

Research interests

Extremal combinatorics and graph theory, algebraic and probabilistic methods, discrete geometry, combinatorial number theory.

Employment

- **Research fellow**, Institute for Basic Science (ECOPRO) 01/2024–now
 - Mentor: Hong Liu
- **Research fellow**, Alfréd Rényi Institute of Mathematics 09/2023–12/2023
 - Mentor: János Pach

Education

- **PhD in Mathematics**, Carnegie Mellon University 09/2018–05/2023
 - Advisor: Boris Bukh
 - Thesis: “Several problems in extremal combinatorics”
- **BS in Mathematics**, Peking University 09/2014–07/2018
 - Advisor: Chunwei Song
 - Thesis: “Three proofs of Roth’s theorem”
- **Middle and High School**, Beijing National Day School 09/2008–07/2014

Academic positions

- **Teaching assistant at CMU** 09/2018–present
 - 21-325 Probability, grading Spring 2023
 - 21-228 Discrete Mathematics, grading and recitations Spring 2022
 - 21-301 Combinatorics, grading Fall 2021
 - 21-623 Complex Analysis (graduate), grading Spring 2021
 - 21-295 Putnam Seminar, grading Fall 2020

– 21-325 Probability, grading	Spring 2020
– 21-701 Discrete Mathematics (graduate), grading	Fall 2019
– 21-325 Probability, grading	Spring 2019
– 21-371 Algebraic Structures, grading	Fall 2018
– 21-341 Linear Algebra, grading	Fall 2018
• Teaching assistant at PKU	09/2017–01/2018
– Calculus (college of engineering), grading and recitations	Fall 2017

Publications

- **Large grid subsets without many cospherical points**
 - With Zijian Xu, [arXiv:2506.18113](#).
- **Induced rational exponents and bipartite subgraphs in $K_{s,s}$ -free graphs**
 - With Jun Gao, Ruonan Li, and Hong Liu, [arXiv:2506.09020](#).
- **Set families: restricted distances via restricted intersections**
 - With Jun Gao, Hong Liu, Minghui Ouyang, and Qiang Zhou, [arXiv:2504.12296](#).
- **Bipartite Turán problem on graph gluing**
 - With Jun Gao and Hong Liu, [arXiv:2501.12953](#).
 - To appear in [Bull. Lond. Math. Soc.](#).
- **Many cliques with small degree powers**
 - With Ting-Wei Chao, Zijun Shen, and Ningyuan Yang, [arXiv:2410.04744](#).
- **Empty red-red-blue triangles**
 - With Ting-Wei Chao and Zhuo Wu, [arXiv:2409.17078](#).
 - The main result of the paper appeared in “A note on empty balanced tetrahedra in two-colored point sets in \mathbb{R}^3 ” by Díaz-Bañez, Fabila-Monroy, and Urrutia.
- **Saturation results around the Erdős–Szekeres problem**
 - With Gabór Damásdi, Manfred Scheucher, and Ji Zeng, [arXiv:2312.01223](#).
 - Preliminary version appeared in [SoCG 2024](#).
 - To appear in [Eur. J. Comb.](#).
- **Rainbow even cycles**
 - With Zijian Xu, [arXiv:2211.09530](#).
 - Appeared in [SIAM J. Discrete Math.](#), vol. 38(2), 2024.

- Convex polytopes in restricted point sets in \mathbb{R}^d
 - With Boris Bukh, [arXiv:2204.02487](#).
 - Appeared in [Adv. Comb.](#), 2025:1.
- A simple proof of the Gan–Loh–Sudakov conjecture
 - With Ting-Wei Chao, [arXiv:2201.05181](#).
 - Appeared in [Electronic J. of Combinatorics](#), vol. 29(3), P3.59, 2022.
- On the stability of graph independence number
 - With Zhuo Wu, [arXiv:2102.13306](#).
 - Appeared in [SIAM J. Discrete Math.](#), vol. 36(1), 2022.
- Longest common subsequences between words of very unequal length
 - With Boris Bukh, [arXiv:2009.05869](#).

