School of Statistics   Email: zhao1118@umn.edu
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Research interests

Generative model, diffusion model, high-dimensional statistics, deep learning theory, machine learning, sequential analysis, distributed inference, random matrix theory, nonconvex optimization

Education

Ph.D. in Statistics (2025), University of Minnesota,
Adviser: Adam J. Rothman
M.S. in Mathematical Sciences (2020), University of Minnesota,
B.S. in Statistics (2018), Jilin University, China

Research — Publication and Preprint

Hongru Zhao, Aaron J. Molstad, and Adam J. Rothman. (2024) Subspace decompositions for association structure learning in multivariate categorical response regression. Submitted, *Annals of Statistics*.

Xiaoou Li, and Hongru Zhao. (2024). Globally-Optimal Greedy Experiment Selection for Active Sequential Estimation. Submitted, *IEEE Transactions on Information Theory*.

Hongru Zhao, and Xiaotong Shen. (2024) Distributed Algorithms for High-Dimensional Statistical Inference and Structure Learning with Heterogeneous Data. Submitted, *Journal of Machine Learning Research*.

Hongru Zhao, and Jinchao Xu. (2024) Convergence Analysis and Trajectory Comparison of Gradient Descent for Overparameterized Deep Linear Networks. *Transactions on Machine Learning Research*, ISSN: 2835-8856.

Kangsheng Liu, Zhuangyi Liu, and Hongru Zhao. (2024). Exponential stability of the linear KdV-BBM equation. *Discrete and Continuous Dynamical Systems-B*, 29(3), 1206-1216.

Yongcheng Qi, and Hongru Zhao. (2021). Limiting empirical spectral distribution for products of rectangular matrices. *Journal of Mathematical Analysis and Applications*, 502(2),125237.

— Selected works in progress

Hongru Zhao, and Xiaotong Shen. (2024). Conditional Independence Testing with Diffusion Models: A Generative Approach.

Invited presentations

— 2024

Poster Presentation at the IRSA Conference, School of Statistics, University of Minnesota: "Structure Learning in Multivariate Categorical Response Regression."

— 2023

Colloquium Seminar at the Computer, Electrical, and Mathematical Science and Engineering Division, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia: "Exploring the Optimization Landscape and Training Dynamics of Deep Linear Networks."

Professional service

— Journal Referee

Annals of Applied Probability, 2022

— Conference Reviewer

Transactions on Machine Learning Research, 2024

Courses taught

— UMN-TC: Graduate Instructor

Fall   2024: STAT 4101: Theory of Statistics I
Spring 2024: STAT 3301: Regression and Statistical Computing
Fall   2023: STAT 3011: Introduction to Statistical Analysis

— UMN-TC: Graduate Teaching Assistant

Fall   2022: STAT 5101 - Theory of Statistics I
Spring 2022: STAT 5102 - Theory of Statistics II
Fall   2021: STAT 3021 - Introduction to Probability and Statistics