Xiaozhu Zhang

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Research interests

- Model selection, uncertainty quantification, multiple testing
- Causal discovery, domain adaptation

Education

University of Washington, Seattle — Seattle, WA
Ph.D. in **Statistics**, GPA: 3.94/4.00 — 09/2023 – 06/2028

Duke University — Durham, NC
M.S. in **Statistical Science**, GPA: 4.00/4.00 — 08/2021 – 05/2023

Hunan University — Changsha, China
B.S. in **Statistics**, GPA: 3.94/4.00 — 09/2016 – 07/2020

Research Experience

UW Department of Statistics | **Advisor: Armeen Taeb** — Seattle, WA
Research Assistant in ***Causal Discovery*** — 03/2025 – Present
- Improved accuracy for nonlinear DAG recovery via convex mixed integer programming; outperformed all existing methods.
- Developed non-parametric theories including correct permutation, variance convergence rate, and perfect DAG recovery.

Research Assistant in ***Uncertainty Quantification*** [software] — 10/2023 – 05/2025
- Developed an uncertainty-aware framework of model selection for nearly linearly dependent data; re-defined the notion of true positive, false positive error, stability, and substitutability via a subspace perspective.
- Designed an algorithm that returns models with false positive error control, high power and robustness; established a data analysis pipeline that calibrates and identifies models based on stability and substitutability.

Duke Department of Statistical Science — Durham, NC
Research Assistant in ***Stable Model Selection*** [software] | **Advisor: Yuansi Chen** — 10/2021 – 05/2023
- Proved that Lasso solution set forms a polytope when multiple solution exist; conducted finite-sample theoretical analysis.
- Designed an MCMC algorithm that uniformly samples on this polytope of Lasso solutions.

Research Assistant in ***Non-standard Sampling*** [software] | **Advisor: Jerome Reiter** — 07/2022 – 05/2023
- Developed a new sampling procedure for the generalized inverse Gaussian density; obtained the lowest rejection constants.

Papers

- **Zhang, X.**, Keret, N., Shojaie A., and Taeb, A. (2025). Convex mixed integer programming for causal discovery in causal additive models. *arXiv preprint arXiv:2511.21126.*
- **Zhang, X.**, Bien, J., and Taeb, A. (2025). Quantifying uncertainty and stability among highly correlated predictors: a subspace perspective. *arXiv preprint arXiv:2505.06760.* **Submitted to *JRSSB*.**
- **Zhang, X.** (2023). Stable Variable Selection for Sparse Linear Regression in a Non-uniqueness Regime (**Master's thesis**, Duke University).
- **Zhang, X.**, and Reiter, J. P. (2022). A Generator for Generalized Inverse Gaussian Distributions. *arXiv preprint arXiv:2211.13049.*

Talks

- The 5th Biennial Meeting of the Pacific Northwest Section of SIAM, October 2025, Seattle, WA
- The 3rd Joint Conference on Statistics and Data Science in China, July 2025, Hangzhou, China

Awards

- Dean's Research Award for Master's Students, Duke University, 2022
- Outstanding Undergraduates, Hunan Province, 2020
- China National Scholarship, 2017 – 2019
- National 1st Prize & Best Paper Award in China Undergraduate Mathematical Contest in Modeling, 2018