TIANZE JIANG

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EDUCATION

Ph.D., Princeton University Operations Research and Financial Engineering **2024 - present**

Advisor: Prof. Boris Hanin.

B.S., Massachusetts Institute of Technology Mathematics and Computer Science (GPA: 5.0/5.0) **2020 - 2024**

Selected Honors and Awards:

- Francis Robbins Upton Graduate Fellowship 2024
- William Lowell Putnam Math Competition, N1 (top 15 overall) 2021
- International Math Olympiad (IMO), Team USA, Silver Medal 2020
- USA Math Olympiad (USAMO) winner, 5th place nationwide 2020
- Asian Pacific Math Olympiad, 3rd place worldwide 2020
- Chinese International Math Olympiad (IMO) Team Candidate (top 15 overall) 2018

RESEARCH INTERESTS

I'm interested in studying deep learning theoretically and empirically using methods from mathematical physics, statistics, and probability. At the moment I think about scaling deep networks and their training dynamics. In the past, I've also worked on non-asymptotic and high-dimensional statistical inference problems and explored their average-case complexity.

SELECTED RESEARCH

*Papers in this section are *all* under joint first-authorship, ordered *alphabetically*

1. Boris Hanin, **TJ**, "*Global Universality of Singular Values in Products of Many Large Random Matrices.*" (2025+) Paper.
2. Patrik Gerber, **TJ**, Yury Polyanskiy, Rui Sun, "*Density estimation using the perceptron.*" (2025) Accepted In: *Journal of Machine Learning Research (JMLR).* Paper.
3. Yanjun Han, **TJ**, Yihong Wu, "*Prediction from compression for models with infinite memory.*" In: *Proc Conf on Learning Theory (COLT 2024)*, July 2024. Paper.
4. Patrik Gerber, **TJ**, Yury Polyanskiy, Rui Sun, "*Kernel-based Tests for Likelihood-Free Hypothesis Testing.*" In: *Proc 37th Adv Neural Inf Process Syst (NeurIPS 2023)*, December 2023. Paper.
5. Guy Bresler and **TJ**, "*Detection-Recovery and Detection-Refutation Gaps via Reductions from Planted Clique.*" In: *Proc Conf on Learning Theory (COLT 2023)*, July 2023. Paper.

CURRENT PROJECTS

- Hyper-parameter transfer for Mixture-of-Experts language models and their mean-field feature learning dynamics
- Bayesian inference for (shaped) weakly non-linear networks at the infinite width, depth, and data limit

SELECTED PRESENTATIONS

- Sampling via stochastic localization, Bresler Research Group, MIT Nov. 2023
- Computational lower bounds via avg. case reductions, Chen Research Group, Harvard Oct. 2023
- Slicing with random half-spaces, Pilanci Research Group, Stanford Apr. 2023
- Likelihood-Free Inference with kernels, Polyanskiy Research Group, MIT Dec. 2022

INDUSTRY EXPERIENCES

Quantitative Research Intern, Citadel Securities, Miami, FL Jun. - Aug. 2024

FICC and Systematic Equities

- Constructed market impact accounting models of high-frequency trades on the US equities market.

OTHER EXPERIENCES

- **Reviewer**: IEEE Transactions on Information Theory, Algorithmic Learning Theory (ALT) 2024, 2025, 2026
- **Grader, Test Reviewer**, IMO (USA) Team Selection Tests. 2021