Shuyang Gong

PhD candidate, School of Mathematical Sciences, Peking University, Beijing, China
gongshuyang@stu.pku.edu.cn
https://shuyanggong.github.io

About me

My research interest is probability theory, and its applications in statistics, statistical physics and theoretical computer science.

Education

School of Mathematical Sciences, Peking University, Beijing, China — September, 2021 — June, 2026(expected)
PhD in Mathematics

Department of Mathematics, Shandong University, Jinan, China — September, 2017 — June, 2021
Bachelor in Statistics (with honor): GPA ranked 1st/132

Academic Experience

Simons Laufer Mathematical Sciences Institute(MSRI) — Berkeley, United States
Program Associate — Janurary, 2025 — February, 2025
The Fuqua School of Business, Duke University — Durham, United States
Visiting student, hosted by Prof. Jiaming Xu — September, 2024 — Janurary, 2025
Department of Statistics and Data Science, Yale University — New Haven, United States
Visiting Student, hosted by Prof. Yihong Wu — November, 2024
The 2024 CRM-PIMS summer school — Montréal, Canada
Visiting Student — July, 2024

Publications and Preprints

Journal Publications

- **A computational transition for detecting correlated stochastic block models by low-degree polynomials.**
  To appear in *Annals of Statistics*.
  Coauthors: Guanyi Chen, Jian Ding, Zhangsong Li.

- **The algorithmic phase transition of random graph alignment problem**.
  Probability Theory and Related Fields **191** (2025), 1233–1288.
  Coauthors: Hang Du and Rundong Huang.

- **A polynomial-time approximation scheme for the maximal overlap of two independent Erdős–Rényi graphs**.
  Random Structures and Algorithms **65**(1) (2024), 220–257.
  Coauthors: Jian Ding and Hang Du.

Conference Papers

- **Detecting correlation efficiently in very supercritical stochastic block models: breaking the Otter's threshold barrier.**
  To appear at *SODA 2026*.
  Coauthors: Guanyi Chen, Jian Ding, Zhangsong Li.

- **A proof of the changepoint detection threshold conjecture in preferential attachment models**.
  Proceedings of the 38th Conference on Learning Theory (COLT 2025), PMLR 291:1559–1563.
  Submitted to Annals of Applied Probability.
  Coauthors: Hang Du and Jiaming Xu.

Preprints

- **The broken-sample problem revisited II: Detecting hidden linear dependencies.**
  In preparation.

Coauthors: Yihong Wu and Jiaming Xu

- **Detecting correlation efficiently in stochastic block models: breaking Otter's threshold in the entire supercritical Regime**
  arXiv:2503.06464, *submitted to Annals of Statistics.*
  Coauthors: Guanyi Chen, Jian Ding, Zhangsong Li.

- **Finding a dense submatrix of a random matrix. Sharp bounds for online algorithms.**
  arXiv:2507.19259, *submitted to Electronic Communications in Probability.*
  Coauthors: Shankar Bhamidi and David Gamarnik.

- **Detection and reconstruction of a random hypergraph from noisy graph projection.**
  arXiv:2506.17527, *to be submitted to ISIT.*
  Coauthors: Zhangsong Li and Qiheng Xu.

- **Asymptotic diameter of preferential attachment model.**
  arXiv:2504.21741, *submitted to Electronic Communications in Probability.*
  Coauthors: Hang Du, Zhangsong Li, Haodong Zhu.

- **The Umeyama algorithm for matching correlated Gaussian geometric models in the low-dimensional regime.**
  arXiv:2402.15095, *submitted to IEEE Transactions on Information Theory.*
  Coauthor: Zhangsong Li.

Teaching experience

- Calculus (B) — Spring 2025
- Stochastic Processes and Statistical Physics — Spring 2024
- Advanced Probability Theory — Fall 2023
- Measure Theory — Spring 2023
- Stochastic Processes — Spring and Fall 2022
- Calculus (C) — Fall 2021

Awards

- Elite Program — May, 2025/Peking University
- President Scholarship — May, 2024/Peking University
- Schlumberger Scholarship — October, 2023/Peking University
- President Scholarship (Top award for undergraduates) — October, 2020/Shandong University
- National Scholarship — October, 2020/Shandong University
- National Scholarship — October, 2019/Shandong University

Talks

Conference Talks

A proof of the changepoint detection threshold conjecture in preferential attachment models — July 3, 2025
COLT 2025. Lyon, France

A proof of the changepoint detection threshold conjecture in preferential attachment models — June 3, 2025
An international conference on applied probability. Beijing, China

Invited Talks

Asymptotic diameter of preferential attachment model — May 29, 2025
YMSC probability seminar, Tsinghua University

Recent progress on random graph matching and changepoint detection — March 26, 2025
Combinatorics seminar at Shandong University

Matching Wishart matrices via Umeyama algorithm — September 9, 2024
Peking University

Optimizing the overlap of two independent Erdős–Rényi graphs January 15, 2024
Probability seminar at Sichuan University

Algorithms and phase transitions in random graph alignment problem September 11, 2023
Peking University

A PTAS for the maximal overlap of two independent Erdős–Rényi graphs November 7, 2022
Probability seminar at Shandong University