Haoxuan (Steve) Chen

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Education

- **Stanford University** — **Stanford, CA, USA**
  Ph.D. Candidate — *2022.09 – present*
  Major: Computational and Mathematical Engineering (ICME)
  Ph.D. Advisor: Prof. Lexing Ying (Mathematics & ICME)

- **California Institute of Technology** — **Pasadena, CA, USA**
  Bachelor of Science — *2018.09 – 2022.06*
  Majors: Mathematics (PMA), Information and Data Sciences (CMS)
  Undergraduate Research Supervisor: Prof. Andrew M. Stuart (Computing and Mathematical Sciences)

Publications

(Below * is used to denote alphabetical ordering or equal contribution)

[P2] Yinuo Ren, **Haoxuan Chen**, Grant M. Rotskoff, Lexing Ying. **How Discrete and Continuous Diffusion Meet: Comprehensive Theoretical Analysis via a Stochastic Integral Framework**, *arXiv preprint arXiv:2410.03601 (2024).*

[C3] **Haoxuan Chen***, Yinuo Ren*, Lexing Ying, Grant M. Rotskoff. **Accelerating Diffusion Models with Parallel Sampling: Inference at Sub-Linear Time Complexity**, *The 38-th Conference on Neural Information Processing Systems (NeurIPS), 2024* (**Spotlight**).

[P1] **Haoxuan Chen**, Lexing Ying. **Ensemble-Based Annealed Importance Sampling**, *arXiv preprint arXiv:2401.15645 (2024).*

[C2] Jose H. Blanchet*, **Haoxuan Chen***, Yiping Lu*, Lexing Ying*. **When can Regression-Adjusted Control Variates Help? Rare Events, Sobolev Embedding and Minimax Optimality (alphabetical order)**, *The 37-th Conference on Neural Information Processing Systems (NeurIPS), 2023.*

[J1] Zongyi Li, Hongkai Zheng, Nikola B. Kovachki, David Jin, **Haoxuan Chen**, Burigede Liu, Kamyar Azizzadenesheli, Anima Anandkumar. **Physics-Informed Neural Operator for Learning Partial Differential Equations**, *ACM/IMS Journal of Data Science 1 (3), 1-27, 2024.*
(Short version presented at *ICML 2022 Workshop on Continuous Time Perspectives in Machine Learning* as a **Spotlight Talk**)

[C1] Yiping Lu, **Haoxuan Chen**, Jianfeng Lu, Lexing Ying, Jose H. Blanchet. **Machine Learning For Elliptic PDEs: Fast Rate Generalization Bound, Neural Scaling Law and Minimax Optimality**, *International Conference on Learning Representations (ICLR)*, 2022.
(Short version presented at *NeurIPS 2021 Workshop on the Symbiosis of Deep Learning and Differential Equations (DLDE)* as a **Spotlight Talk**)

Contributed Talks and Poster Presentations

The 38-th Conference on Neural Information Processing Systems (NeurIPS 2024) [Vancouver, Canada]	2024.12
ICME's 20-th Anniversary Research Symposium, Stanford University [Stanford, CA]	2024.11
SIAM Conference on Mathematics of Data Science (MDS24) [Atlanta, GA]	2024.10
Scientific Computing and Learning (SCALE) Lab	2024.07

Industrial Engineering and Management Sciences (IEMS), Northwestern University [online]
Student Operations Research (OR) Seminar, Stanford University [Stanford, CA] 2024.06
EnCORE Workshop on Computational vs Statistical Gaps in Learning and Optimization 2024.02
Institute for Pure and Applied Mathematics (IPAM), UCLA [Los Angeles, CA]
The 37-th Conference on Neural Information Processing Systems 2023.12
(NeurIPS 2023) [New Orleans, LA]
INFORMS Annual Meeting 2023 [Phoenix, AZ] 2023.10
Applied Math Seminar, Fudan University [Shanghai, China] 2023.07
ICME Xpo Research Symposium, Stanford University [Stanford, CA] 2023.05
International Conference on New Trends in Computational and Data Sciences, 2022.12
Caltech, [Pasadena, CA]
Causal Science Conference, Stanford University [Stanford, CA] 2022.11
The 11-th International Conference on Learning Representations (ICLR 2022) [online] 2022.04
Computational Mathematics + X (CMX) Seminar, 2022.02
Computing and Mathematical Sciences (CMS), Caltech [Pasadena, CA]
The Symbiosis of Deep Learning and Differential Equations (DLDE), Workshop at the 35-th 2021.12
Conference on Neural Information Processing Systems (NeurIPS 2021) [online]
Uncertainty Quantification (UQ) Group 2021.10
Center for Computational Science and Engineering (CCSE), MIT [online]

