Zhangsong Li

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Research interests

Probability, high-dimensional statistics, combinatorics, and theoretical computer science.

Education

2023 - present Ph.D Candidate in Probability at **Peking University**
2019 - 2023 Bachelor in Mathematics at **Peking University**

Journal publications

- **A Polynomial-Time Iterative Algorithm for Random Graph Matching with Non-vanishing Correlation**
  Jian Ding and Zhangsong Li
  Mathematics of Operations Research, to appear
- **A Computational Transition for Detecting Correlated Stochastic Block Models by Low-Degree Polynomials**
  Guanyi Chen, Jian Ding, Shuyang Gong, and Zhangsong Li
  Annals of Statistics, to appear
- **Low-Degree Hardness of Detection for Correlated Erdős-Rényi Graphs**
  Jian Ding, Hang Du, and Zhangsong Li
  Annals of Statistics, 53(5):1833–1856, 2025.
- **A Polynomial Time Iterative Algorithm for Matching Correlated Gaussian Matrices with Non-vanishing Correlation**
  Jian Ding and Zhangsong Li
  Foundations of Computational Mathematics, 25(4):1287–1344, 2025.

Conference publications

- **Detecting Correlation Efficiently in Very Supercritical Stochastic Block Models: Breaking the Otter's Threshold Barrier**
  Guanyi Chen, Jian Ding, Shuyang Gong, and Zhangsong Li
  SODA 2026, to appear
- **Algorithmic Contiguity from Low-Degree Conjecture and Applications in Correlated Random Graphs**
  Zhangsong Li
  Proceedings of 29th APPROX/RANDOM, pages 30:1–30:18, 2025.
- **Robust Random Graph Matching in Gaussian Models via Vector Approximate Message Passing**
  Zhangsong Li
  Proceedings of 38th COLT, pages 3580–3581, 2025.

Preprints

- **The Algorithmic Phase Transition in Symmetric Correlated Spiked Wigner Model**

Zhangsong Li
Preprint, *https://arxiv.org/abs/2511.06040*

- **Detecting Correlation Efficiently in Stochastic Block Models: Breaking Otter's Threshold in the Entire Supercritical Regime**
  Guanyi Chen, Jian Ding, Shuyang Gong, and Zhangsong Li
  Preprint, *https://arxiv.org/abs/2503.06464*
- **A Smooth Computational Transition in Tensor PCA**
  Zhangsong Li
  Preprint, *https://arxiv.org/abs/2509.09904*
- **Detection and Reconstruction of a Random Hypergraph from Noisy Graph Projection**
  Shuyang Gong, Zhangsong Li, and Qiheng Xu
  Preprint, *https://arxiv.org/abs/2506.17527*
- **Asymptotic Diameter of Preferential Attachment Model**
  Hang Du, Shuyang Gong, Zhangsong Li, and Haodong Zhu
  Preprint, *https://arxiv.org/abs/2504.21741*
- **A Computational Transition for Detecting Multivariate Shuffled Linear Regression by Low-Degree Polynomials**
  Zhangsong Li
  Preprint, *https://arxiv.org/abs/2504.03097*
- **The Umeyama Algorithm for Matching Correlated Gaussian Geometric Models in the Low-Dimensional Regime**
  Shuyang Gong and Zhangsong Li
  Preprint, *https://arxiv.org/abs/2402.15095*

Research talks

The 29th International Conference on Randomization and Computation, Algorithmic Contiguity from Low-Degree Conjecture and Applications in Correlated Random Graphs (online), August 2025.

The 38th Annual Conference on Learning Theory, Robust Random Graph Matching in Gaussian Models via Vector Approximate Message Passing, July 2025.

International Conference on Applied Probability, Robust Random Graph Matching in Gaussian Models via Vector Approximate Message Passing, June 2025.

YMSC Probability Seminar, Asymptotic Diameter of Preferential Attachment Model (joint with Shuyang Gong), May 2025.

Tsinghua University Statistics Seminar, Recent Progress on Random Graph Matching Problems, March 2025.

Tsinghua Sanya International Mathematics Forum, Low-Degree Hardness of Detection for Correlated Erdős-Rényi Graphs, January 2024.

Teaching experience

Spring 2025	TA, Probability Theory	Peking University
Fall 2024	TA, Advanced Probability Theory	Peking University
Fall 2023	TA, Applied Stochastic Process (Honor)	Peking University

Service

- **Assistant in Undergraduate Research Mentorship:**

  (1) Peking University undergraduate research program 2024-2025

  Student: Chenxu Feng (mentored by Jian Ding)

  Title: "Strong Detection Threshold in Correlated Erdős-Rényi Graphs with Constant Average Degree"

  (2) Peking University undergraduate research program 2025-2026

  Students: Chenxu Feng and Yifan Li (mentored by Jian Ding)

  Title: "Structural Properties of the Geometric Preferential Attachment Model"

- **Journal Reviewing:** *Annals of Applied Probability*, *Bernoulli*