Haobo Zhang

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Education

Georgia Institute of Technology *Aug 2024 – Present*
MS in Operations Research

- GPA: 3.88/4.00
- **Coursework:** Stochastic Processes I*, Stochastic Processes II*, Linear Optimization*, Discrete Optimization, Simulation Theory and Methods, Computational Methods in Optimization, Theoretical Statistics, Computational Statistics, Monte Carlo Methods.

Shanghai Jiao Tong University *Sep 2020 - Jun 2024*
BA in Economics & BS in Mathematics and Applied Mathematics

- GPA: 3.70/4.30
- SJTU Scholarship for Outstanding Undergraduates for the 2021, 2022 and 2023 academic years.
- **Coursework:** Machine Learning, Computational Text Analysis, Data Structures and Algorithms, Financial Engineering, Econometrics, Microeconomics, Behavioral Economics, Topology, Real Analysis, Functional Analysis.

Hong Kong University of Science and Technology *Sep 2023 - Dec 2023*
School of Business and Management Semester Exchange

- GPA: 4.03/4.30
- **Coursework:** Applied Game Theory, Statistical Analysis of Financial Data in R, Simulation in Business and Management.

Research Experience

Mechanism Design for Data Markets with Competing Buyers under Approximate Differential Privacy *Sep 2025 - Present*
Work in progress, independent.

- Developed a data-market model where competing buyers use Gaussian (ϵ, δ)-DP mechanisms with posted prices to acquire user data.
- Established threshold-based user participation, formulated buyers' optimization problems in single-buyer, simultaneous-duopoly, and Stackelberg settings, and designed algorithms to compute equilibrium mechanisms.
- Derived closed-form DP MSE expressions and proved structural min–max bounds on a DP-aware price of competition, revealing how privacy parameters and market structure jointly inflate estimation error under competition.

Incentivizing Data Sharing with Heterogeneous Privacy Costs *May 2025 - Present*
Work in progress, advised by Prof. Juba Ziani and Prof. Kate Donahue.

- Developed a data-sharing game with heterogeneous pairwise privacy costs and characterized coalition formation under multiple stability notions, including Nash equilibrium, individual stability, and sink equilibria.
- Proved that determining the existence of a Nash stable coalition in the general pairwise-cost model is NP-hard via a reduction from CLIQUE.
- Designed an efficient equilibrium-existence test via viable intervals, analyzed dynamic stability through best-response graphs and stochastic potential.

Stable Matching Process on Random Bipartite Graph Sequences *Dec 2023 - May 2024*
Undergraduate thesis, advised by Prof. Jun Luo and Prof. Yan Wang.

- Proposed a two-sided dynamic matching model with restrictions imposed on matching at each time stage.
- Developed a corresponding matching mechanism that guarantees instant stability and convergence to universal stability.

Prediction of Cryptocurrency Returns Based on Market Sentiment and Blockchain Address Activity *May 2022 - Oct 2022*

Undergraduate participation in research program, advised by Prof. Haibing Shu.

- Created automatically updated databases of crypto-relevant texts and blockchain address activities.
- Constructed sentiment indices tailored to the cryptocurrency market, based on crypto-relevant texts.
- Formulated network indices to characterize blockchain address activities using social network analysis.
- Evaluated the constructed indices with linear models and validated their predictive powers for cryptocurrency returns.

Professional Experience

Model Engineer Intern *Shanghai, China*

Ping An Asset Management Co., Ltd. *May 2023 - Aug 2023*

- Conducted research on FOF investment, including fund performance evaluation and portfolio optimization.
- Developed algorithms on financial market style indication and fund portfolio estimation.
- Supported the construction of factor data required for investment research platforms and financial models.

Data Researcher Intern *Shanghai, China*

East Money Information Co., Ltd. *Jul 2022 - Sep 2022*

- Conducted research on industry chains and supported the creation of industry chain graphs.
- Performed statistical analysis on industry data and constructed industry chain databases.
- Contributed to the development of the industry chain data research platform.

Skills

Programming Languages: Python, C/C++, Java, SQL, R, Stata, MATLAB.

Technologies: CUDA, PyTorch, Linux, Git, Financial terminals, LaTeX.

Teaching Experience

Tutor for ISyE 3133 - Engineering Optimization *Fall 2025, Gatech*

Tutor for ISyE 2027 - Probability With Applications *Spring 2025, Gatech*

Miscellaneous

Languages: English (Fluent), Mandarin (Native).

Clubs & Associations: SJTU *NIX User Group.

*Passed PhD Comprehensive Exam