Tengyuan Liang

curriculum vitae

5807 South Woodlawn Avenue
Chicago, IL 60637
+1 773.702.7935
tengyuan.liang AT ChicagoBooth DOT edu
tyliang.github.io

Statistician and machine learning theorist, with applications in business and economics.

My research builds mathematical foundations for modern AI: theories that reveal when and why learning systems work, and principled tools for when they don't. These foundations shape how predictive and generative models are validated, how experiments are designed in business and economics, and how uncertainty is communicated to decision-makers.

† full curriculum vitae available at tyliang.github.io/Liang-CV.pdf

Academic Appointment

2017–present **The University of Chicago**, *Booth School of Business*, United States.
JP Gan Professorship in the Wallman Society of Fellows
Professor of Econometrics and Statistics and Applied AI, 2025 – present
Full Professor, 2022 – 2024
Associate Professor, 2021 – 2022
Assistant Professor, 2017 – 2021

Becker Friedman Institute, *Big Data Initiative*.
Affiliated Scholar, 2018 – present

The Center for Applied Artificial Intelligence.
Affiliated Faculty, 2022 – present

Education

2012–2017 **University of Pennsylvania**, *The Wharton School*, United States.
Ph.D. in Statistics

2008–2012 **Peking University**, China.
B.S. in Mathematics

Visiting Positions

2024 The University of Chicago Campus in Hong Kong.
Global Faculty in Residence

2019 Yale University, *Cowles Foundation for Research in Economics*.
Visiting Assistant Professor in Econometrics

2016 Yahoo Research New York, *Online Learning and Optimization Group*.
Summer Research Scientist

Research

Fields Statistics, Learning Theory, Econometrics

Research Programs
Distributional Shrinkage: denoising and optimal transport
Generative Models: geometry and dynamics
Causal Learning: design and inference
The Interpolation Regime: overparametrization and regularization

"Quasi-Random" Samples of Work

† over 30 peer-reviewed publications spanning statistics, machine learning, economics, and applied mathematics
† full list at tyliang.github.io/publications

Distributional Shrinkage

- T. Liang.
"Distributional Shrinkage I: Universal Denoiser Beyond Tweedie's Formula."
arXiv:2511.09500, 2025.

- T. Liang.
"Distributional Shrinkage II: Higher-Order Scores Encode Brenier Map."
arXiv:2512.09295, 2025.

Generative Models

- T. Liang.
"How Well Generative Adversarial Networks Learn Distributions."
Journal of Machine Learning Research, 22(228):1-41, 2021.

- W. Guo, Y. Hur, T. Liang, C. Ryan.
"Online Learning to Transport via the Minimal Selection Principle."
Conference on Learning Theory, pmlr 178:4085-4109, 2022.

- Y. Hur, W. Guo, T. Liang.
"Reversible Gromov-Monge Sampler for Simulation-Based Inference."
SIAM Journal on Mathematics of Data Science, 6(2):283-310, 2024.

- T. Liang, K. Dharmakeerthi, T. Koriyama.
"Denoising Diffusions with Optimal Transport: Localization, Curvature, and Multi-Scale Complexity."
Transactions on Machine Learning Research, 2026.

- N. Deb, T. Liang.
"No-Regret Generative Modeling via Parabolic Monge-Ampère PDE."
arXiv:2504.09279, 2025.

The Interpolation Regime

- T. Liang, A. Rakhlin.
"Just Interpolate: Kernel "Ridgeless" Regression Can Generalize."
The Annals of Statistics, 48(3):1329-1347, 2020.

- X. Dou, T. Liang.
"Training Neural Networks as Learning Data-adaptive Kernels: Provable Representation and Approximation Benefits."
Journal of the American Statistical Association (Theory and Methods), 116:535, 1507-1520, 2021.

- T. Liang, A. Rakhlin, X. Zhai.
"On the Multiple Descent of Minimum-Norm Interpolants and Restricted Lower Isometry of Kernels."
Conference on Learning Theory, pmlr 125:2683-2711, 2020.

- T. Liang, P. Sur.
"A Precise High-Dimensional Asymptotic Theory for Boosting and Minimum-ℓ_1-Norm Interpolated Classifiers."
The Annals of Statistics, 50(3):1669-1695, 2022.

- ⋆ T. Liang, H. Tran-Bach.
"Mehler's Formula, Branching Process, and Compositional Kernels of Deep Neural Networks."
Journal of the American Statistical Association (Theory and Methods), 117:539, 1324-1337, 2022.

- ⋆ T. Liang.
"Universal Prediction Band via Semi-Definite Programming."
Journal of the Royal Statistical Society: Series B (Statistical Methodology), 84(4):1558-1580, 2022.

- ⋆ T. Liang, B. Recht.
"Interpolating Classifiers Make Few Mistakes."
Journal of Machine Learning Research, 24(20):1-27, 2023.

Causal Learning

- ⋆ M. H. Farrell, T. Liang, S. Misra.
"Deep Neural Networks for Estimation and Inference."
Econometrica, 89(1):181-213, 2021.

- ⋆ T. Liang.
"Blessings and Curses of Covariate Shifts: Adversarial Learning Dynamics, Directional Convergence, and Equilibria."
Journal of Machine Learning Research, 25(140):1-27, 2024.

