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
  Coauthors: 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
  Coauthors: Zhangsong Li and Qiheng Xu

- **Asymptotic diameter of preferential attachment model**
  Preprint: https://arxiv.org/abs/2504.21741, *submitted*
  Coauthors: 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*
  Coauthors: 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*
  Coauthors: 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*
  Coauthors: 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