

Jeff Cai

356 Mendoza College of Business

Department of Information Technology, Analytics, and Operations

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RESEARCH INTERESTS	Data-driven Decision-making, Network Analysis, Model Selection, Post-selection Inference, Empirical Bayes; Econometrics, Equity Holding Network, Ownership/Organization Structure, Healthcare, Revenue Management.
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ACADEMIC POSITION	<i>Scharpf Family Assistant Professor in Real Estate</i>	2022 – current
	Department of Information Technology, Analytics, and Operations	
	Mendoza College of Business, University of Notre Dame	

EDUCATION	The Wharton School	2017 – 2022
	University of Pennsylvania	
	<i>Ph.D. in Statistics (Advisor: Linda Zhao)</i>	

Thesis: Network, network regression, and equity holding network

Chinese University of Hong Kong	2013 – 2017
<i>Bachelor of Science in Computer Science (Minor in Statistics), First Class Honors</i>	

Thesis: Variance-reduced stochastic optimization and acceleration techniques (with Jiacheng Zhuo supervised by James Cheng)

JOURNAL PUBLICATIONS	JP6. Cai, J. , Chen, R., Wainwright, M., Zhao, L. (2026). “Doubly high-dimensional contextual bandits: An interpretable model with applications to assortment and pricing.” <i>Management Science (accepted)</i> . Available here .
	JP5. Cai, J. , Yang, D., Chen, R., Shen, H., Zhao, L., Zhu, W. (2026). “Network regression and supervised centrality estimation.” <i>Journal of the American Statistical Association (accepted)</i> . Available here .
	JP4. Cai, J. , Yang, D., Zhu, W., Zhao, L. (2023). “Hierarchical vintage sparse PCA. Discussion on the paper by Rohe and Zeng.” <i>Journal of the Royal Statistical Society. Series B: Statistical Methodology</i> , 85(4), 1076-1080. Available here .
	JP3. Ogburn, E., Cai, J. , Kuchibhotla A., Berk, R., Buja A. (2022). “Practical issues concerning assumption-lean inference for generalized linear models. Discussion on the paper by Vansteelandt and Dukes.” <i>Journal of the Royal Statistical Society. Series B: Statistical Methodology</i> , 84(3), 715-716. Available here .
	JP2. Kuchibhotla, A. K., Brown, L. D., Buja, A., Cai, J. , George, E. I., Zhao, L. (2020). “Valid post-selection inference in model-free linear regression.” <i>Annals of Statistics</i> , 48(5), 2953-2981. Available here .
	JP1. Cai, J. , Mandelbaum, A., Nagaraja, C. H., Shen, H., Zhao, L. (2019). “Statistical theory powering data science.” <i>Statistical Science</i> , 34(4), 669-691. Available here .

- C4. Alavo, R., Zhang, X.*, Ademaj, G.*, **Cai, J.**, Kwon, H., Cotes, R., Clifford, G., Abbasi, A. (2026).
“Dash-M5H: An interactive dashboard for multi-modal, multi-model mental health assessment.” In *Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics (ACL System Demonstrations)*. Available [here](#).
- C3. Zhang, X.*, **Cai, J.**, Li, J., Abbasi, A. (2025).
“Empirical bayes tensor decomposition: A holistic and interpretable representation of digital trace patterns.” In *the 46th AIS International Conference on Information Systems (ICIS)*. Available [here](#).
- C2. **Cai, J.**, Gu, X., Zhao, L., Zhu, W. (2025).
“State ownership in China: An equity network perspective.” In *The Arc of Chinese Economy, 156-91*. Cambridge: Cambridge University Press. Available [here](#).
- C1. Allen, F., **Cai, J.**, Gu, X., Qian, J., Zhao, L., Zhu, W. (2023).
“Centralization or decentralization? The evolution of state-ownership in China.” *VoxChina*. Available [here](#).

