Yifan Chen

Homepage: yifanc96.github.io
Email: yifanc96@gmail.com
GitHub: github.com/yifanc96
LinkedIn: yifan-chen-3b9437159

Updated Oct, 2025

Employment

Department of Mathematics, UCLA — Los Angeles, CA
Assistant Professor (tenure track) — 2025/7–present

Courant Institute, New York University — New York, NY
Assistant Professor/Courant Instructor (non-tenure track) — 2023/9–2025/7

Education

California Institute of Technology — Pasadena, California
Ph.D. in Applied and Computational Mathematics — 2018–2023
Advisors: Thomas Y. Hou, Houman Owhadi, Andrew M. Stuart

Tsinghua University — Bejing, China
B.S. in Pure and Applied Mathematics — 2014–2018

Research Interests

My research lies at the intersection of applied and computational mathematics, applied probability, and statistics. I am interested in the mathematical analysis and applications of probabilistic inference, stochastic algorithms, and PDEs in scientific computing and data science.

Publications

Preprints

[1] **Yifan Chen**, Eric Vanden-Eijnden. Scale-Adaptive Generative Flows for Multiscale Scientific Data. *arxiv: 2509.02971*, 2025

[2] **Yifan Chen**, Eric Vanden-Eijnden, Jiawei Xu. Lipschitz-Guided Design of Interpolation Schedules in Generative Models. *arxiv: 2509.01629*, 2025

[3] **Yifan Chen**. New Affine Invariant Ensemble Samplers and Their Dimensional Scaling. *arxiv: 2505.02987*, 2025

[4] **Yifan Chen**, Xiaoou Cheng, Jonathon Niles-Weed, Jonathon Weare. Convergence of Unadjusted Langevin in High Dimensions: Delocalization of Bias. *arxiv: 2408.13115*, 2024.

[5] José A. Carrillo, **Yifan Chen**, Daniel Zhengyu Huang, Jiaoyang Huang, Dongyi Wei. Fisher-Rao Gradient Flow: Geodesic Convexity and Functional Inequalities. *arxiv: 2407.15693*, 2024

[6] **Yifan Chen**, Daniel Zhengyu Huang, Jiaoyang Huang, Sebastian Reich, Andrew M. Stuart. Sampling via Gradient Flows in the Space of Probability Measures. *arxiv: 2310.03597*, 2023

Journal publications

[1] Huan Zhang, **Yifan Chen**, Eric Vanden-Eijnden, Benjamin Peherstorfer. Sequential-in-time training of nonlinear parametrizations for solving time-dependent partial differential equations. *To appear in SIAM Review Research Spotlights*, 2025

[2] Baojun Che, **Yifan Chen**, Zhenghao Huan, Daniel Zhengyu Huang, Weijie Wang. Stable Derivative Free Gaussian Mixture Variational Inference for Bayesian Inverse Problems. *SIAM Journal on Scientific Computing*, 2025

[3] **Yifan Chen**, Ethan N. Epperly, Joel A. Tropp, and Robert J. Webber. Randomly pivoted Cholesky: Practical approximation of a kernel matrix with few entry evaluations. *Communications on Pure and Applied Mathematics*, 2024.

[4] **Yifan Chen**, Bamdad Hosseini, Houman Owhadi, Andrew M. Stuart. Gaussian Measures Conditioned on Nonlinear Observations: Consistency, MAP Estimators, and Simulation. *Statistics and Computing*, 2024.

[5] **Yifan Chen**, Daniel Zhengyu Huang, Jiaoyang Huang, Sebastian Reich, Andrew M. Stuart. Efficient, Multimodal, and Derivative-Free Bayesian Inference With Fisher-Rao Gradient Flows. *Inverse Problems*, 2024

[6] Pau Batlle, **Yifan Chen**, Bamdad Hosseini, Houman Owhadi, Andrew M. Stuart. Error Analysis of Kernel/GP Methods for Nonlinear and Parametric PDEs. *Journal of Computational Physics*, 2024.

[7] Yu Sun, Zihui Wu, **Yifan Chen**, Berthy T. Feng, Katherine L. Bouman. Provable Probabilistic Imaging using Score-Based Generative Priors. *IEEE Transactions on Computational Imaging*, 2024.

[8] **Yifan Chen**, Houman Owhadi, Florian Schaefer. Sparse Cholesky Factorization for Solving Nonlinear PDEs via Gaussian Processes. *Mathematics of Computation*, 2024.

[9] **Yifan Chen**, Thomas Y. Hou, and Yixuan Wang. Exponentially convergent multiscale methods for 2D high frequency heterogeneous Helmholtz equations. *SIAM Multiscale Modeling & Simulation*, 21(3): 849–883, 2023.

[10] **Yifan Chen**, Thomas Y. Hou, and Yixuan Wang. Exponentially convergent multiscale finite element method. *Communications on Applied Mathematics and Computation*, 1–17, 2023.

