BO ZHAO

Email: bozhao@ucsd.edu ⋄ Website: b-zhao.github.io

RESEARCH INTEREST

Deep learning theory, optimization, parameter space symmetry

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)

EXPERIENCE

IBM June - September 2022
AI Intern (Mentor: Nima Dehmamy) Cambridge, MA
· Studied parameter space symmetry and conserved quantities in gradient flow.

PUBLICATIONS

In submission

[1] Tao Wang, **Bo Zhao**, Sicun Gao, Rose Yu. Understanding the Difficulty of Solving Cauchy Problems with PINNs. *In submission*, 2024.

[2] **Bo Zhao**, Nima Dehmamy, Robin Walters, Rose Yu. Understanding Mode Connectivity via Parameter Space Symmetry. *In submission*, 2024.

Conference & Journal

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

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

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

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

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

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

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

Selected Workshop Abstracts
[1] **Bo Zhao**, Nima Dehmamy, Robin Walters, Rose Yu. Understanding Mode Connectivity via Parameter Space Symmetry. *Unifying Representations in Neural Models Workshop (UniReps)* at NeurIPS 2023.

[2] **Bo Zhao**, Iordan Ganev, Robin Walters, Rose Yu, Nima Dehmamy. Charting Flat Minima Using the Conserved Quantities of Gradient Flow. *Symmetry and Geometry in Neural Representations Workshop (NeurReps)* at NeurIPS 2022.

[3] **Bo Zhao**, Nima Dehmamy, Robin Walters, Rose Yu. Symmetry Teleportation for Accelerated Optimization. *Conference on the Mathematical Theory of Deep Neural Networks (DeepMath)*, 2022. **Contributed talk**.

TALKS

Symmetries, Flat Minima, and the Conserved Quantities of Gradient Flow

· Boston Computation Club	July 2023
· AI TIME	May 2023

AWARDS & FUNDINGS

DeepMind Fellowship, 2023-2024
Scholar Award (travel award), NeurIPS 2022

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

Reviewer for conferences
ICML (2022-2024), NeurIPS (2022-2023), ICLR (2024)

Student volunteer
NeurIPS 2023, ICML 2023, NeurIPS 2022 Women in Machine Learning Workshop

SKILLS

Programming   Python (PyTorch), C++/C, MATLAB