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

- 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 random matrix theory, non-asymptotic high-dimensional statistical inference, and average-case complexity theory.

SELECTED RESEARCH

1. **TJ**, Blake Bordelon, Cengiz Pehlevan, Boris Hanin, "*Hyperparameter Transfer with Mixture-of-Experts Layers.*" Paper.

2. $^{\alpha\beta}$Boris Hanin, **TJ**, "*Global Universality of Singular Values in Products of Many Large Random Matrices.*" (2025+) Paper.

3. $^{\alpha\beta}$Patrik Gerber, **TJ**, Yury Polyanskiy, Rui Sun, "*Density estimation using the perceptron.*" (2025) In: *Journal of Machine Learning Research (JMLR).* Paper.

4. $^{\alpha\beta}$Yanjun Han, **TJ**, Yihong Wu, "*Prediction from compression for models with infinite memory.*" In: *Proc Conf on Learning Theory (COLT 2024)*, July 2024. Paper.

5. $^{\alpha\beta}$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.

6. $^{\alpha\beta}$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

- Bayesian inference for (shaped) weakly non-linear networks at the infinite width, depth, and data limit.

- Isotropic local laws and eigenvector delocalization of Geometric Dyson Brownian Motion.

- Understanding μP and learning rate transfer over a long training horizon.

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

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; ICLR 2026; ICML 2026

- **TA-ship:** (SP26) ORF445 High Frequency Markets