[11] **Yifan Chen** and Thomas Y. Hou. Multiscale elliptic PDE upscaling and function approximation via subsampled data. *SIAM Multiscale Modeling & Simulation*, 20(1):188–219, 2022.

[12] **Yifan Chen**, Bamdad Hosseini, Houman Owhadi, and Andrew M. Stuart. Solving and learning nonlinear PDEs with Gaussian processes. *Journal of Computational Physics*, 447:110668, 2021.

[13] **Yifan Chen**, Houman Owhadi, and Andrew M. Stuart. Consistency of empirical Bayes and kernel flow for hierarchical parameter estimation. *Mathematics of Computation*, 90(332):2527–2578, 2021.

[14] **Yifan Chen**, Thomas Y. Hou, and Yixuan Wang. Exponential convergence for multiscale linear elliptic PDEs via adaptive edge basis functions. *SIAM Multiscale Modeling & Simulation*, 19(2):980–1010, 2021.

[15] **Yifan Chen** and Thomas Y. Hou. Function approximation via the subsampled Poincaré inequality. *Discrete & Continuous Dynamical Systems-A*, 41(1), 2021.

[16] **Yifan Chen** and Wuchen Li. Optimal transport natural gradient for statistical manifolds with continuous sample space. *Information Geometry*, 3(1):1–32, 2020.

[17] **Yifan Chen**, Yuejiao Sun, and Wotao Yin. Run-and-Inspect Method for nonconvex optimization and global optimality bounds for R-local minimizers. *Mathematical Programming*, 176(1): 39-67, 2019.

[18] Jing Chen, **Yifan Chen**, Hao Wu, and Dinghui Yang. The quadratic Wasserstein metric for earthquake location. *Journal of Computational Physics*, 373:188–209, 2018.

Conference publications

[1] Wenda Chu, Zihui Wu, **Yifan Chen**, Yang Song, Yisong Yue. Split Gibbs Discrete Diffusion Posterior Sampling. *NeurIPS*, 2025

[2] **Yifan Chen**, Mark Goldstein, Mengjian Hua, Michael S. Albergo, Nicholas M. Boffi, Eric Vanden-Eijnden. Probabilistic Forecasting with Stochastic Interpolants and Föllmer Processes. *ICML*, 2024.

[3] Xinzhe Dai, Peichen Zhong, Bowen Deng, **Yifan Chen**, and Gerbrand Ceder. Inpainting crystal structure generations with score-based denoising. *ICML Workshop AI4Science*, 2024.

[4] Zihui Wu, Yu Sun, **Yifan Chen**, Bingliang Zhang, Yisong Yue, Katherine L. Bouman. Principled Probabilistic Imaging using Diffusion Models as Plug-and-Play Priors. *NeurIPS*, 2024

Awards

- AMS-Simons Travel Grant 2025
- The W.P. Carey and Co. Prize in Applied Mathematics, 2023, Caltech 2023
- Kortschak Scholars Program, Department of Computational and Mathematical Sciences, Caltech 2018–2023
- Tsinghua Xuetang Mathematics Program, Department of Mathematical Sciences, Tsinghua University 2015–2018
- Outstanding Undergraduate, Tsinghua University and Beijing 2018
- Baosteel Scholarship, Baosteel Corporation 2017
- Scholarship in Memory of the "12.9" Student Movement, Tsinghua University 2016
- Qualcomm Scholarship, Qualcomm Corporation 2016
- Scholarship in Memory of Mathematics Professor Ou Li, Tsinghua University 2016
- National Scholarship, Ministry of Education of China 2015

Teaching

Instructor at NYU Courant

- Discrete Mathematics Fall 2023
- Discrete Mathematics Spring 2024
- Numerical Analysis Fall 2024
- Numerical Analysis Spring 2025

Teaching Assistant at Caltech

- ACM 109: Mathematical Modeling Spring 2021
- ACM 118: Stochastic Processes and Regression Winter 2020
- ACM 117: Probability and Stochastic Processes Fall 2020
- ACM 109: Mathematical Modeling Spring 2020

Industrial Experiences

Citadel Securities Miami, Florida
Quantitative Research Intern 6/2022-8/2022

- Project on Alpha Research: Predicting APAC Market Returns

Microsoft (virtual) Redmond, Washington
Part Time Researcher, working with Pengchuan Zhang 9/2021-2/2022

- Project: Stablizing Large Scale Neural Network Training of Vision Transformers

Referee Services

- **Journal**: Reviewer for Communications on Pure and Applied Mathematics, Annals of Applied Probability, Proceedings of the National Academy of Sciences (PNAS), Journal of Machine Learning Research, Mathematics of Computation, Journal of the Royal Statistical Society Series B, Journal of Computational Physics, Journal of Functional Analysis, SIAM on Uncertainty Quantification, SIAM on Imaging Sciences, SIAM on Optimization, SIAM on Mathematics of Data Science, SIAM on Multiscale Modeling and Simulation, SIAM on Numerical Analysis, SIAM on Control and Optimization, IMA Journal of Numerical Analysis, Analysis and Applications, Nature Machine Intelligence, Linear Algebra and Its Applications, European Journal of Applied Mathematics, Foundations of Data Science, Discrete and Continuous Dynamical Systems, Research in the Mathematical Sciences, Computational Methods in Applied Mathematics, Computers & Fluids, International Journal of Computer Mathematics
- **Conference**: Reviewer for NeurIPS, International Conference on Geometric Science of Information (GSI)