UNDER REVIEW

- UR1. Allen, F., **Cai, J.**, Gu, X., Qian, J., Zhao, L., Zhu, W. (2026).
“Ownership network and firm growth: What do forty million companies tell about the Chinese economy?”
AFA 2021, NBER Chinese Economy Meeting 2020, MFA 2020, FMA 2020, NSF 6th Annual Conference for Network Science, The Sixth Network Science in Economics Conference, CFRC 2021, CICF 2021. Under review. Available [here](#).
China Financial Research Conference (CFRC) 2021 Best Paper Award (3 out of 534 papers).
- UR2. Zhang, X.*, **Cai, J.**, Li, J., Abbasi, A. (2026).
“Designing for digital traces: Towards holistically contextualized tensor-based representations.”
INFORMS Workshop on Data Science 2023 and 2024. INFORMS Conference on Information Systems and Technology (CIST) 2025. International Conference on Information Systems (ICIS) 2025. Revision at *Information Systems Research*.
- UR3. **Cai, J.**, Chen, R., Huang, Q.*, Zhao, L., Zhu, W. (2026).
“Poisson-MNL bandit: Nearly optimal dynamic joint assortment and pricing with decision-dependent customer arrivals.”
2024 ESIF Economics and AI+ML Meeting. R&R at Operations Research. Available [here](#).
- UR4. Allen, F., **Cai, J.**, Gu, X., Qian, J., Zhao, L., Zhu, W. (2025).
“Centralization or decentralization? The evolution of state-ownership in China.”
CICF 2021, MFA 2022, FIRS 2022. Under review. Available [here](#).
China International Conference in Finance (CICF) 2021 XiYue Best Paper Award (2 out of 2065 papers).
- UR5. **Cai, J.**, Coetzee, M.* (2026).
“Building barricades or belonging: Moral-organizational translation to emergent crisis governance.”
AOM Annual Meeting 2026. Under review.
- UR6. Jiang, H., Wu, B., Zhu, W., **Cai, J.**, Hu, X. (2026).
“Do LLMs forecast or remember? A Bayesian decomposition framework for leakage-sensitive financial forecasting evaluation.”
Under review.

- UR7. Zhang, H.* , Sundararajan, R., Mahmud, N., **Cai, J.**, Zaman, S., Li, H., Zhao, L., Khan, N. (2025).
 “A prediction model to determine the clinical course of newly diagnosed ulcerative colitis patients in a nationwide cohort.” *Under review*.

* Ph.D. student.

PREPRINTS
AND
WORKING
PAPERS

- WP1. **Cai, J.**, Gu, X., Liu, S., Xia, M.* , Zhao, L., Zhu, W. (2025).
 “AI as ‘co-founder’: GenAI for entrepreneurship.”
Asian Bureau of Finance and Economic Research (ABFER) 2026, Adam Smith Workshop (London Business School) 2026. Available [here](#).
2026 China Financial Research Conference (CFRC) Corporate Finance Best Paper Award.
- WP2. **Cai, J.**, Gu, X., Li, Y.* , Zhao, L., Zhu, W. (2025).
 “Generative AI and entrepreneurship: A spatial synthetic difference-in-differences approach.”
STAI-X ’26 Statistics and Trustworthy AI for Cross (X)-Domain Acceleration Paper Award.
- WP3. Ademaj, G.* , Zhang, X.* , **Cai, J.**, Abbasi, A., Sarker, S., Sarker, S. (2026).
 “Sensemaking in multimodal, multi-model environments: Designing support for remote mental health assessments.” *International Conference on Information Systems (ICIS) 2025*.
- WP4. **Cai, J.**, Chen, R., Wainwright, M., Zhao, L. (2026).
 “Personalized reinforcement learning: with applications to sepsis management in ICU.”
- WP5. Zhang, X.* , **Cai, J.**, Li, J., Abbasi, A. (2026).
 “CoSparTA: An R package for covariate-aware sparsity-adaptive tensor analysis.”
- WP6. Zhang, X.* , **Cai, J.**, Kitchens, B., Mousavi, R., Abbasi, A. (2025).
 “Theory-guided in-context learning via parallel representation for LLM-based health assessment.” *INFORMS Workshop on Data Science 2025*.
- WP7. Yang, X.* , **Cai, J.**, Huang, Q.* , Liu, J., Zhu, W. (2026).
 “Textual regression with doubly supervised learning.” *Draft available*.
- WP8. **Cai, J.**, Gu, X., Zhao, L., Zhu, W. (2025).
 “Microscopic dynamics of equity ownership networks in China.” *Draft available*.
- WP9. **Cai, J.**, Han, X., Ritov, Y., Zhao, L. (2021).
 “Nonparametric empirical Bayes estimation and testing for sparse and heteroscedastic signals.” *Available [here](#)*.
- WP10. Kuchibhotla, A. K., Brown, L. D., Buja, A., **Cai, J.** (2019).
 “All of linear regression.” *Available [here](#)*.

