Shaocong Ma | Curriculum Vitae

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Education

❖ **Ph.D. in Electrical and Computer Engineering**

2019–2024, University of Utah

❖ **M.A. in Statistics**

2017–2019, University of California, Santa Barbara

❖ **B.S. in Statistics**

2013–2017, Sichuan University

Research Experiences

❖ **Postdoctoral Researcher**

2024.6–present, University of Maryland, College Park

Supervisor: Prof. Heng Huang

Developed sample- and memory-efficient machine learning algorithms and architectures, with results published as a Spotlight paper at top-tier conferences such as ICLR.

❖ **Research Internship**

2022.5–2022.8, Lawrence Livermore National Laboratory

Supervisor: Dr. Bhavya Kailkhura, Dr. James Diffenderfer

Designed a hybrid model, CFD-GCN-ZO, incorporating external black-box PDE solvers to tackle non-differentiability challenges in fluid flow predictions using Physics-Informed Graph Neural Networks.

❖ **Research Fellowship**

2019–2024, University of Utah

Supervisor: Prof. Yi Zhou

Designed fast and stable algorithms for large-scale machine learning and reinforcement learning, publishing on top conferences such as ICML, NeurIPS, and ICLR, as well as top journals like JMLR.

Publications

[1] Shaocong Ma, James Diffenderfer, Bhavya Kailkhura, et al. "Deep learning of PDE correction and mesh adaption without automatic differentiation". In: *Machine Learning* 114.61 (2025). https://doi.org/10.1007/s10994-025-06746-9.

[2] Shaocong Ma and Heng Huang. "Revisiting Zeroth-Order Optimization: Minimum-Variance Two-Point Estimators and Directionally Aligned Perturbations". In: *International Conference on Learning Representations (ICLR)* (2025).
Spotlight; https://openreview.net/forum?id=ywFOSIT9ik.

[3] Yi Zhou and Shaocong Ma. "Stochastic Optimization Methods for Policy Evaluation in Reinforcement Learning". In: *Foundations and Trends in Optimization* 6.3 (2024). https://www.nowpublishers.com/article/Details/OPT-045, pp. 145–192.

[4] Shaocong Ma, Ziyi Chen, Shaofeng Zou, and Yi Zhou. "Decentralized Robust V-learning for Solving Markov Games with Model Uncertainty". In: *The Journal of Machine Learning Research (JMLR)* (2023). https://www.jmlr.org/papers/v24/23-0310.html.

[5] Shaocong Ma, James Diffenderfer, Bhavya Kailkhura, and Yi Zhou. "End-to-End Mesh Optimization of a Hybrid Deep Learning Black-Box PDE Solver". In: *NeurIPS 2023 (ML4PS Workshop)* (2023). https://ml4physicalsciences.github.io/2023/files/NeurIPS_ML4PS_2023_8.pdf.

[6] Ziyi Chen, Shaocong Ma, and Yi Zhou. "Accelerated proximal alternating gradient-descent-ascent for nonconvex minimax machine learning". In: *2022 IEEE International Symposium on Information Theory (ISIT)* (2022). https://ieeexplore.ieee.org/document/9834691, pp. 672–677.

[7] Ziyi Chen, Shaocong Ma, and Yi Zhou. "Finding correlated equilibrium of constrained Markov game: A primal-dual approach". In: *Advances in Neural Information Processing Systems (NeurIPS)* 35 (2022). https://openreview.net/forum?id=2-CflpDkezH, pp. 25560–25572.

[8] Shaocong Ma, Ziyi Chen, Yi Zhou, Kaiyi Ji, and Yingbin Liang. "Data sampling affects the complexity of online sgd over dependent data". In: *Uncertainty in Artificial Intelligence (UAI)* (2022). https://openreview.net/forum?id=Sb4xBLUsqx9, pp. 1296–1305.

[9] Ziyi Chen, Shaocong Ma, and Yi Zhou. "Sample efficient stochastic policy extragradient algorithm for zero-sum markov game". In: *International Conference on Learning Representations (ICLR)* (2021). https://openreview.net/forum?id=IvepFxYRDG.

[10] Shaocong Ma, Ziyi Chen, Yi Zhou, and Shaofeng Zou. "Greedy-GQ with Variance Reduction: Finite-time Analysis and Improved Complexity". In: *International Conference on Learning Representations (ICLR)* (2020). https://openreview.net/forum?id=6t_dLShIUyZ.

[11] Shaocong Ma and Yi Zhou. "Understanding the impact of model incoherence on convergence of incremental SGD with random reshuffle". In: *International Conference on Machine Learning (ICML)* (2020). https://proceedings.mlr.press/v119/ma20e.html, pp. 6565–6574.

[12] Shaocong Ma, Yi Zhou, and Shaofeng Zou. "Variance-reduced off-policy TDC learning: Non-asymptotic convergence analysis". In: *Advances in Neural Information Processing Systems (NeurIPS)* 33 (2020). https://dl.acm.org/doi/10.5555/3495724.3496964, pp. 14796–14806.

Teaching Experiences

❖ **Teaching Assistant**

2020–2021, University of Utah

- ECE 3500: Fundamentals of Signals and Systems

❖ **Teaching Assistant**

2018–2019, University of California, Santa Barbara

- PSTAT 5A: Statistics; PSTAT 5LS: Statistics for Life Science; PSTAT 109: Statistics for Economics; PSTAT 172A: Actuarial Statistics; PSTAT 175: Survival Analysis

Professional Services

❖ **Conference Reviewer**: ICML; ICLR; NeurIPS; IEEE BigData; IJCAI; UAI; AAAI; AISTATS; RLC.

Best Reviewer Award (AISTATS 2025)

❖ **Journal Reviewer**: Transactions on Machine Learning Research (TMLR); IEEE Transactions on Signal Processing; IEEE Transactions on Networking (ToN); Numerical Algorithms; IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI); European Journal of Control.

❖ **Workshop Reviewer**: ICLR Blogpost.