Zeyu Zheng

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EDUCATION

Rutgers University, B.A. expected in 2023 — New Brunswick, USA
Pure Math major, with a minor in Computer Science — *May 2022 - Present*
GPA class rank: 1st

Fudan University, B.S. expected in 2023 — Shanghai, China
Computational Math, Buqing Su Top-notch Talent Program in Mathematics — *Sep 2019 - Present*
GPA class rank: top 20%

Budapest Semesters in Mathematics — Budapest, Hungary
with Highest Honors (for top students, based on professor recommendations) — *Jan 2022 - Aug 2022*
GPA class rank: 1st

Selected coursework (including non-credit reading courses):
Fourier Analysis, Complex Analysis, Real Analysis and Measure, Galois Theory, Graduate Algebra, Commutative Algebra, Algebraic Topology, Advanced Combinatorics, Combinatorial Optimization, Graduate Graph Theory, Discrete Geometry, The Probabilistic Method, Additive Combinatorics

RESEARCH WORKS

1. Chaoliang Tang, Hehui Wu, Shengtong Zhang, and Zeyu Zheng, "On the Turán number of the linear 3−graph C_{13}", *The Electronic Journal of Combinatorics* Volume 29, Issue 3 (2022), P3.46. arXiv Journal version
2. Logan Post and Zeyu Zheng, "Common kings of a chain of cycles in a strong tournament", *under review.* arXiv
3. Ervin Győri, Xianzhi Wang and Zeyu Zheng, "Extremal planar graphs with no cycles of particular lengths", *under review.* arXiv
4. Robin Huang, Tibor Jordán, Henry Simmons, Kaylee Weatherspoon and Zeyu Zheng, "Four-regular graphs with extremal rigidity properties", *under review.* EGRES
5. Yaobin Chen, Hehui Wu and Zeyu Zheng, Progress on the small quasi-kernel conjecture, *in preparation.*
6. Bhargav Narayanan and Zeyu Zheng, Maximum number of independent sets in 3-graphs, *in preparation.*
7. Zeyu Zheng, Twins from common positions in random permutations, *in preparation.*

HONORS AND AWARDS

- Scholarship for Outstanding Students, Fudan University — 2019-2020, 2020-2021 & 2021-2022
- Program Highest Honors, Budapest Semesters in Mathematics — Spring 2022 & Summer 2022
- BME Mathematical Contest for university students (Hungary), second place — 2022
- East China Cup Mathematical Modeling Contest, outstanding winner — 2021
- The Chinese Mathematics Competition for college students, first prize — 2020
- National High School Mathematical Contest (China), first prize — 2018

RESEARCH EXPERIENCE

Rutgers Discrete Mathematics Research Group Sep 2022 - present
Advisor: Bhargav Narayanan *Rutgers University - New Brunswick, New Jersey, USA*
- Use entropy method / occupancy fraction to study the number of independent sets in regular uniform hypergraphs. Generalized a result of József Balogh, Béla bollobás and Bhargav Narayanan.

BSM Undergraduate Research Opportunity Jan 2022 - Aug 2022
Advisor: Ervin Győri and Tibor Jordán *Budapest Semesters in Mathematics, Budapest, Hungary*
- Found a new and shorter proof to the planar Turán number of C_5. Developed a technique to bound the maximum number of edges in a bipartite/triangle-free planar graph without small cycles.
- Established some combinatorial characterizations of lowly redundantly (globally) rigid graphs. Fully characterized minimum 3-edge rigid graphs.

Fudan SCMS Combinatorics Research Group Dec 2020 - Present
Advisor: Hehui Wu *Shanghai Center for Mathematical Sciences, Fudan University, Shanghai, China*
- Proved and strengthened a conjecture of András Gyárfás on the Turán number of a linear 3-graph by introducing an innovative double counting.
- Completed a project on Shannon Capacity by implementing an algorithm to determine the independence number of strong product of small cycles.
- Work on the small quasi-kernel conjecture. Generalized a result of Alexandr Kostochka.

MATHEMATICAL MODELING

East China Cup Mathematical Modeling Contest (Paper, in Chinese) May 2021
- Worked with two team members to develope a graph coloring model for the physical layout of printed circuit boards; implemented our algorithms in MATLAB.
- Won first place out of thousands of participants in the East China Cup Mathematical Modeling Contest.

Mathematical Modeling and Practice (Final Project) Aug 2021 - Dec 2021
- Attended weekly paper reading seminar on mathematical modeling. Completed several mathematical modeling projects with other student collaborators.
- Used social network analysis and robust regression to analyze the critical factors that led a soccer team to victory. Successfully predicted the team's final ranking and provided useful coaching advice.

TEACHING EXPERIENCE

- Fall 2021: TA for Linear Algebra at FDU

TALKS

1. 11th Cross-strait Conference on Graph Theory and Combinatorics, Student Session Aug 2021
2. Fudan SCMS Graduate Student Combinatorics Seminar Sep 2022
3. Rutgers DIMACS Graduate Student Combinatorics Seminar Nov 2022
4. (poster) Undergraduate Mathematics Symposium, University of Illinois at Chicago Nov 2022
5. Joint Mathematics Meetings 2023, AMS-PME Student Contributed Paper Session Jan 2023