* Ph.D. student.

NON-REFEREED
PUBLICATIONS

- NR2. **Cai, J.**, Pashley, N., Zhao, L. (2021).
 “2021 IMS Membership Survey: Report.” *IMS Bulletin*, 50(5), 6-9. *Available [here](#)*.
- NR1. **Cai, J.** (2015). “Project on glacier recognition with SIFT and CNN.” *The Arctic Explorers from S.H. Ho College, 2015, pp. 182-187. Available [here](#)*.

SOFTWARES

1. **SNP**: R package (C++-based) on Spike-and-Nonparametric Prior (SNP) for Sparse and Heteroscedastic Signals. Available at <https://github.com/cccfran/SNP>.
2. **tmax**: R package (C++/FORTRAN-based) on assumption-lean Post-Selection Inference (PoSI). Available at <https://post-selection-inference.github.io/R/>.
3. **SuperCENT**: R package (C++-based) on Supervised Centrality Estimation and Network Prediction (SuperCENT). Available at <https://jh-cai.com/SuperCENT>.
4. **tmax-GPU**: GPU version of **tmax** (C++/CUDA-based) with Tan, X. Available soon.

INVITED TALKS

- Generative AI and Entrepreneurship: A Spatial Synthetic Difference-in-Differences Approach.
 - *STAI-X '26: Statistics and Trustworthy AI for Cross (X)-Domain Acceleration*, Harvard University, 2026.
- AI as ‘Co-founder’: GenAI for Entrepreneurship.
 - *Chinese Economy Society Annual Meeting*, Emory University, 2026.
- Poisson-MNL Bandit: Nearly Optimal Dynamic Joint Assortment and Pricing with Decision-Dependent Customer Arrivals.
 - *Joint Statistical Meeting (JSM)*, Boston, 2026.
 - *ESIF Economics and AI+ML Meeting*, Ithaca, 2024.
- Doubly High-Dimensional Contextual Bandits: An Interpretable Model with Applications to Assortment and Pricing.
 - *Quantitative Methods Seminar*, Mitch Daniels School of Business, Purdue University, 2025.
 - *Production and Operations Management Society Annual Meeting (POMS)*, Atlanta, 2025.
 - *2024 Conference on Artificial Intelligence, Machine Learning, and Business Analytics*, New Haven, 2024.
 - *Production and Operations Management Society Annual Meeting (POMS)*, Minneapolis, 2024.
 - *The 15th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMSTAT)*, Berlin, 2023.
 - *Joint Statistical Meeting (JSM)*, Toronto, 2023.
 - *Manufacturing and Service Operations Management Conference (MSOM)*, Montreal, 2023.
- Personalized Reinforcement Learning.
 - *Joint Statistical Meeting (JSM)*, Toronto, 2026.
 - *IMS International Conference on Statistics and Data Science (ICSDS)*, Seville, 2025.
 - *INFORMS Annual Meeting (INFORMS)*, Seattle, 2024.
 - *Statistics Empowering Data Science (SEEDS) Conference*, Los Angeles, 2023.
 - *IMS International Conference on Statistics and Data Science (ICSDS)*, Lisbon, 2023.
 - *INFORMS Annual Meeting (INFORMS)*, Phoenix, 2023.
- Centralization or Decentralization? The Evolution of State-Ownership in China.
 - *The Arc of Chinese Economy*, University of Pennsylvania, Philadelphia, 2022.
 - *China International Conference in Finance (CICF)*, Virtual, 2021.
- Equity Ownership Network and Supervised Centrality Estimation