Conferences and Seminars

- Applied Mathematics Seminar, University of California, Berkeley, Nov 2025
- Scientific Computing and Numerics seminar, Cornell University (virtual), Oct 2025
- PDE & Applied Mathematics seminar, UC Riverside (virtual), Oct 2025
- Computational and Applied Mathematics Colloquium, Penn State University, Sep 2025
- Workshop on Scientific Machine Learning: Theory, Algorithms, and Applications, Purdue University, Sep 2025
- Co-organizing the minisymposium "Analysis of Langevin and related algorithms" in International Conference on Monte Carlo Methods and Applications, Illinois Institute of Technology, Chicago, July 2025
- Computational Bayesian Statistics Journal Club, Flatiron Institute, New York, May, 2025
- Purdue-PSU-Maryland joint mathematical data science seminar (virtual), April, 2025
- Applied Math Colloquium, UCLA, Los Angeles, Jan 2025
- Probability Seminar, University of Michigan, Ann Arbor, Jan 2025
- Colloquium Seminar, University of Michigan, Ann Arbor, Jan 2025
- Applied Math Colloquium, Duke University, Durham, Jan 2025
- CMOR Special Lecture, Rice University, Houston, Dec 2024
- Co-organizing the minisymposium "Efficient computation and learning with randomized sampling and pruning" at the SIAM Conference on Mathematics of Data Science (MDS24), Atlanta, Georgia, Oct 2024
- Recent Advances and Future Directions for Sampling, Yale University, New Haven, Oct 2024
- Data Science Seminar, Department of Mathematics, University of Minnesota, Oct 2024
- Rising Stars in Computing for Science and Engineering, Harvard University, Sep 2024
- Computational Bayesian Statistics Journal Club, Flatiron Institute, New York, Sep, 2024
- Applied Mathematics Seminar, Nanyang Technology University, July, 2024
- International Conference on Scientific Computation and Differential Equations, National University of Singapore, July, 2024
- Conference on Multiscale Modeling based on Physics and Data, IPAM, UCLA, April, 2024
- Columbia Applied Math Colloquium, January, 2024
- Workshop on Scientific Computing and Large Data, University of South Carolina, Dec, 2023
- Numerical Analysis Seminar (virtual), Hong Kong University, Dec, 2023
- Measure Transport, Diffusion Processes and Sampling Workshop, Flatiron, New York, Dec, 2023
- Yau Mathematical Science Center CAM seminar, Tsinghua University (virtual), Nov, 2023
- International Workshop on Recent Developments in Applied Mathematics and its Applications, Caltech, Nov, 2023
- Scientific machine learning seminar, Courant Institute, Oct, 2023
- 17th U. S. National Congress on Computational Mechanics, Albuquerque, New Mexico, July 2023
- Mathematical and Scientific Machine Learning, ICERM, Providence, June, 2023
- The AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, North Carolina, May 2023
- Southern California Applied Mathematics Symposium, University of California, Irvine, April 2023
- Peking University applied math colloquium (virtual), Feb, 2023.
- Columbia applied math colloquium (virtual), January, 2023.
- The International Conference on New Trends in Computational and Data Sciences, Caltech, December 2022.
- Co-organizing the minisymposium "Recent Advances in Kernel Methods for Computing and Learning" in SIAM Mathematics of Data Science, San Diego, September, 2022.

- Southern California Applied Mathematics Symposium, Harvey Mudd College, May, 2022
- Rough Path Interest Group, The Alan Turing Institute (virtual), April, 2022
- SIAM Uncertainty Quantification Minisymposium "New Developments in Gaussian Processes", Atlanta, April 2022
- CMX Student and Postdoc Seminar, Caltech, November, 2020
- Second Symposium on Machine Learning and Dynamical Systems, Fields Institute (virtual), September, 2020
- Bernoulli-IMS One World Symposium (virtual), August, 2020
- Oberwolfach Seminar: Beyond Numerical Homogenization, June, 2019
- Machine Learning for Multiscale Model Reduction Workshop, Harvard University, March, 2019
- Mathematical Model and Computation of Nonlinear Problems, Tsinghua Sanya International Mathematics Forum, January, 2018
- Youth Forum in the 15th Annual Meeting of CSIAM, Qingdao, China, October, 2017

Computer Skills

Professional experiences in MATLAB, Python, Julia.

Languages

English (fluent), Chinese (native)