509.01766](https://arxiv.org/abs/2509.01766)
16. Sammy Luo and Zixuan Xu,
On off-diagonal F-Ramsey numbers,
[arXiv:2412.19042](https://arxiv.org/abs/2412.19042)
15. Dingding Dong and Sammy Luo,
Structure of tight $(k, 0)$ -stable graphs,
[arXiv:2401.16639](https://arxiv.org/abs/2401.16639)
14. Sammy Luo,
A new shift operator-based polynomial method in additive combinatorics,
[arXiv:2311.08873](https://arxiv.org/abs/2311.08873)
13. Lyuben Lichev and Sammy Luo,
Large monochromatic components in colorings of complete hypergraphs,
Journal of Combinatorial Theory Series A 205 (2024): 105867. [arXiv:2302.04487](https://arxiv.org/abs/2302.04487)
12. Jacob Fox, Sammy Luo, Huy Tuan Pham, and Yunkun Zhou,
Small subsets with large sumset: Beyond the Cauchy–Davenport bound,
Combinatorics, Probability and Computing 33 (2024), 1-21. [arXiv:2210.07196](https://arxiv.org/abs/2210.07196)
11. Jacob Fox, Sammy Luo, and Huy Tuan Pham,
On random irregular subgraphs,
Random Structures & Algorithms 64.4 (2024): 899-917. [arXiv:2207.13651](https://arxiv.org/abs/2207.13651)
10. David Conlon, Sammy Luo, and Mykhaylo Tyomkyn,
Monochromatic components with many edges,
Journal of Combinatorics 15.1 (2024), 59–75. [arXiv:2204.11360](https://arxiv.org/abs/2204.11360)

9. Sammy Luo,
On connected components with many edges,
SIAM Journal on Discrete Mathematics 37.2 (2023), 573–585. arXiv:2111.13342
8. Jacob Fox, Xiaoyu He, Sammy Luo, and Max Wenqiang Xu,
Multicolor list Ramsey numbers grow exponentially,
Journal of Graph Theory 101 (2022), 389–396. arXiv:2103.15175
7. Jacob Fox, Sammy Luo, and Yuval Wigderson,
Extremal and Ramsey results on graph blowups,
Journal of Combinatorics 12.1 (2021), 1–15. arXiv:1912.08328
6. Ian Le and Sammy Luo,
Generalized Minors and Tensor Invariants,
International Mathematics Research Notices 2023.16 (2023), 13658–13686.
arXiv:1901.09855
5. Hong Liu, Sammy Luo, Peter Nelson, and Kazuhiro Nomoto,
Stability and exact Turan numbers for matroids,
Journal of Combinatorial Theory Series B 143 (2020), 29–41. arXiv:1710.03815
4. Ryan Alweiss and Sammy Luo,
Bounded gaps between primes in short intervals,
Research in Number Theory 4.2 (2018), 1–27. arXiv:1707.05437
3. Sammy Luo,
A counting lemma for binary matroids and applications to extremal problems,
Journal of Combinatorial Theory Series B 136 (2019), 329–359. arXiv:1610.09587
2. Sammy Luo,
Short zero-sum sequences over abelian p-groups of large exponent,
Journal of Number Theory 177 (2017), 28–36. arXiv:1608.05157
1. Sammy Luo and Mark Sellke,
The Saxl conjecture for fourth powers via the semigroup property,
Journal of Algebraic Combinatorics 45.1 (2017), 33–80. arXiv:1511.02387

Other Work Experience

| | |
|--|-----------|
| Problem Czar for the Harvard-MIT Math Tournament (HMMT) | 2014–2016 |
| Assistant Trader at Jane Street Capital | Jan 2015 |
| Concept Map Designer at Expii, Inc. , an online crowdsourced education platform | 2014–2015 |

Presentations

Invited Talks

| | |
|---|----------|
| UMaine Math Colloquium | Apr 2025 |
| JMM, Special Session on Extremal Combinatorics and Random Discrete Structures | Jan 2025 |
| EPFL Workshop on Synergies of combinatorics and theoretical computer science | Aug 2024 |

| | |
|---|-----------|
| ISTA Combinatorics, Geometry and Topology Seminar | May 2024 |
| AMS Spring Western Sectional Meeting, Special Session on Extremal Combinatorics and Connections | May 2024 |
| MIT Combinatorics Seminar | Oct 2023 |
| UCSD Workshop on Ramsey Theory | Feb 2023 |
| AMS Fall Western Sectional Meeting, Special Session on Extremal Graph Theory | Oct 2022 |
| AMS Fall Eastern Sectional Meeting, Special Session on Ramsey Theory | Oct 2022 |
| SIAM Conference on Discrete Mathematics, Minisymposium on Probabilistic Methods and Combinatorics | June 2022 |
| Stanford Combinatorics Seminar | May 2022 |

Other Talks

| | |
|--|------------------|
| SLMath Extremal Combinatorics Seminar & Graduate Student Seminar | 2025 |
| G2 (Girls Together) Math Program at MIT | 2024 |
| Graduate Student Combinatorics Seminar | 2023 |
| Stanford Combinatorics Reading Seminar | 2019, 2021, 2022 |
| Stanford Student Probability Seminar | 2022 |
| MIT-Stanford Combinatorics Reading Seminar | 2020 |
| Joint Math Meetings (JMM) | 2016, 2017 |

Languages

American English – Native
 Mandarin Chinese – Native
 German – Conversational
 Spanish – Conversational