

# Shuyang Gong

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<https://shuyanggong.github.io>

## About me

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My research interest is the intersection of probability theory, theoretical computer science and high-dimensional statistics.

## Education

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**School of Mathematical Sciences, Peking University**, Beijing, China      September, 2021 — June, 2026(expected)  
PhD in Mathematics. Advisors: Prof. Dayue Chen and Prof. Jian Ding.

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

## Academic Experience

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

## Publications and Preprints

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### 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.**  
*SODA 2026*.  
Coauthors: Guanyi Chen, Jian Ding, Zangsong 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.  
*Minor revision at Annals of Applied Probability*.  
Coauthors: Hang Du and Jiaming Xu.

## Preprints

- **Detecting correlation efficiently in stochastic block models: breaking Otter's threshold in the entire supercritical regime.**  
arXiv:2503.06464.  
Coauthors: Guanyi Chen, Jian Ding, Zhangsong Li.
- **Finding a dense submatrix of a random matrix. Sharp bounds for online algorithms.**  
arXiv:2507.19259.  
Coauthors: Shankar Bhamidi and David Gamarnik.
- **Detection and reconstruction of a random hypergraph from noisy graph projection.**  
arXiv:2506.17527.  
Coauthors: Zhangsong Li and Qiheng Xu.
- **Asymptotic diameter of preferential attachment model.**  
arXiv:2504.21741.  
Coauthors: Hang Du, Zhangsong Li, Haodong Zhu.
- **The Umeyama algorithm for matching correlated Gaussian geometric models in the low-dimensional regime.**  
arXiv:2402.15095.  
Coauthor: Zhangsong Li.
- **The broken-sample problem revisited II: Detecting hidden linear dependencies.**  
*In preparation.*  
Coauthors: Yihong Wu and Jiaming Xu
- **On hardness for finding isolated perceptron solutions via stable algorithms.**  
*In preparation.*  
Coauthors: Brice Huang, Shuangping Li, Mark Sellke.
- **Fundamental limits of community detection in contextual multi-Layer stochastic block models.**  
*In preparation.*  
Coauthors: Dong Huang and Zhangsong Li.
- **The conclave model.**  
*In preparation.*  
Coauthors: Itai Benjamini, Zhenhao Cai, Guanyi Chen, Zhangsong Li.

## Teaching experience

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• 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

## Services

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**Journal Reviewing:** *Annals of Applied Probability, Operations Research.*

## Awards

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• 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

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<b>A proof of the changepoint detection threshold conjecture in preferential attachment models</b> <i>COLT 2025. Lyon, France</i>	July 3, 2025
<b>A proof of the changepoint detection threshold conjecture in preferential attachment models</b> <i>An international conference on applied probability. Beijing, China</i>	June 3, 2025
<b>Asymptotic diameter of preferential attachment model</b> <i>YMSC probability seminar, Tsinghua University</i>	May 29, 2025
<b>Recent progress on random graph matching and changepoint detection</b> <i>Combinatorics seminar at Shandong University</i>	March 26, 2025
<b>Matching Wishart matrices via Umeyama algorithm</b> <i>Peking University</i>	September 9, 2024
<b>Optimizing the overlap of two independent Erdős–Rényi graphs</b> <i>Probability seminar at Sichuan University</i>	January 15, 2024
<b>Algorithms and phase transitions in random graph alignment problem</b> <i>Peking University</i>	September 11, 2023
<b>A PTAS for the maximal overlap of two independent Erdős–Rényi graphs</b> <i>Probability seminar at Shandong University</i>	November 7, 2022