

BO ZHAO

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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

Conference & Journal

- [1] 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.
- [2] **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.
- [3] **Bo Zhao**, Nima Dehmamy, Robin Walters, Rose Yu. Symmetry Teleportation for Accelerated Optimization. *Advances in Neural Information Processing Systems (NeurIPS)*, 2022.
- [4] 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.
- [5] 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.
- [6] 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 & Preprints

- [1] **Bo Zhao**, Robert M. Gower, Robin Walters, Rose Yu. Improving Convergence and Generalization Using Parameter Symmetries. *Symmetry and Geometry in Neural Representations Workshop (NeurReps)* at NeurIPS 2023. arXiv:2305.13404.
- [2] **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.
- [3] Tao Wang, **Bo Zhao**, Sicun Gao, Rose Yu. Understanding the Approximation Gap of Neural Networks. *In submission*, 2023.
- [4] **Bo Zhao**, Jordan 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.
- [5] **Bo Zhao**, Nima Dehmamy, Robin Walters, Rose Yu. Symmetry Teleportation for Accelerated Optimization. **Contributed talk** at *Conference on the Mathematical Theory of Deep Neural Networks (DeepMath)*, 2022.

TALKS & PRESENTATIONS

Symmetries, Flat Minima, and the Conserved Quantities of Gradient Flow	
· Boston Computation Club	July 2023
· AI TIME	May 2023
Symmetry Teleportation for Accelerated Optimization	
· Conference on the Mathematical Theory of Deep Learning, contributed talk	Nov. 2022

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	Fall 2017 - Spring 2019

SERVICE

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

Volunteering
NeurIPS 2023, ICML 2023, NeurIPS 2022 Women in Machine Learning Workshop

SKILLS

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