Jifan Zhang

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Education

Northwestern University, PhD Candidate in Statistics and Data Science — Sep 2021 – June 2026
Advisor: Miklós Rácz *Cumulative GPA: 3.96*

Tsinghua University, Bachelor of Science in Mathematics — Sep 2017 – Sep 2021
Advisor: Qian Lin *Major GPA: 3.79*

Technical Skills

- **Areas of expertise**: Time Series Forecasting, Statistical modelling, Machine Learning, Network Data Analysis.
- **Programming languages**: Python, R, C++, Matlab

Research Experience

Uncertainty Quantification for Spatio-Temporal Graph Forecasting — May 2024 – Oct 2024

- Proposed STACI, a topology-aware joint conformal prediction framework for spatio-temporal graphs, enabling forecasting with guaranteed coverage across the entire graph in high-dimensional setting.
- Outperformed baseline models on the PEMS traffic dataset, achieving state-of-the-art average coverage and reduced prediction set volume by at least 15%, improving both coverage reliability and efficiency.

Causal Representation Learning for Network-Structured Genomics Data — June 2024 - Oct 2024

- Developed a novel causal disentanglement framework for network data by integrating graph structures into autoencoding variational Bayes, enabling representation learning that captures causal dependencies.
- Applied the framework to large-scale, high-dimensional biological genomics networks, achieving improved prediction of unseen interventions as measured by reduced Maximum Mean Discrepancy loss and higher R^2 scores.

Theoretical Foundations for Network Analysis: Graph Matching, Community Recovery, and Local Isomorphism — Feb 2023 – present

- Advanced the theoretical limits of graph-based learning, with implications for large-scale network inference, social network analysis, and graph-based recommendation systems.
- **Graph Matching in Correlated Networks:** Designed algorithms achieving tight information-theoretic thresholds under the stochastic block model for matching multiple correlated graphs.
- **Community Recovery in Sparse Networks:** Proved that exact recovery is achievable by matching $O(\log n)$ correlated graphs, even when weak recovery is unattainable from a single graph.
- **Local Identifiability in Graphs:** Derived threshold of when 1-neighbourhoods in a random graph are distinct.

Working experience & Projects

PhD Decision Science Intern: Robust CTR Controller in Large-Scale Digital Advertising — May 2025 - Jul 2025
Epsilon Company

- Built a robust CTR controller for large-scale real-time advertising (200M+ samples, 8M+ branches) by integrating a unified deep learning embedding model for multi-modal inputs (time series, categorical, numerical) into an end-to-end pipeline, implemented in Spark on Databricks, achieving substantial CTR gains (>10% lift) and consistently meeting CTR goals in real-data simulations.

Summer research project: High-Resolution Astronomical Image Generation with GANs — Jul 2020 - Sep 2020
Massachusetts Institute of Technology

- Developed a Progressive Generative Adversarial Networks with Wasserstein loss for the high-resolution (512×512) synthetic astronomical images generation. Calculated the Frechet Inception Distance score for evaluation.

Collaborative Project: User Behavior Prediction for Social Media Platforms — Sep 2020 - Nov 2020
ByteDance Company, Tsinghua University

- Predicted online behavior of 100K TikTok users over a 3-year period by combining linear discriminant analysis for user segmentation with a CatBoost-based feature selection and prediction model, achieving a 20% reduction in Mean Squared Error over the baseline.

Data Analysis Intern: Market Timing Models for Equity Trading — Dec 2019 - Mar 2020
Huatai Securities

- Developed Monte Carlo–based market timing models using historical stock price data to optimize buy-in strategies, reducing maximum drawdown and improving the Sharpe Ratio.

Publications

Harnessing multiple correlated networks for exact community recovery Sep 2024
Jifan Zhang, Miklós Rácz
Advances in the 38th Conference on Neural Information Processing Systems(NeurIPS 2024)

Topology-aware conformal prediction for stream networks Feb 2025
Jifan Zhang, Fangxin Wang, Kaize Ding, Shixiang Zhu
Invited talk at the Institute for Operations Research and the Management Sciences (Informs 2025)

Causal representation learning from network data Jul 2025
Jifan Zhang, Michelle Li, Elena Zheleva
Submitted to the 40th Annual AAAI Conference on Artificial Intelligence

Working Paper

When local neighbourhoods become distinct in random graphs Forthcoming
Jifan Zhang, Miklós Rácz

Honors And Additional Experience

Northwestern University Fellowship 2021-2022

First Prize of China undergraduate Mathematical Contest in Modelling, Beijing Region 2019

Honor of Comprehensive Excellence, Department of Mathematics,Tsinghua University 2018

President of Student Science Association, Department of Mathematics, Tsinghua University 2019-2020

Member of the Women's Basketball Team and the Badminton Team, 2019-2021
Department of Mathematics, Tsinghua University