- *IMS International Conference on Statistics and Data Science (ICSDS)*, Florence, 2022.
- *The 14th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMSTAT)*, London, 2022.
- Network Regression and Supervised Centrality Estimation.
 - *Young Scholars Conference on Machine Learning in Economics and Finance*, Federal Reserve Bank of Philadelphia, 2021.
 - *Statistics department seminar*, George Mason University (joint with Linda Zhao), 2021.
 - *The 14th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMSTAT)*, London, 2021.
- Semi-Supervised Centrality Estimation and Network Prediction.
Joint Statistical Meeting (JSM), Virtual, 2021.
- Ownership Network and Firm Growth: What do Forty Million Companies Tell about the Chinese Economy?
The Sixth Network Science in Economics Conference, Virtual, 2021.
- Nonparametric Empirical Bayes Estimation and Testing for Sparse and Heteroscedastic Signals.
The 12th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMSTAT), London, 2019.
- Innovation and Equity Holding Network.
Workshop on Innovation and Intellectual Property: Firm Strategies and Policy Challenges in a Rapidly Changing World, Beijing, 2019.
- Nonparametric Empirical Bayes Methods for Sparse and Noisy Signals.
 - *Joint Statistical Meeting (JSM)* Denver, 2019.
 - *The Fourth Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI-4)* (represented Linda Zhao), Washington University of St. Louis, 2019.
 - *The International Chinese Statistical Association Conference (ICSA)*, Chicago, 2017.
- Generalized Cp and a Predictive Model Selection Test in Assumption-Lean Framework.
 - *The International Chinese Statistical Association Conference (ICSA)*, Naikai University, Tianjin, 2019.
 - *Joint Statistical Meeting (JSM)*, Vancouver, 2018.
 - *The Third Workshop on Higher-Order Asymptotics and Post-Selection Inference (WHOA-PSI-3)* (joint with Linda Zhao), Washington University of St. Louis, 2018.
 - *Joint Statistical Meeting (JSM)*, Baltimore, 2017.
 - *Workshop on Chinese Firm-level Data*, Beijing, 2017.

AWARDS

- Statistics and Trustworthy AI for Cross (X)-Domain Acceleration (STAI-X '26) Paper Award 2026
“Generative AI and Entrepreneurship: A Spatial Synthetic Difference-in-Differences Approach.”
- China Financial Research Conference (CFRC) Corporate Finance Best Paper Award 2026
“AI as ‘Co-founder’: GenAI for Entrepreneurship.”

- Faculty AI Mini-Grant, University of Notre Dame 2026
- Master of Science in Business Analytics Residential Outstanding Professor Award, Mendoza College of Business, University of Notre Dame 2025
- Murray Teaching Award, the Wharton School, University of Pennsylvania 2021
- China Financial Research Conference (CFRC) Best Paper Award 2021
“Ownership Network and Firm Growth: What do Forty Million Companies Tell about the Chinese Economy?” (3 out of 534 papers).
- China International Conference in Finance (CICF) XiYue Best Paper Award 2021
“Centralization or Decentralization? The Evolution of State-Ownership in China.” (2 out of 2065 papers).
- Mack Institute Research Fellowship. Co-PI: **Cai, J.**, Zhao, L., Zhu, W. 2020
“Networks, Machine Learning, and Asset Pricing.”
- Penn China Research and Engagement Fund (CREF). 2019
PI: Harrison, A., Meyer, M., Zhao, L., Zhao, M.
- George James Term Fund Award, the Wharton School 2019
- Global Initiative Fund, the Wharton School 2017 – 2022
- National Science Foundation Grant DMS-1512084. PI: Brown, L., Zhao, L. 2018

