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 Probability and Statistics

The Fuqua School of Business, Duke University, Durham, United States — September, 2024 | Janurary, 2025
Visiting PhD student, hosted by Prof. Jiaming Xu

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
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 (in reversed chronological order)

- **The broken-sample problem revisited II: Detecting hidden linear dependencies**
  Preprint, in preparation.
  Coauthors: Yihong Wu and Jiaming Xu

- **Detecting Correlation Efficiently in Stochastic Block Models: Breaking Otter's Threshold in the Entire Supercritical Regime**
  Preprint: https://arxiv.org/abs/2503.06464
  Coauthor: Guanyi Chen, Jian Ding and Zhangsong Li

- **Finding a dense submatrix of a random matrix. Sharp bounds for online algorithms**
  Preprint: https://arxiv.org/abs/2507.19259.
  Coauthors: Shankar Bhamidi and David Gamarnik

- **Detection and reconstruction of a random hypergraph from noisy graph projection**
  Preprint: https://arxiv.org/abs/2506.17527
  Coauthor: Zhangsong Li and Qiheng Xu

- **Asymptotic diameter of preferential attachment model**
  Preprint: https://arxiv.org/abs/2504.21741, *submitted*
  Coauthor: Hang Du, Zhangsong Li and Haodong Zhu

- **Detecting correlation efficiently in stochastic block models: breaking Otter's threshold by counting decorated trees**
  Preprint: https://arxiv.org/abs/2503.06464, conference version to appear at *SODA 2026*
  Coauthor: Guanyi Chen, Jian Ding and Zhangsong Li

- **A Proof of The Changepoint Detection Threshold Conjecture in Preferential Attachment Models**
  Preprint: https://arxiv.org/abs/2502.00514, *COLT* 2025, *submitted*
  Coauthor: Hang Du and Jiaming Xu

- **A computational transition for detecting correlated stochastic block models by low-degree polynomials**
  Preprint: https://arxiv.org/abs/2409.00966, to appear in *Annals of Statistics*
  Coauthor: Guanyi Chen, Jian Ding and Zhangsong Li

- **The Umeyama algorithm for matching correlated Gaussian geometric models in the low-dimensional regime.**
  Preprint: https://arxiv.org/abs/2402.15095, *submitted*
  Coauthor: Zhangsong Li

- **The algorithmic phase transition of random graph alignment problem.**
  Probability Theory and Related Fields. https://link.springer.com/article/10.1007/s00440-025-01370-z
  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 (2024), 1-38. https://doi.org/10.1002/rsa.21212
  Coauthors: Jian Ding and Hang Du

Teaching experience

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

Awards

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

Talks

- A proof of the changepoint detection threshold conjecture in preferential attachment models. — July 3 2025, *COLT 2025*
- A proof of the changepoint detection threshold conjecture in preferential attachment models. — June 3 2025, An international conference on applied probability
- Asymptotic diameter of preferential attachment model. — May 29 2025, Tsinghua University
- Recent progress on random graph matching and changepoint detection. — March 26 2025, Shandong University
- Matching Wishart matrices via Umeyama algorithm. — September 9 2025, Peking University
- Optimizing the overlap of two independent Erdős-Rényi graphs. — January 15 2024, Sichuan University
- Algorithms and phase transitions in random graph alignment problem. — September 11 2023, Peking University
- On cluster expansion and its applications into Ising model — April 22 2023, Peking University
- A PTAS for the maximal overlap of two independent Erdős-Rényi graphs. — November 7 2022, Shandong University

LANGUAGE

Chinese, English