

School of Statistics
University of Minnesota
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Research interests

High-dimensional statistics, generative AI, diffusion model, 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

— Manuscripts submitted for publication

Hongru Zhao, Aaron J. Molstad, and Adam J. Rothman. (2025) Subspace decompositions for association structure learning in multivariate categorical response regression. Submitted, *J. R. Statist. Soc. B*.

Hongru Zhao, and Xiaotong Shen. (2025) Distributed Algorithms for High-Dimensional Statistical Inference and Structure Learning with Heterogeneous Data. Submitted, *Statistica Sinica*.

— Peer reviewed articles

Xiaoou Li, and Hongru Zhao. (2025). [Globally-Optimal Greedy Experiment Selection for Active Sequential Estimation](#). *IEEE Transactions on Information Theory*.

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.

Xiangyu Zhang, Erik Floden, Hongru Zhao, Jesse Miller, Sara Algeri, Galin Jones, and Vuk Mandic. (2024). On Validating Angular Power Spectral Models for the Stochastic Gravitational-Wave Background Without Distributional Assumptions.

Hongru Zhao, Tiefeng Jiang, and Sho Matsumoto. (2021). Central limit Theorem for the linear statistics for the circular macdonald ensemble.

Hongru Zhao, and Tiefeng Jiang. (2023). Asymptotic Distribution of Linear Statistics for Roots of Random Polynomial.

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, 2024-2025

Courses taught

— UMN-TC: Graduate Instructor

Spring 2025: STAT 3301: Regression and Statistical Computing

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

Programming Skills

R, MATLAB, Mathematica, SLURM, Python.