Professional Services

- **Journal Reviewer**: Journal of Scientific Computing, Journal of Computational Mathematics, Mathematics of Operations Research
- **Conference Reviewer**: International Conference on Learning Representations (ICLR, 2024, 2025), International Conference on Artificial Intelligence and Statistics (AISTATS, 2024, 2025), Conference on Neural Information Processing Systems (NeurIPS, 2024)
- **Conference Workshop Reviewer:** AI for Science: Scaling in AI for Scientific Discovery (AI4Science, ICML 2024), Structured Probabilistic Inference and Generative Modeling (SPIGM, ICML 2024), AI for Accelerated Materials Design (AI4Mat, NeurIPS 2024), Machine Learning and the Physical Sciences (ML4PS, NeurIPS 2024), Data-driven and Differentiable Simulations, Surrogates, and Solvers (D3S3, NeurIPS 2024), Mathematics of Modern Machine Learning (M3L, NeurIPS 2024)
- **Workshop/Mini-Symposium/Session Organizer:** Modern Scientific Machine Learning from a Statistical Perspective (MS 72 with Prof. Sven Wang) at SIAM Conference on Mathematics of Data Science (MDS24)

Visiting Positions

- **Massachusetts Institute of Technology** **Cambridge, MA, USA**
  Uncertainty Quantification Group *2021.07 – 2021.09*
  Host: Prof. Youssef M. Marzouk (Aeronautics and Astronautics & Computational Science and Engineering)

Teaching Experiences

As a Course Instructor/Lecturer:

Stanford University

- ICME Refresher Course: Applied Calculus, Fall 2023.

As a Course Assistant/Teaching Assistant:

Stanford University

- CME 108: Introduction to Scientific Computing with Machine Learning Applications (Undergraduate level), Fall 2023, Fall 2024.

California Institute of Technology

- CS/CMS/CNS/EE/IDS 155: Machine Learning and Data Mining (Graduate level), Winter 2022.
- CS/CMS/IDS 139: Analysis and Design of Algorithms (Graduate level), Winter 2022.
- ACM/CMS 117: Probability Theory and Stochastic Processes (Graduate level), Fall 2021.
- ACM/IDS 104: Applied Linear Algebra (Undergraduate level), Fall 2020.
- ACM 11: Introduction to Computational Science and Engineering (Undergraduate level), Spring 2020, Spring 2021.
- Math 2: Differential Equations (Undergraduate level), Fall 2019.

Honors and Awards

SIAM Student Travel Award (Conference on Mathematics of Data Science)	2024.10
The T. S. Lo Graduate Fellowship, Stanford School of Engineering (one year)	2022.09
Robert P. Balles Caltech Mathematics Scholars Award	2022.06
Henry M. MacCracken Graduate Fellowship, Courant Institute, NYU (declined)	2022.03
Presidential Graduate Fellowship, Department of Mathematics, MIT (declined)	2022.03
Class of '36 Summer Undergraduate Research Fellowship, Caltech	2021.06
Summer Undergraduate Research Fellowship, Caltech	2020.06
William Lowell Putnam Mathematical Competition - Rank 114	2019.12
Morgan Ward Summer Undergraduate Research Fellowship, Caltech	2019.06
William Lowell Putnam Mathematical Competition - Rank 120	2018.12
Harvard-MIT Math Tournament (HMMT), 20-*th* in individual ranking	2016.11
Princeton University Mathematics Competition (PUMaC), 7-*th* in individual ranking	2016.11