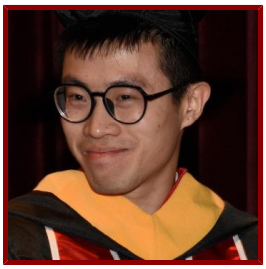
Stanford



# Hanfeng Zhai

Ph.D. Student in Mechanical Engineering, admitted Autumn 2023

## Bio

### BIO

I study mechanics of materials using computer simulations across multiple length and time scales. I am currently working on understanding how material defects and microstructures govern macroscopic mechanical behaviors. This includes constructing plasticity theory from statistics of dislocations, homogenization theory of digital rocks, and developing data-driven methods for multiscale simulations.

I did Research Interns at Mitsubishi Electric Research Labs (working on machine learning for dynamical and energy systems) and Tokyo Electron (working on computational modeling of semiconductor manufacturing).

I am currently teaching (TA & co-lecture) for Elasticity & Inelasticity (ME340). I served as the TA for Finite Element Method (ME335A).

### EDUCATION AND CERTIFICATIONS

- M.S., Cornell University , Mechanical Engineering (2023)
- B.S., Shanghai University , Theoretical and Applied Mechanics (2021)

### LINKS

- Personal Web: https://hanfengzhai.github.io

## Research & Scholarship

### LAB AFFILIATIONS

- Wei Cai, Micro & Nano Mechanics Group (9/6/2023)

## Professional

### WORK EXPERIENCE

- Research Intern - Institute of Mechanics, CAS (May 2021 - August 2021)
- Research Scientist Intern - Tokyo Electron (May 2023 - August 2023)
- Research Intern - Mitsubishi Electric Research Labs (June 15, 2025 - September 12, 2025)

# Publications

## PUBLICATIONS

- **Link statistics of dislocation network during strain hardening** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
  Akhondzadeh, S., Zhai, H., Jian, W., Sills, R. B., Bertin, N., Cai, W.
  2026; 210

- **Atomistic and data-driven insights into the local slip resistances in random refractory multi-principal element alloys** *INTERNATIONAL JOURNAL OF PLASTICITY*
  Jian, W., Kulathuvayal, A. S., Zhai, H., Raj, A., Yao, X., Su, Y., Xu, S., Beyerlein, I. J.
  2026; 199

- **Stress predictions in polycrystal plasticity using graph neural networks with subgraph training** *COMPUTATIONAL MECHANICS*
  Zhai, H.
  2025

- **Benchmarking inverse optimization algorithms for materials design** *APL MATERIALS*
  Zhai, H., Hao, H., Yeo, J.
  2024; 12 (2)

- **Computational and data-driven modelling of solid polymer electrolytes** *DIGITAL DISCOVERY*
  Wang, K., Shi, H., Li, T., Zhao, L., Zhai, H., Korani, D., Yeo, J.
  2023

- **Multiscale Mechanics of Thermal Gradient Coupled Graphene Fracture: A Molecular Dynamics Study** *INTERNATIONAL JOURNAL OF APPLIED MECHANICS*
  Zhai, H., Yeo, J.
  2023; 15 (06)

- **Controlling biofilm transport with porous metamaterials designed with Bayesian learning** *JOURNAL OF THE MECHANICAL BEHAVIOR OF BIOMEDICAL MATERIALS*
  Zhai, H., Yeo, J.
  2023; 147 (106127)

- **Computational Design of Antimicrobial Active Surfaces via Automated Bayesian Optimization** *ACS BIOMATERIALS SCIENCE & ENGINEERING*
  Zhai, H., Yeo, J.
  2023; 9 (1): 269-279

- **Predicting micro-bubble dynamics with semi-physics-informed deep learning** *AIP ADVANCES*
  Zhai, H., Zhou, Q., Hu, G.
  2022; 12 (3)

- **Controlling Chaos in Van Der Pol Dynamics Using Signal-Encoded Deep Learning** *MATHEMATICS*
  Zhai, H., Sands, T.
  2022; 10 (3)