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 and Statistics at **Peking University**
2019 - 2023 Bachelor in Mathematics at **Peking University**

Publications

- **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*
- **Detecting Correlation Efficiently in Stochastic Block Models: Breaking Otter's Threshold by Counting Decorated Trees**
  Guanyi Chen, Jian Ding, Shuyang Gong, and Zhangsong Li
  Preprint, *https://arxiv.org/abs/2503.06464*
- **Algorithmic Contiguity from Low-Degree Conjecture and Applications in Correlated Random Graphs**
  Zhangsong Li
  Conference version in *Proceedings of 29th APPROX/RANDOM*, no. 30, pp. 1–18, 2025.
  Preprint version in *https://arxiv.org/abs/2502.09832*
- **Robust Random Graph Matching in Gaussian Models via Vector Approximate Message Passing**
  Zhangsong Li
  Conference version in *Proceedings of 38th COLT*, pp. 3580–3581, 2025.
  Preprint version in *https://arxiv.org/abs/2412.16457*
- **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
  Preprint version in *https://arxiv.org/abs/2409.00966*

- **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*

- **Low-Degree Hardness of Detection for Correlated Erdős-Rényi Graphs**
  Jian Ding, Hang Du, and Zhangsong Li
  Annals of Statistics, to appear
  Preprint version in *https://arxiv.org/abs/2311.15931*

- **A Polynomial-Time Iterative Algorithm for Random Graph Matching with Non-vanishing Correlation**
  Jian Ding and Zhangsong Li
  Preprint, *https://arxiv.org/abs/2306.00266*

- **A Polynomial Time Iterative Algorithm for Matching Correlated Gaussian Matrices with Non-vanishing Correlation**
  Jian Ding and Zhangsong Li
  Foundations of Computational Mathematics, vol. 25, no. 4, pp. 1287–1344, 2025.
  Preprint version in *https://arxiv.org/abs/2212.13677*

Invited research talks

The 29th International Conference on Randomization and Computation, Algorithmic Contiguity from Low-Degree Conjecture and Applications in Correlated Random Graphs, 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

- Reviewer: Annals of Applied Probability, Bernoulli