Zhaonan Qu

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Academic Employment

Postdoctoral Research Scientist **2024–**
Data Science Institute, Columbia University
Mentors: Agostino Capponi, Simon Lee

Research Interests

My research interests are at the intersection of econometrics, operations research, and machine learning. I leverage novel connections between these topics to develop robust and scalable data-driven solutions in applications such as digital platforms, consumer preference, transportation, supply chains, energy networks, and finance.

Education

Ph.D in Economics, Stanford University **2024**
Specialization: Econometrics
Dissertation: *Topics in Econometrics and Optimization*
Advisor: Guido Imbens
Committee: Alfred Galichon, Han Hong, Yinyu Ye, Johan Ugander

M.A. in Mathematics, Courant Institute, New York University **2017**
Advisor: Alfred Galichon

A.B. in Mathematics, Princeton University **2015**

Current Projects

Graph Neural Networks for International Finance
Capponi, Agostino and Zhaonan Qu and Andreas Stathopolous

Learning Consumer Preferences via Graph Connectivity Optimization
Gao, Wenzhi and Zhaonan Qu

Sharp Non-Asymptotic Local Convergence of Sinkhorn's Algorithm
Gao, Wenzhi and Zhaonan Qu

Model Evaluation Using Data with Distributional Shifts
Lee, Simon and Zhaonan Qu

Research Works

Triply Robust Panel Estimators
Accepted at *Journal of Applied Econometrics* (2026)
Athey, Susan, Guido Imbens, Zhaonan Qu, and Davide Viviano

Semiparametric Estimation of Treatment Effects in Observational Studies with Heterogeneous Partial Interference
Accepted at *Journal of Business & Economic Statistics* (2026)
Qu, Zhaonan, Ruoxuan Xiong, Jizhou Liu, and Guido Imbens
arXiv:2107.12420

Handling Sparse Non-negative Data in Finance
Under Review (2025)
Capponi, Agostino and Zhaonan Qu

Structured Lasso for Convex Nonparametric Least Squares: An Application to Swedish Electricity Distribution Networks
Major Revision at *European Journal of Operational Research* (2025)
Liao, Zhiqiang and Zhaonan Qu

Scalable Approximate Optimal Diagonal Preconditioning
Accepted at *Computational Optimization and Applications* (2026)
Gao, Wenzhi, Zhaonan Qu, Madeleine Udell, and Yinyu Ye
arXiv:2312.15594

On Sinkhorn's Algorithm and Choice Modeling
Operations Research (2025)
Qu, Zhaonan, Alfred Galichon, Wenzhi Gao, and Johan Ugander
arXiv:2310.00260

Optimal Diagonal Preconditioning
Operations Research (2025)
Qu, Zhaonan, Wenzhi Gao, Oliver Hinder, Yinyu Ye, and Zhengyuan Zhou
arXiv:2209.00809

Causal Analysis of Bail Reform Policies
Working Paper (2025)
Harvey, Anna, Guido Imbens, Zhaonan Qu, and Orion Taylor

Inferring Dynamic Networks from Marginals with Iterative Proportional Fitting
41st International Conference on Machine Learning (ICML) (2024)
Chang, Serina, Frederic Koehler, Zhaonan Qu, Jure Leskovec, and Johan Ugander
arXiv:2402.18697

Distributionally Robust Instrumental Variables Estimation
Under Review (2024)
Qu, Zhaonan and Yongchan Kwon
arXiv:2410.15634

Computationally Efficient Estimation of Large Probit Models
Major Revision at *Journal of Econometrics* (2024)
Ding, Patrick, Guido Imbens, Zhaonan Qu, and Yinyu Ye
arXiv:2407.09371

A Unified Linear Speedup Analysis of Federated Averaging and Nesterov FedAvg
Journal of Artificial Intelligence Research 78: 1143-1200 (2023)
Qu, Zhaonan, Kaixiang Lin, Zhaojian Li, Jiayu Zhou, and Zhengyuan Zhou
arXiv:2007.05690

