BO ZHAO

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RESEARCH INTEREST

Parameter space symmetry, optimization, deep learning theory

EDUCATION

University of California San Diego *2021–present*
Ph.D. in Computer Science
· Advisor: Rose Yu

Georgia Institute of Technology *2019–2021*
M.S. Computer Science

University of Illinois at Urbana-Champaign *2016–2019*
B.S. Computer Science (with highest honors)
B.S. Physics (cum laude and departmental highest distinction)
Minor in Business

EXPERIENCE

NTT Research Cambridge, MA
Research Intern (Mentor: Hidenori Tanaka) *2024/6–2024/9*
· Studied representation and dynamics of emotion in large language models.

IBM Cambridge, MA
AI Intern (Mentor: Nima Dehmamy) *2022/6–2022/9*
· Studied parameter space symmetry and conserved quantities in gradient flow.

AWARDS & HONORS

NVIDIA Graduate Fellowship finalist *2025*

Qualcomm Innovation Fellowship finalist *2024*

DeepMind PhD Fellowship *2023*

PUBLICATIONS

Conference

[1] Understanding Mode Connectivity via Parameter Space Symmetry.
   Bo Zhao, Nima Dehmamy, Robin Walters, Rose Yu.
   International Conference on Machine Learning (ICML), 2025.

[2] Understanding the Difficulty of Solving Cauchy Problems with PINNs.
   Tao Wang, **Bo Zhao**, Sicun Gao, Rose Yu.
   The 6th Annual Learning for Dynamics and Control Conference (L4DC), 2024.

[3] Improving Convergence and Generalization Using Parameter Symmetries.
Bo Zhao, Robert M. Gower, Robin Walters, Rose Yu.
International Conference on Learning Representations (ICLR), 2024.
Oral presentation (top 1.2%).

[4] DYffusion: A Dynamics-informed Diffusion Model for Spatiotemporal Forecasting.
Salva Rühling Cachay, **Bo Zhao**, Hailey Joren, Rose Yu.
Advances in Neural Information Processing Systems (NeurIPS), 2023.

[5] Symmetries, Flat Minima, and the Conserved Quantities of Gradient Flow.
Bo Zhao*, Iordan Ganev*, Robin Walters, Rose Yu, Nima Dehmamy. (*equal contribution)
International Conference on Learning Representations (ICLR), 2023.

[6] Symmetry Teleportation for Accelerated Optimization.
Bo Zhao, Nima Dehmamy, Robin Walters, Rose Yu.
Advances in Neural Information Processing Systems (NeurIPS), 2022.

[7] LIMO: Latent Inceptionism for Targeted Molecule Generation.
Peter Eckmann, Kunyang Sun, **Bo Zhao**, Mudong Feng, Michael Gilson, Rose Yu.
International Conference on Machine Learning (ICML), 2022.

[8] Concentric Spherical Neural Network for 3D Representation Learning.
James Fox, **Bo Zhao**, Beatriz Gonzalez Del Rio, Sivasankaran Rajamanickam, Rampi Ramprasad, Le Song.
International Joint Conference on Neural Networks (IJCNN), 2022.

Journal

[1] Multiple Aging Mechanisms in Ferroelectric Deuterated Potassium Dihydrogen Phosphate.
Gregory A. Fields, Samuel F. Cieszynski, **Bo Zhao**, Kidan A. Tadesse, Mohammed A. Sheikh, Eugene V. Colla, and M. B. Weissman.
Journal of Applied Physics 125, 194102, 2019.

Preprints and Recent Workshops

[1] Emergence of Hierarchical Emotion Representations in Large Language Models
Bo Zhao*, Maya Okawa*, Eric J. Bigelow, Rose Yu, Tomer Ullman, Hidenori Tanaka.
In submission. Workshop version appeared at SciForDL 2024.

[2] Finding Symmetry in Neural Network Parameter Spaces.
Bo Zhao, Nima Dehmamy, Robin Walters, Rose Yu.
In submission. Workshop version appeared at UniReps 2024.

[3] Improving Learning to Optimize Using Parameter Symmetries.
Guy Zamir, Aryan Dokania, **Bo Zhao**, Rose Yu
Workshop on Neural Network Weights as a New Data Modality at ICLR 2025.

TEACHING

Teaching Assistant, CS 4641 Machine Learning, Georgia Tech	Fall 2020
Lead Course Assistant, CS 225 Data Structures, UIUC	Spring 2019
Course Assistant, CS 225 Data Structures, UIUC	Fall 2017, Spring 2018, Fall 2018

SERVICE

Workshop organizer
Weight Space Learning Workshop at ICLR 2025
Women in Machine Learning (WiML) Workshop at NeurIPS 2024

Reviewer
ICML (2022-2025), NeurIPS (2022-2024), ICLR (2024-2025), AISTATS (2024-2025), AAAI (2025)