Yitong HE

Website: https://thegreatanna.github.io | Email: yitong.he@stu.xjtu.edu.cn/yitongh25@gmail.com

EDUCATION BACKGROUND

Xi'an Jiaotong University, Honors Science Program (Mathematics) **Xi'an, China**

B.Sc. in Mathematics *Sep. 2022 - Jul. 2026 (expected)*

GPA: 4.00/4.30 | 92.67/100

- **Research Interests:** Combinatorics, Graph Theory, Number Theory
- **Programming:** Python, LaTeX
- **Relevant Coursework:** Mathematical Analysis I-1 (94), Mathematical Analysis I-2 (100), Mathematical Analysis I-3 (98), Elementary Number Theory (98), Combinatorics (97), Modern Algebra (93), Topology (92), Functions of real variable (97), Probability (97), Analytic Number Theory (96)

University of California, Berkeley **Berkeley, CA**

Berkeley Global Access Visiting Student Programs *Jan. 2025 - Jun. 2025*

- **Relevant Coursework:** MATH 272 Interdisciplinary Topics in Mathematics (The Theory of Combinatorial Limits) (A+), MATH 225B Metamathematics (A-)

Xi'an Jiaotong University, Honors Youth Program (Special Class for the Gifted Young) **Xi'an, China**

Preparatory Program *Sep. 2020 - Jul. 2022*

GPA: 91.48/100, Rank: 3/171

PUBLICATION

[1] Chen, L., **He, Y. T.**, & Wang, D. G. (2026). Clocks are *e*-positive. *Discrete Mathematics*, 349(1), 114723. https://doi.org/10.1016/j.disc.2025.114723.

[2] **He, Y. T.**, Xie, P. C. Model-Driven Subspaces for Large-Scale Optimization with Local Approximation Strategy. Submitted to *Mathematics of Operations Research* (under review). https://arxiv.org/abs/2509.08256

CONFERENCE PRESENTATION

Yitong He, "Advanced Subspaces for Large-Scale Optimization with Local Approximation Strategy," Poster presentation at The First Academic Youth Conference, Operations Research Society of China. August 19-21, 2025. Taiyuan, China

RESEARCH EXPERIENCE

Basics of anti-Ramsey Theory **Xi'an, China**

Mentor: Prof. Hongliang Lu @ Xi'an Jiaotong University *Jul. 2025 - present*

- Learned the concept of the anti-Ramsey number and Turán density
- Reviewed classical results and method of determining the anti-Ramsey number of specific graphs and hypergraphs
- Proposed some new ideas on determining upper bound of the anti-Ramsey number of $K_4^{(3)-}$

Short Lecture Series on Combinatorial Number Theory **Xi'an, China**

Mentor: Prof. Yonggao Chen @ Nanjing Normal University; Prof. Hongze Li @ Shanghai Jiao Tong University Jul. 2025 - Aug. 2025

- Studied the polynomial method with Prof. Hongze Li, focusing on upper and lower bounds of $r_3(N)$, the Bloom-Sisask bound, the Erdős-Turán conjecture, the Cauchy-Davenport theorem, and recent advances such as the Ellenberg-Gijswijt theorem on cap sets
- Studied with Prof. Yonggao Chen, covering Freiman's theorem, lower bounds and structural results on sumsets and product sets, general forms of multiple sumsets hA, and introductory theory of complete sets

Model-Driven Subspaces for Large-Scale Optimization with Local Approximation Strategy **Berkeley, CA**

Mentor: Postdoc. Pengcheng Xie @ Lawrence Berkeley National Laboratory *Jan. 2025 - Sep. 2025*

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- Designed a novel class of subspaces suitable for classical subspace-based optimization frameworks
- Reviewed the random subspace and trust region method of optimization and the Johnson-Lindenstrauss lemma, JL-embeddings and its applications in optimization

Extremal Combinatorics Seminar **Xi'an, China**

Mentor: Prof. Hongliang Lu @ Xi'an Jiaotong University *Sep. 2024 - Nov. 2024*

- Read Stasys Jukna's *Extremal Combinatorics*
- Discussed topics such as C_4-free graphs, Turán's theorem, sunflower lemma, intersecting family and designs
- Presented on sunflower lemma and its modifications

PKU Algebra and Combinatorics Experience (PACE), Beijing International Center for Mathematical Research **Beijing, China**

Mentor: Prof. Guoliang Wang @ Beijing Institute of Technology; Prof. Long Guo @ Nankai University *Jul. 2024 - Aug. 2024*

- Explored some topics in algebraic combinatorics, such as matroids, Coxeter groups, chromatic symmetric functions, Deodhar diagrams, and covering graph
- Partially answered two research problems from the topics of chromatic symmetric function and Deodhar diagrams under group collaboration
- Successfully proved the e-positivity of a special class of graph based on the idea of composition method proposed by the team of Prof. Guoliang Wang

Combinatorics Seminar **Xi'an, China**

Mentor: Prof. Hongliang Lu @ Xi'an Jiaotong University *Sep. 2023 - Nov. 2023*

- Discussed topics such as posets, generating functions, basic counting techniques, the pigeonhole principle, Ramsey theorem, Hall's theorem and classic results in graph theory
- Presented on Ramsey theorem in the course discussion session, covering its set-theoretic and graph-theoretic formulations, upper bounds of Ramsey numbers, and Erdős' probabilistic lower bound
- Completed a report on the representative six theorems of Ramsey theory and underlying philosophy ideas

Probability Theory, Shanghai Jiao Tong University **Shanghai, China**

Mentor: Prof. F. Alberto Grünbaum @ University of California, Berkeley *Jul. 2023 - Aug. 2023*

- Studied topics of random variables, probability distribution, independence, expectation and some limit theorems
- Learned basic skills in academic writing
- Reviewed the recurrence and transience results for different random walk models

HONORS & AWARDS

- Model Student of Academic Records of XJTU 2023, 2024, & 2025
- The Second Prize Scholarship of XJTU 2023, 2024