

Xiaoyan Zhang

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[Homepage](#) | [Google Scholar](#) | [LinkedIn](#)

Research Interests: Generative AI, Multi-agent systems, Continual Learning

EDUCATION

University of Michigan

M.S. in Electrical and Computer Engineering

Ann Arbor, USA

Aug. 2026 - May. 2028 (Expected)

Anhui University

B.E. in Artificial Intelligence

Hefei, China

Sep. 2021 - Jun. 2025

- GPA: 4.34/5.0, Rank: 1/251
- Thesis: Small Object Detection in Fetal Ultrasound Images (Bachelor's Thesis with Honors)
- Coursework: Advanced Mathematics A(97), Linear Algebra A(95), Python Programming(99), Machine Learning(99), Digital Image Processing (bilingual)(98), Natural Language Processing(97), Software Project(96), etc.

RESEARCH EXPERIENCE

DeepThink Lab, University of Michigan

Research Assistant, advised by [Qing Qu](#)

Ann Arbor, USA

Jan. 2026 - Present

I. Robustness and Representation in Multi-agent Systems

- Investigated robustness, generalization, and safety properties across different multi-agent systems, focusing on performance variability, failure modes, and system-level bottlenecks.
- Analyzed how information is transmitted and represented across agents, with an emphasis on representation alignment and communication efficiency under distribution shifts.
- Exploring more robust communication protocols by designing unified latent channels for cross-modal communication, aiming to improve stability and alignment of shared representations.

II. Representation Analysis of Diffusion Language Models

- Conducted layer-wise representation analysis across diffusion, autoregressive, and encoder-based language models, examining representation geometry through anisotropy, intrinsic/effective rank, and sublayer dynamics.
- Evaluated representation quality on semantic similarity, clustering, and retrieval tasks, revealing substantial architecture- and layer-dependent differences in representation quality and downstream utility.

Department of Computer Science, Indiana University

Undergrad Intern, advised by [Jiangpeng He](#)

Remote

Jun. 2025 - Mar. 2026

I. Step-imbalance Continual Learning

- Identified and formulated the step-imbalance problem in class-incremental learning, highlighting limitations of existing balanced-task assumptions in real-world deployment.
- Proposed a novel asymmetric SVD-based adapter merging strategy that preserves dominant subspaces from large tasks while constraining noisy updates from small tasks.
- Implemented a direction-aware gating mechanism enabling fine-grained stability-plasticity control and constant-cost inference, which outperforms multi-adapter baselines under severe imbalance.

VIPER Lab, Purdue University

Undergrad Intern, advised by [Fengqing Zhu](#)

West Lafayette, USA

Jun. 2024 - Jan. 2025

I. Continual Learning and Visual Food Analysis

- Designed long-tailed continual learning benchmarks based on VFN186 to capture diverse food consumption patterns across populations.
- Conducted extensive benchmarking and comparative analysis across continual food recognition and 3D food reconstruction, evaluating baseline methods and synthesizing experimental results.
- Contributed to the analysis, visualization, and presentation of experimental findings.

II. Food Portion Estimation

- Contributed to the design of MFP3D, a monocular food portion estimation framework that integrates 3D point-cloud geometry with 2D RGB features to estimate food volume and energy content.
- Conducted extensive experiments and comparative analyses on MetaFood3D, demonstrating substantial improvements over existing portion estimation methods, including over 50% reduction in energy estimation error.

WORK EXPERIENCE

Creately AI

China

Intern – *Multi-Condition Image Generation*, advised by Yiren Song

Jul. 2025 - Nov. 2025

- Developed a multi-condition controllable image generation framework by extending state-of-the-art vision-language models with special tokens and customized attention masks, enabling precise extraction and recomposition of specified visual elements from reference images.
- Proposed an interleaved training strategy to jointly optimize generation and condition alignment, significantly improving controllability and compositional generalization.
- Constructed a large-scale multimodal dataset of 700k+ samples by generating paired text-image samples with LLMs and image editing pipelines.

ACADEMIC TRAINING

Nanyang Technological University

Singapore

Machine Learning Summer School

Jun. 2023 – Aug. 2023

- Completed coursework in machine learning and deep learning methodologies.