Presentations

- Large grid subsets without many cospherical points
 - Seminar in DISCRETE MATHEMATIC at Umeå University, Sweden, October 2025.
- Large grid subsets without many cospherical points
 - CoGe Seminar at HUN-REN, Budapest, Hungary, October 2025.
- Bipartite Turán problem on graph gluing
 - School of Mathematics and Physics seminar at XJTLU, Suzhou, China, August 2025.
- Bipartite Turán problem on graph gluing
 - School of Mathematical Sciences Seminar at PKU, Beijing, China, June 2025.
- Set families: restricted distances via restricted intersections
 - The 34th KIAS Combinatorics Workshop in Jeju, Korea, May 2025.
- Maximizing the number of cliques in a graph of given degree sequence ℓ^p -norm
 - Yongjiang Mathematics forum at NBU, Ningbo, China, Nov. 2024.
- Lectures on Erdős–Szekeres combinatorial geometry results and related problems
 - Combinatorics seminar at NKU, Tianjin, China, Nov. 2024.
- Maximizing the number of cliques in a graph of given degree sequence ℓ^p -norm
 - Mathematical sciences seminar at TYUT (online), Taiyuan, China, Nov. 2024.

- Maximizing the number of cliques in a graph of given degree sequence ℓ^p -norm
 - Lectures of the New Stars at SDU, Jinan, China, Nov. 2024.
- Saturation around the Happy Ending
 - Combinatorics Seminar at NPU, Xi'an, China, Nov. 2024.
- Maximizing the number of cliques in a graph of given degree sequence ℓ^p -norm
 - Combinatorics Seminar at NPU, Xi'an, China, Nov. 2024.
- Saturation around the Happy Ending
 - The Ninth Qilu Youth Forum at SDU (online), Jinan, China, Oct. 2024.
- Saturation around the Happy Ending
 - SoCG 2024 in Athens, Greece, June 2024.
- Saturation around the Happy Ending
 - The 31st KIAS Combinatorics Workshop in Jeju, Korea, May 2024.
- Convex polytopes in non-elongated point sets in \mathbb{R}^d
 - IBS Discrete Mathematics Seminar at IBS, Korea, Jan. 2024.
- Convex polytopes in non-elongated point sets in \mathbb{R}^d
 - Erdős Center Seminar at the Rényi Institute, Hungary, Oct. 2023.
- Rainbow even cycles
 - AMS Spring Southeastern Sectional Meeting at GIT, Atlanta, USA, Mar. 2023.
- A simple proof of the Gan–Loh–Sudakov conjecture
 - Graduate students seminar at CMU, Pittsburgh, USA, Feb. 2023.
- On the Stability of Graph Independence Number
 - SIAM Conference on Discrete Mathematics (DM22) at CMU, Pittsburgh, USA, Jun. 2022.
- Convex polytopes in non-elongated point sets in \mathbb{R}^d
 - ACO seminar at CMU, Pittsburgh, USA, Apr. 2022.
- Convex independence and convex holes
 - Graduate students seminar at CMU, Pittsburgh, USA, Oct. 2019.
- Random permutations and extremal set problems
 - Graduate students seminar at CMU, Pittsburgh, USA, Feb. 2019.
- Domino Tilings of Aztec Diamonds
 - Graduate students seminar at CMU, Pittsburgh, USA, Oct. 2018.

Services

- Anonymous journal referee
 - *Discrete Comput. Geom.* (2023, 2024)
 - *J. Graph Theory* (2024)
 - *SIAM J. Discrete Math.* (2024)
 - *Amer. Math. Monthly* (2025)
 - ECOPRO Student Research Program instructor Summer 2024 & Summer 2025
 - Initiated research publication [arXiv:2504.12296](#) with visiting students.
 - Initiated research publication [arXiv:2410.04744](#) with visiting students.
 - Math Olympiad Summer Program (MOP) instructor Summer 2022
 - Trained the USA national team at International Math. Olympiad (IMO).
 - Gave lectures on algebra and number theory under directions of Po-Shen Loh.
 - Western PA ARML instructor 2019–2022
 - Trained the Western Pennsylvania Team at American Regions Math. League (ARML).
 - Gave lectures on combinatorics and number theory.