SERVICE

- Reviewer for *Annals of Statistics*, *Journal of the American Statistical Association*, *Annals of Applied Statistics*, *Observational Studies*, *American Statisticians*, *Operations Research*, *INFORMS Journal on Computing*, *Quarterly Review of Economics and Finance*. Associate editor for the *International Conference on Information Systems 2024, 2025*. Judge for American Statistical Association *Business and Economic Statistics Section Student Paper Award*.
- Program committee member, 10th INFORMS Workshop on Data Science, 2026.
- Chair, Institute of Mathematical Statistics (IMS) Survey Committee, 2025 – 2030.
- University of Notre Dame
 - Analytics Ph.D. admission committee, Mendoza College of Business, 2023 – 2024, 2024 – 2025.
 - Faculty mentor, Building Bridges Mentoring Program, 2022 – 2023, 2024 – 2025, 2025 – 2026.
 - Social committee, Department of Information Technology, Analytics, and Operations, 2024 – current.
- Organizing committee for Advancing the Frontier Data Science, AI, and Statistical Learning: A Symposium in Honor of Jun Liu, Boston, 2025.
<https://jh-cai.com/junliu-workshop>
- Organizing committee for Workshop in Honor of Ed George’s 70th Birthday: Perspectives in Statistical Modeling and Inference, Philadelphia, 2021.
<https://jh-cai.com/edgeorge70>
- Ph.D. Student Mentor, Wharton Doctoral Council, 2020.
- Co-organizer of Workshop on Innovation and Intellectual Property: Firm Strategies and Policy Challenges in a Rapidly Changing World, Beijing, 2019.
<http://jh-cai.com/pwcc2019>

- Co-organizer of Lawrence D. Brown Memorial Service and Workshop, Philadelphia, 2018. <https://jh-cai.com/larrybrown2018>
- Organizing committee for Workshop on Chinese Firm-level Data, Beijing, 2017. <https://jh-cai.com/pwcc2017>
- Co-organizer of Data Science Live. Spring 2019, Fall 2019, Spring 2021, Summer 2021. <https://jh-cai.com/modern-data-mining/dsl>

TEACHING AND ADVISING

- Mendoza College of Business
 - Developed [ITAO 40570: Urban Analytics](#) (Spring 2023, 2024, 2025, 2026) and MSBR 50780: Machine Learning in Urban Analysis (Spring 2024, 2025, 2026).
 - Ph.D. advisor: Xinyuan Zhang (co-advised with Ahmed Abbasi).
 - Research assistant supervisor: Melissa Perotin (Summer and Fall 2024), Maggie Brangle (Summer 2025).
- The Wharton School
 - Ph.D. mentor: Samuel Rosenberg (currently Statistics Ph.D. candidate at the University of Michigan), Wharton Directed Reading Program, Fall 2021.
 - Lead teaching fellow, Wharton Data Science Academy of Wharton Youth Program, Summer 2021.
 - Co-developed [STAT 471/571/701 Modern Data Mining](#) (cross-listed for undergraduates, graduates and MBAs) and served as head TA Spring 2021 and TA Fall 2017.
 - Co-instructor, Wharton Executive Education OneConnect Program with Two Sigma, Summer 2019.

SKILLS

- Programming: C/C++, R, Python, L^AT_EX (proficient); FORTRAN, Matlab, Java (experienced)
- Database management: SQL (PostgreSQL), graph database (Neo4j)
- Web design and development: Javascript (AngularJS), HTML5/CSS, Django; Photoshop
- Server administration: Unix