

SIZHUANG HE

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RESEARCH INTEREST

Generative Modeling: Flow Matching, Diffusion, Discrete Diffusion, **Operator Learning:** Modeling Continuous Spatiotemporal Dynamics, Integral Equations, **Computational Biology:** Single-cell Transcriptomics Data Analysis, **LLMs and Agentic AI:** Autonomous Systems for Biological Discovery

Currently, I work on **discrete diffusion models on the finite symmetric group** and develop **LLM multi-agent systems** for single perturbation response prediction and DNA methylation data curation.

EDUCATION

Yale University

Ph.D. in Computer Science

New Haven, CT

Aug. 2024 – Present

- Advisor: Dr. David van Dijk
- Research Focus: Machine Learning for Computational Biology

University of Michigan, Ann Arbor

Bachelor of Science in Honors Mathematics (Minor in Computer Science)

Ann Arbor, MI

Sep. 2019 – May 2023

- Graduated with Highest Distinction
- GPA: 4.0 / 4.0

PUBLICATIONS

Non-Markovian Discrete Diffusion with Causal Language Models

Y. Zhang*, S. He*, et al. (NeurIPS 2025)

TANTE: Time-Adaptive Operator Learning via Neural Taylor Expansion

Z. Wu, S. Wang, S. Zhang, S. He, et al. (In Review)

Intelligence at the Edge of Chaos

S. Zhang*, A. Patel*, S. Rizvi, N. Liu, S. He, et al. (ICLR 2025)

COAST: Intelligent Time-Adaptive Neural Operators

Z. Wu, S. Zhang, S. He, et al. (AI4MATH Workshop at ICML 2025)

Scaling Large Language Models for Next-Generation Single-Cell Analysis

S. Rizvi*, D. Levine*, A. Patel*, S. Zhang*, E. Wang*, S. He, et al. (In Review)

CaLMFlow: Flow Matching using Causal Language Models

S. He*, D. Levine*, et al. (arXiv)

Operator Learning Meets Numerical Analysis: Improving Neural Networks through Iterative Methods

E. Zappala, D. Levine, S. He, et al. (arXiv)

* denotes equal contribution

HONORS & AWARDS

- **Fan Family Fellowship**, Yale University (2025)
- **Outstanding Achievement in Mathematics Award**, University of Michigan, Ann Arbor (2023)
- **James B. Angell Scholar**, University of Michigan, Ann Arbor (2023)
- **University Honors**, University of Michigan, Ann Arbor (2022, 2023)

Journal Reviewer

- Transactions on Machine Learning Research

Conference Reviewer

- International Conference on Learning Representations, 2026
- AI4MATH Workshop at International Conference on Machine Learning, 2025