PUBLICATION LIST

- [1] **SIGMA: Selective-Interleaved Generation with Multi-Attribute Tokens**
Xiaoyan Zhang, Zechen Bai, Haofan Wang, Yiren Song.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.
- [2] **One Adapter for All: Towards Unified Representation in Step-Imbalanced Class-Incremental Learning**
Xiaoyan Zhang, Jiangpeng He.
arXiv preprint, 2026.
- [3] **Dual-Imbalance Continual Learning for Real-World Food Recognition**
Xiaoyan Zhang, Jiangpeng He.
CVPR 3rd. MetaFood Workshop, 2026. **Best Paper Award**
- [4] **See What I See, Know What I Think: Dense Latent Communication Across Heterogeneous Agents**
Siyi Chen, Xiaoyan Zhang, Meng Wu, Jonathan Tremblay, Valts Blukis, Stan Birchfield, Rene Vidal, Alvaro Velasquez, Sijia Liu, Qing Qu.
arXiv preprint, 2026.
- [5] **Physically Informed 3D Food Reconstruction: Methods and Result**
Jiangpeng He, Yuhao Chen, Gautham Vinod, Xiaoyan Zhang, Talha Ibn Mahmud, Umair Haroon, Ricardo Marques, Petia Radeva, Jiadong Tang, Dianyi Yang, Yu Gao, Zhaoxiang Liang, Yawei Jueluo, Chengyu Shi, Pengyu Wang, Pengcheng Xi, Alexander Wong, Edward Delp, Fengqing Zhu.
IEEE Journal of Biomedical and Health Informatics (JBHI), 2026.
- [6] **Long-Tailed Continual Learning for Visual Food Recognition**
Jiangpeng He, Xiaoyan Zhang, Luotao Lin, Jack Ma, Heather A. Eicher-Miller, Fengqing Zhu.
IEEE Transactions on Multimedia (TMM), 2025.
- [7] **CertainTTA: Estimating Uncertainty for Test-Time Adaptation on Medical Image Segmentation**
Xingbo Dong, Liwen Wang, Xingguo Lv, Xiaoyan Zhang, Hui Zhang, Bin Pu, Zhan Gao, Iman Yi Liao, Zhe Jin.
Information Fusion, 2025.
- [8] **Single Source Domain Generalization for Palm Biometrics**
Congcong Jia, Xingbo Dong, Yen Lung Lai, Andrew Beng Jin Teoh, Ziyuan Yang, Xiaoyan Zhang, Liwen Wang, Zhe Jin, Lianqiang Yang.
Pattern Recognition, 2025.
- [9] **Validating Privacy-Preserving Face Recognition under a Minimum Assumption**
Hui Zhang, Xingbo Dong, YenLung Lai, Ying Zhou, Xiaoyan Zhang, Xingguo Lv, Zhe Jin, Xuejun Li.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024.
- [10] **MFP3D: Monocular Food Portion Estimation Leveraging 3D Point Clouds (Oral)**
Jinge Ma, Xiaoyan Zhang, Gautham Vinod, Siddeshwar Raghavan, Jiangpeng He, Fengqing Zhu.
International Conference on Pattern Recognition (ICPR) MADiMa Workshop, 2024.

[11] **Learning Frequency and Structure in UDA for Medical Object Detection**
Liwen Wang*, **Xiaoyan Zhang***, Guannan He, Ying Tan, Shengli Li, Bin Pu, Zhe Jin, Wen Sha, Xingbo Dong.
Chinese Conference on Pattern Recognition and Computer Vision (PRCV), 2024.

PRESENTATIONS

CVPR 3rd MetaFood Workshop, <i>oral</i>	2026
• Topic: Dual-Imbalance Continual Learning for Real-World Food Recognition	
CVPR 2024, <i>poster</i>	2024
• Topic: Validating Privacy-Preserving Face Recognition under a Minimum Assumption	

SERVICE

Reviewer: ICLR ICBINB Workshop, Pattern Recognition

TEACHING EXPERIENCE

Teaching Assistant, ZJ52014 Introduction to Artificial Intelligence, <i>Anhui University</i>	Fall 2024
• Assisted with course preparation, student Q&A, and grading of assignments and exams.	
Teaching Assistant, ZX52340 Java Technology and Its Application (Practice), <i>Anhui University</i>	Fall 2024
• Led lab and tutorial sessions, demonstrated Java concepts, assisted with debugging, and graded assignments.	
Academic Peer Mentor, <i>Anhui University</i>	May 2023 – May 2024
• Collaborated with a six-member team to provide tutoring, study resources, and targeted academic support, including workshops for 120 students.	
• Contributed to a 7.6% increase in average final-exam scores, a 27% reduction in course failure rates, and a 38.18% decrease in academic warnings within one year.	

AWARDS AND HONORS

Best Paper Award, <i>CVPR 3rd MetaFood Workshop</i>	2026
Outstanding Graduate of Anhui Province, <i>Ministry of Education of Anhui Province</i>	2025
National Scholarship, <i>Ministry of Education of the People’s Republic of China</i>	2024
Outstanding Mentioned in the Second “Huashu Cup” International Mathematical Contest in Modeling	2024
Soong Ching Ling Future Grant for Discipline Focus Students (0.05%), <i>China Soong Ching Ling Foundation</i>	2024
Pacemaker to Merit Student, <i>Anhui University</i>	2022, 2023, 2024
Merit Student, <i>Anhui University</i>	2022, 2023, 2024
Excellent Student Scholarship, <i>Anhui University</i>	2023
Academic Science and Technology Scholarship, <i>Anhui University</i>	2023