- ⋆ Y. Hur, T. Liang.
"Detecting Weak Distribution Shifts via Displacement Interpolation."
Journal of Business & Economic Statistics, 43(1):178-190, 2025.

- ⋆ T. Liang, B. Recht.
"Randomization Inference When N Equals One."
Biometrika, 112(2):1-24, 2025.

- ⋆ W. Guo, T. Liang, P. Toulis.
"Gaussianized Design Optimization for Covariate Balance in Randomized Experiments."
Journal of the Royal Statistical Society: Series B (Statistical Methodology), 2026.
Extended abstract in *ACM Conference on Economics and Computation*, 918-918, 2025.

Professional Service

2024–2025 **IMS Committee on Nominations**.

2024– **Associate Editor**, *Journal of the American Statistical Association (Theory and Methods)*.

2023– **Associate Editor**, *Operations Research*.

2020– **Editorial Board**, *Journal of Machine Learning Research*.

2020 **Senior Program Committee**, *Conference on Learning Theory (COLT)*.

2014– **Referee**.
AoS, JRSSB, JASA, Biometrika, Stat. Sci., PTRF, Bernoulli, JMLR, COLT, STOC, ICLR, Econometrica, ReStud, REStat, JPE Micro, IEEE-IT, MOR, OR, SIMODS . . .

University Service

2025–2028 **Policy Committee**, *The University of Chicago Booth School of Business*.
school-wide oversight and governance committee

2025 **Co-Organizer**, *AI Workshop*, Chicago Booth.

2020–2022 **Co-Organizer**, *Econometrics and Statistics Colloquium*, Chicago Booth.

Mentoring & Advising

2018– **Doctoral Students.**
Takuya Koriyama [2029, PhD, Chicago Booth], Kulunu Dharmakeerthi [2026, PhD, UChicago Stat], Wenxuan Guo [2026, PhD, Chicago Booth], YoonHaeng Hur [2025, PhD, UChicago Stat → Postdoc, Columbia], Hai Tran-Bach [2023, PhD, UChicago Stat], Xialiang Dou [2021, PhD, UChicago Stat → Two Sigma].

2018– **Dissertation Committee.**
Sue Parkinson [2026, PhD, Computational and Applied Mathematics], Boxin Zhao [2025, PhD, Chicago Booth], Zhouyu Shen [2025, PhD, Chicago Booth], Walter Zhang [2024, PhD, Chicago Booth → Assistant Professor, Wharton], Shuo-Chieh Huang [2024, PhD, Chicago Booth → Postdoc, Rutgers], Sen Na [2021, PhD, UChicago Stat → Postdoc, Berkeley], Shihao Gu [2021, PhD, Chicago Booth], Jingyu He [2020, PhD, Chicago Booth → Assistant Professor, CityU Hong Kong], Ming Yu [2020, PhD, Chicago Booth → Citadel], Qi An [2019, PhD, Chicago Booth].

Invited Colloquia & Seminars

2024–2025 Harvard, Columbia, Northwestern, Warwick

2023–2024 HKU, Academia Sinica, HKUST

2022–2023 Cornell, UCSD, Princeton, UPenn, UW Madison, UCLA, UC Irvine

2021–2022 UBC, UCL, UIUC, MSR New England

2020–2021 NSF-Simons, UMass Amherst, Rutgers, Durham, LSE

2019–2020 MIT, Yale, Harvard, Duke, Google Research NYC

2018–2019 Duke, ENSAE-CREST, UChicago

2017–2018 UIUC, UChicago, HKUST

2016–2017 Stanford, Princeton, MIT, UChicago, Cambridge, Georgia Tech, UCSD, UVA, UIUC, Rutgers, Imperial College London, Yahoo Labs

Conferences CIRM (Luminy), MFO (Oberwolfach), BIRS (Banff), CRM (Barcelona), Isaac Newton Institute (Cambridge), DALI (South Africa), FIMI (Japan), IMS, JSM, COLT, ICML, AISTATS, ICCOPT

Teaching Experience

2017– **Instructor**, *University of Chicago Booth School of Business*.
Classes: Data, Learning and Algorithms (PhD), Business Statistics (MBA), 2017–present

2012–2017 **Recitation Instructor & TA**, *Wharton School at University of Pennsylvania*.
Classes: Stochastic Processes, Advanced Quantitative Modeling, Probability, Statistics, 2012–2017

Fellowships & Awards

2025– Wallman Society of Fellows
university-wide fellowship recognizing impactful scholarship at the University of Chicago

2021–2026 NSF CAREER Award
DMS - 2042473 "New Statistical Paradigms Reconciling Empirical Surprises in Modern Machine Learning", National Science Foundation, Division of Mathematical Sciences

2022–2025 William Ladany Faculty Fellow

2021–2022 William S. Fishman Faculty Scholar

2017–2021 George C. Tiao Faculty Fellow
research fellowship for computational and data science awarded by the Booth School

2014–2017 Winkelman Fellowship
highest honorific fellowship awarded by the Wharton School

2016 J. Parker Bursk Memorial Award
awarded by the Statistics Department at the Wharton School for excellence in research

2014 US Junior Oberwolfach Fellow