Sammy Luo

sammyluo@mit.edu

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

Department of Mathematics, Massachusetts Institute of Technology (MIT)
NSF Postdoctoral Fellow   2023 – Present

Education

Stanford University	Stanford, CA
Ph.D. in Mathematics. Advisor: Jacob Fox	2018 – 2023
Massachusetts Institute of Technology (MIT)	Cambridge, MA
B.S. in Mathematics (Theoretical)	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, graph theory)

Teaching and Mentorship

MIT Teaching

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

Stanford Teaching

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

Other Teaching and Mentorship

MIT PRIMES: Mentor (2024)
Stanford Math Department Directed Reading Program: Mentor (2021 – 2023)
Contest Math Tutoring: Olympiad Math Tutor (2018 – 2019)
Math Olympiad Summer Program (MOP): Grader (2015); Head Grader / Lead TA (2018)
Art of Problem Solving: TA for Worldwide Online Olympiad Training (WOOT) class (2014 – 2017)

Publications

14. Sammy Luo,
    A new shift operator-based polynomial method in additive combinatorics,
    `arXiv:2311.08873`

13. Lyuben Lichev and Sammy Luo,
    Large monochromatic components in colorings of complete hypergraphs,
    `arXiv:2302.04487`

12. Jacob Fox, Sammy Luo, Huy Tuan Pham, and Yunkun Zhou,
    Small subsets with large sumset: Beyond the Cauchy–Davenport bound,
    `arXiv:2210.07196`

11. Jacob Fox, Sammy Luo, and Huy Tuan Pham,
    On random irregular subgraphs,
    To appear in *Random Structures and Algorithms*. `arXiv: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`

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

Referee for:

> 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

Presentations

Invited Talks

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

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	2016, 2017

Languages

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