

Sammy Luo

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Department of Mathematics, Massachusetts Institute of Technology (MIT)

NSF Postdoctoral Fellow 2023 – Present
SLMath Postdoctoral Fellow Spring 2025

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 18.226 (Probabilistic Methods in Combinatorics) Fall 2024
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 Richard P. Stanley Seminar in Combinatorics: Co-organizer (2024 – 2025)

MIT PRIMES: Mentor (2024 – 2025)

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

16. Sammy Luo and Zixuan Xu,
On off-diagonal F-Ramsey numbers,
arXiv: 2412.19042
15. Dingding Dong and Sammy Luo,
Structure of tight $(k,0)$ -stable graphs,
arXiv: 2401.16639
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,
Journal of Combinatorial Theory Series A 205 (2024): 105867. arXiv: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
11. Jacob Fox, Sammy Luo, and Huy Tuan Pham,
On random irregular subgraphs,
Random Structures & Algorithms 64.4 (2024): 899–917. 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 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	

Presentations

Invited Talks

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

G2 Math Program	2024
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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