Federated Learning's Blessing: Fedavg has Linear Speedup
ICLR 2021 Workshop on Distributed and Private Machine Learning (DPML) (2021)
Qu, Zhaonan, Kaixiang Lin, Zhaojian Li, and Jiayu Zhou

Ensemble Methods for Causal Effects in Panel Data Settings
American Economic Association Papers and Proceedings 109: 65-70 (2019)
Athey, Susan, Mohsen Bayati, Guido Imbens, and Zhaonan Qu
arXiv:1903.10079

Teaching Experience

MS&E 311 Optimization (TA), Stanford Winter 2021
ECON 292 Quantitative Methods for Empirical Research (TA), Stanford Autumn 2020

Invited Presentations

International Conference on Information Technology and Quantitative Management (ITQM)	August 2025
International Conference on Continuous Optimization (ICCOPT)	July 2025
INFORMS Service Science Conference, Said Business School, Oxford	July 2025
Annual Conference of the International Association for Applied Econometrics	June 2025
INFORMS Annual Meeting Session on Financial Analytics and Technology	October 2024
41st International Conference on Machine Learning (ICML)	July 2024
2024 American Causal Inference Conference Session on Instrumental Variables	May 2024

2024 Banff Research Center Workshop on Optimal Transport and Distributional Robustness	March 2024
INFORMS Annual Meeting Session on Econometric, Big Data Methods and Applications to Finance	October 2023
INFORMS Annual Meeting Poster Session on Operations Research and Optimization Methodologies	October 2023
2023 Stanford Data Science Conference Poster Session	May 2023
2022 North American Summer Meeting of the Econometric Society	June 2022
2022 American Causal Inference Conference Poster Session	May 2022
2022 California Econometrics Conference Poster Session	May 2022
INFORMS Annual Meeting Session on Stochastic Optimization (virtual)	November 2020

Research Affiliations, Honors, and Awards

Arnold Ventures Research Fellowship in Jail Data Initiative Social Science Research Council	2024–2026
Postdoctoral Research Assistant Professor Johan Ugander's Lab	2023–2024
Stanford Interdisciplinary Graduate Fellowship Stanford University	2019–2022
Provost's Global Research Initiative Fellowship, New York University	2016
Magna Cum Laude in Mathematics and Phi Beta Kappa, Princeton University	2015
7th Place, Rotman International Trading Competition, University of Toronto	2014
Smith-Newton Scholar, Princeton Environmental Institute	2013

Peer Review Services

SIAM Journal on Matrix Analysis and Applications, Decision Sciences Journal, Journal of Econometrics, Journal of Scientific Computing, Journal of Artificial Intelligence Research, Journal of Computational and Graphical Statistics, SIAM Journal on Financial Mathematics

Industry Experiences

Microsoft Research New England, Research Data Science Intern

Robustness and Causal Inference *June 2021–Sept 2021*

Internship project at Microsoft Research New England. Implemented causal inference methods for testing the impact of email campaigns on the subscription of Microsoft 365 membership, and researched theoretical frameworks for robust causal inference using distributionally robust optimization.

Uber, Data Science Intern

Personalized Tipping Suggestions based on Trip Quality *June 2020–Sept 2020*

Internship project at Uber's Driver Incentives Team. Analyzed potential impacts of quality-based tipping suggestions on improving ride quality and driver income. Designed and implemented a contextual bandit algorithm on Uber's Michelangelo machine learning platform that serves personalized tipping suggestions after a trip completes in real time based on trip quality features. Product was tested in cities across the U.S.

Cruise, Data Scientist Intern

Learning Causal Bayesian Networks through Knockoffs *June 2019–Sept 2019*

Internship project at Cruise (now GM's autonomous vehicles arm). Designed and implemented a statistical decision making system in Python that applied the knockoff method to select causal stack-level variables relevant to specific types of near-accidents experienced by an autonomous vehicle. Also curated the near-accident type classification dataset combining multiple sources of data on Google BigQuery and PostgreSQL.

Programming Languages

Python, MATLAB, SQL, R