Anthony Zhou

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research interests: neural PDE surrogates; engineering simulation; generative models; climate modeling

Education

PhD in Mechanical Engineering 2023 – Present
Carnegie Mellon University, Mechanical and AI Lab

- Advisor: Amir Barati Farimani
- Relevant Coursework: Fluid Dynamics, Continuum Mechanics, Finite Elements in Mechanics, Numerical Methods, Intermediate Statistics, Probabilistic Graphical Models, Physics-Based Animation of Fluids and Solids

BS in Mechanical Engineering 2019 – 2023
University of California, Berkeley (GPA 3.9/4.0, with honors)

- Minor in Electrical Engineering and Computer Science
- Relevant Coursework: Deep Learning, Introduction to Machine Learning, Efficient Algorithms and Intractable Problems, Finite Element Methods.

Experience

Research Intern Jun 2026 – Sep 2026
Flatiron Institute / Polymathic AI, New York City

- Supervised by Rudy Morel and Shirley Ho
- Investigated large-scale, pretrained models for steady-state CFD prediction

Research Intern May 2022 – Aug 2022
University of Delaware, Newark

- Supervised by Panagiotis Artemiadis as an NSF REU Fellow
- Designed and analyzed components for a variable stiffness treadmill, used to study lower-limb stroke rehabilitation

Engineering Intern May 2021 – Aug 2021
ATA Engineering, Berkeley

- Performed structural analyses for automotive and aerospace clients as a part of the Loads and Dynamics group.

Publications

Generative Neural Operators through Diffusion Last Layer
Sungwon Park, **Anthony Zhou**, HongJoong Kim, Amir Barati Farimani
ICML, 2026 arxiv, code

Hamiltonian Neural PDE Solvers through Functional Approximation
Anthony Zhou, Amir Barati Farimani
NeurIPS, 2025 arxiv, code

Text2PDE: Latent Diffusion Models for Accessible Physics Simulation
Anthony Zhou, Michael Schneier, John R. Buchanan Jr. Amir Barati Farimani
ICLR, 2025 arxiv, code

Predicting Change, Not States: An Alternate Framework for Neural PDE Surrogates
Anthony Zhou, Amir Barati Farimani
Computer Methods in Applied Mechanics and Engineering, 2025 arxiv, code

Generative Latent Neural PDE Solver using Flow Matching
Zijie Li, **Anthony Zhou**, Amir Barati Farimani
Machine Learning: Science and Technology, 2025 arxiv

Strategies for Pretraining Neural Operators
Anthony Zhou*, Cooper Lorsung*, AmirPouya Hemmasian, Amir Barati Farimani
TMLR, 2024 arxiv, code

Masked Autoencoders are PDE Learners
Anthony Zhou, Amir Barati Farimani
TMLR, 2024 arxiv, code

FaultFormer: Pretraining Transformers for Adaptable Bearing Fault Classification
Anthony Zhou, Amir Barati Farimani
IEEE Access, 2024 arxiv, code

The Variable Stiffness Treadmill 2: Development and Validation of a Unique Tool to Investigate Locomotion on Compliant Terrains.
Vaughn Chambers, Bradley Hobbs, William Gaither, Zachary Thé, **Anthony Zhou**, Chrysostomos Karakasis, Panagiotis Artemiadis
Journal of Mechanisms and Robotics, 2024 paper

* equal contribution

Preprints

Cross-Domain Pretraining for Neural CFD Surrogates
Anthony Zhou, Amir Barati Farimani, Shirley Ho, Rudy Morel arxiv, code

Benchmarking Stochastic Interpolants for Modeling Physical Systems
Anthony Zhou, Alexander Wikner, Amaury Lancelin, Pedram Hassanzadeh, Amir Barati Farimani arxiv, code

CaFA: Global Weather Forecasting with Factorized Attention on Sphere
Zijie Li, **Anthony Zhou**, Saurabh Patil, Amir Barati Farimani arxiv, code

BlastOFormer: Attention and Neural Operator Deep Learning Methods for Explosive Blast Prediction
Reid Graves, **Anthony Zhou**, Amir Barati Farimani arxiv

Talks

Rolling Diffusion Models for Multi-Decadal Climate Simulations, SIAM CSE Symposium, Pittsburgh Feb 2027

Generative Models for Physical Emulation, SciDiff Reading Group, Google Deepmind, Paris Dec 2025

Latent Diffusion Models for PDE Modeling, APS Division of Fluid Dynamics, Salt Lake City Nov 2024

Teaching

Teaching Assistant, Carnegie Mellon University 2025 – 2026

· Introduction to Deep Learning (Fall 2025, Spring 2026)

Technical Skills

ML: PyTorch, Lightning, Large-Scale GPU Training/Inference

Engineering: FEniCS, Ansys Fluent, Simcenter Nastran, SolidWorks

Service

Reviewer: NeurIPS, ICLR, ICML, Nature Machine Intelligence, Computer Methods in Applied Mechanics and Engineering, Journal of Computational Design and Engineering, SIAM Journal on Scientific Computing