Ziheng Zhang

zhang.13617@osu.edu | link7808.github.io | google scholar

Research Statement

My research interest lies in AI for science, spanning heterogeneous data to trustworthy knowledge. I work on machine learning, computer vision, multimodal understanding, and their applications in scientific discovery. I am interested in enriching data to reveal the contribution of each data point to machine learning models. My recent work centers on developing and interpreting multimodal foundation models for biodiversity and conservation and data-centric AI that handles heterogeneous sources, long-tailed data, and shifting distributions.

Education

The Ohio State University

B.S. in Computer Science and B.S. in Mathematics — Graduated on May 2025

Publications

Finer-CAM: Spotting the Difference Reveals Finer Details for Visual Explanation

Zhang, Z.*, Gu, J.*, Chowdhury, A., Mai, Z., Carlyn, D., Berger-Wolf, T., Su, Y., Chao, W.
Method merged into `pytorch-grad-cam` *(12.7k+ GitHub stars)*
CVPR 2025

BioCAP: Exploiting Synthetic Captions Beyond Labels in Biological Foundation Models

Zhang, Z., Ma, X., Chowdhury, A., Campolongo, E. G., . . . Berger-Wolf, T., Su, Y., Chao, W., Gu, J.
ICLR 2026

Prompt-CAM: A Simpler Interpretable Transformer for Fine-Grained Analysis

Chowdhury, A., Paul, D., Mai, Z., Gu, J., ***Zhang, Z.***, . . . Berger-Wolf, T., Su, Y., Chao, W.
CVPR 2025

Building Machine Learning Challenges for Anomaly Detection in Science

Campolongo, E.G., Chou, Y.T., Govorkova, E., Bhimji, W., Chao, W., Harris, C., Hsu, S.C.,. . . Wu, J., ***Zhang, Z.***
arXiv

INTR-VAL: INterpretable TRansformers VALidating Accuracy-Interpretability Trade-off

Paul, D., Chowdhury, A., ***Zhang, Z.***, Kitaguchi, D., Berger-Wolf, T., Sakurai, T., Chao, W.
Under Review

BeetleFlow: An Integrative Deep Learning Pipeline for Beetle Image Processing

Liu, F., Rayeed, S. M., Stevens, S., . . . ***Zhang, Z.***, Record, S., Stewart, C. V., Chao, W.
NeurIPS 2025 Workshop for Imageomics

Video Models Can Identify Identity-Specific Action Patterns, if Appearance is Masked

Lei, Y., Wu, B., Liu, F., Lee, C., ***Zhang, Z.***, . . . Chao, W.
Under Review

System Prompt Auditing for User-centric Large Language Model Systems

Lin, X., Zhu, S., Qian, C., Wang, T., Zhang, H., ***Zhang, Z.***, . . . Haupt, A., Marro, S., Pentland, A., Pei, J.
Under Review

MMSpec: A Comprehensive Benchmark and Unified Evaluation Platform for Speculative Decoding

Shen, H., Wang, X., Zhang, P., ***Zhang, Z.***, Zhang, J., Xiong, J., Liu, Z., Zhang, Y., Cao, H., Zhao, C., Zhang, M.
Under Review

PhyX: Does Your Model Have the "Wits" for Physical Reasoning?

Shen, H., Wu, T., . . . ***Zhang, Z.***, . . . Luo, P., Chen, W., Tao, C., Mao, Z., Wong, N.
Under Review

Research Experience

Research Assistant, Advisor: Prof. Wei-lun (Harry) Chao — Jun, 2024 – Jun, 2026

Research Assistant, Imageomics Institute, The Ohio State University — Jun, 2024 – Jun, 2026

Honors and Awards

Undergraduate Student Research Award (2 given each year) — 2025
Department of Computer Science and Engineering, The Ohio State University

Teaching Experience

CSE 2321 Teaching Assistant — Sep, 2023 – May, 2025
Foundations I: Discrete Structures TA at OSU, Columbus
Assisted in teaching a total of 7 sections, held office hours, and contributed to exam design.

Selected Projects

Open CLIP Fine Tune Guide — Nov, 2025
From-scratch fine-tuning framework for Open CLIP
• Architected a modular Open CLIP fine-tuning library from scratch, unifying Full/Partial tuning with PEFT methods (LoRA, CoCoOp, CLIP-Adapter) to facilitate efficient vision-language model adaptation.

Pytorch Finer CAM — Mar, 2025
Advanced AI Explainability for computer vision.
• Authored the official PyTorch implementation of Finer-CAM, seamlessly integrating a novel mechanism into the pytorch-grad-cam ecosystem to significantly improve saliency map precision for fine-grained visual recognition.

HDR Anomaly Challenge — Aug, 2024
A robust CodaBench framework for applying machine learning to complex biological mimicry detection.
• Engineered a comprehensive CodaBench evaluation pipeline to formalize a novel fine-grained anomaly detection task for biological hybrids, bridging computer vision with Imageomics via Dockerized scoring and baselines.

Academic Service

Anomaly Detection in Scientific Domains Workshop @ AAAI 25 — 2025
Student organizer

Imageomics workshop @NeurIPS 2025,CVPR 2026, ICML 2026 — 2026
Reviewer