Xi Xiao

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Research Interests

- My research primarily focuses on the **post-training stage** of large-scale models (LLMs, MLLMs, and LVMs), especially on **Parameter-Efficient Domain Adaptation** and **Model Quantization**. I also work on **AI4Healthcare**, especially building robust multimodal learning systems for medical image analysis and clinical decision support.

Education

- **University of Alabama at Birmingham** — *Jan 2024 – Present*
  Ph.D. Student in Computer Science — Birmingham, United States
- **Sichuan University Jincheng College** — *Aug 2019 – Jun 2023*
  B.Eng. in Artificial Intelligence — Chengdu, China

Professional Experience

- **Oak Ridge National Laboratory (ORNL)** [🌐] — *May 2025 – Present*
  Research Intern (Advisor: Dr. Xiao Wang) — Oak Ridge, United States
  - Conducted **pretraining of a tens-of-billions parameter foundation model (ORBIT-2)** on high-dimensional nonlinear climate datasets using the **Frontier exascale supercomputer**.
  - Incorporated **low-bit quantization (4–8 bit)** into the model training workflow to lower memory footprint and improve throughput, making large-scale ORBIT-2 pretraining more efficient on Frontier.
  - Optimized large-scale distributed training with **FSDP, DDP, and TILLING**, achieving significant improvements in training scalability and efficiency.
  - Applied **parameter-efficient fine-tuning (PEFT)** for downstream evaluation, enabling efficient adaptation of the foundation model to climate impact tasks.
  - **Output**: Two WACV 2026 and One SC papers (Best Paper Award, ACM Gordon Bell Prize Finalist).

Selected Publications

S=Submitted, J=Journal, C=Conference, P=Patent

[S.1] **Xi Xiao**, Xingjian Li, Yunbei Zhang, Cheng Han, Tianming Liu, Tianyang Wang, Xiao Wang, Min Xu. *Auto-Prompting: Layer-Specific Prompt Fusion Discovery via Differentiable Search*. **Submitted to CVPR 2026**.

[S.2] **Xi Xiao**, Xingjian Li, Cheng Han, Tianyang Wang, Guosheng Hu, Yunbei Zhang, Xiao Wang, Min Xu. *Prompting Large-Scale Vision Models with Cascaded Semantics*. **Submitted to CVPR 2026**.

[S.3] **Xi Xiao**, Chenrui Ma, Yunbei Zhang, Chen Liu, Lin Zhao, Tianyang Wang, Hao Xu. *Not All Directions Matter: Toward Structured and Task-Aware Low-Rank Adaptation*. **Submitted to ACL 2026**.

[S.4] **Xi Xiao**, Yunbei Zhang, Lin Zhao, Yiyang Liu, Xiaoying Liao, Zheda Mai, Xingjian Li, Xiao Wang, Hao Xu, Jihun Hamm, Xue Lin, Min Xu, Qifan Wang, Tianyang Wang, Cheng Han. *Prompt-based Adaptation in Large-scale Vision Models: A Survey*. **Submitted to TMLR**.

[J.1] Chenshen Huang*, Haoyun Xia*, **Xi Xiao***, Hong Chen, Yiqing Jiang, Yahui Lyu, Zhizhan Ni, Tianyang Wang, Ning Wang, Qi Huang. *Geometric Multi-Instance Learning for Weakly Supervised Gastric Cancer Segmentation*. **Accepted to npj Digital Medicine (IF: 17.0)**. (* Co-first author)

[C.1] **Xi Xiao**, Yunbei Zhang, Xingjian Li, Tianyang Wang, Yuxiang Wei, Xiao Wang, Jihun Hamm, Min Xu. *Visual Instance-aware Prompt Tuning*. **ACM MM 2025**.

[C.2] Hengjia Li*, Lifan Jiang*, **Xi Xiao***, Tianyang Wang, Hongwei Yi, Boxi Wu, Deng Cai. *MagicID: Hybrid Preference Optimization for ID-Consistent and Dynamic-Preserved Video Customization*. **ICCV 2025**. (* Co-first author)

[C.3] Chenrui Ma, **Xi Xiao**, Tianyang Wang, Xiao Wang, Hao Zhang, Yanning Shen. *CAD-VAE: Leveraging Correlation-Aware Latents for Comprehensive Fair Disentanglement*. **AAAI 2026**.

[C.4] Yuxiang Wei, Yanteng Zhang, **Xi Xiao**, Tianyang Wang, Xiao Wang, Vince Calhoun. *MoRE-Brain: Routed Mixture of Experts for Interpretable and Generalizable Cross-Subject fMRI Visual Decoding*. **NeurIPS 2025**.

[C.5] **Xi Xiao**, Yunbei Zhang, Thanh-Huy Nguyen, Ba-Thinh Lam, Janet Wang, Lin Zhao, Jihun Hamm, Tianyang Wang, Xingjian Li, Xiao Wang, Hao Xu, Tianming Liu, Min Xu. *Describe Anything in Medical Images*. **ICML Workshop 2025**.

[C.6] **Xi Xiao**, Yunbei Zhang, Xingjian Li, Tianyang Wang, Jihun Hamm, Xiao Wang, Min Xu. *Visual Variational Autoencoder Prompt Tuning*. **CVPR Workshop 2025**.

[C.7] **Xi Xiao**,Yunbei Zhang, Janet Wang, Lin Zhao, Yuxiang Wei, Hengjia Li, Yanshu Li, Xiao Wang, Swalpa Kumar Roy, Hao Xu, Tianyang Wang. *RoadBench: A Vision-Language Foundation Model and Benchmark for Road Damage Understanding*. **WACV 2026**.

[C.8] **Xi Xiao**,Zhuxuanzi Wang, Mingqiao Mo, Chen Liu, Chenrui Ma, Yanshu Li, Smita Krishnaswamy, Xiao Wang, Tianyang Wang. *Self-Supervised Visual Prompting for Cross-Domain Road Damage Detection*. **WACV 2026**.

[C.9] **Xi Xiao**, Zhengji Li, Wentao Wang, Jiacheng Xie, Yuxiao Fan, Houjie Lin, Tianyang Wang, Min Xu. *TD-RD: A Top-Down Benchmark with Real-Time Framework for Road Damage Detection*. **ICASSP 2025**.

[C.10] Yuxiang Wei, Yanteng Zhang, **Xi Xiao**, Tianyang Wang, Xiao Wang, Vince Calhoun *4D Multimodal Co-attention Fusion Network with Latent Contrastive Alignment for Alzheimer's Diagnosis*. **WACV 2026**.

[C.11] Xiao Wang, Jong-Youl Choi, Takuya Kurihaya, Isaac Lyngaas, Hong-Jun Yoon, **Xi Xiao**, Ming Fan, Nasik Muhammad Nafis, Aristeidis Tsaris, Ashwin M. Aji, Maliha Hossain, Mohamed Wahib, Dali Wang, Peter Thornton, Prasanna Balaprakash, Moetasim Ashfaq, Dan Lu. *ORBIT-2: Scaling Exascale Vision Foundation Models for Weather and Climate Downscaling*. **SC 2025**. **[Best Paper Award, ACM Gordon Bell Prize Finalist]**.

[C.12] Hao Zhang, Bo Huang, Zhenjia Li, **Xi Xiao**, Hui Yi Leong, Zumeng Zhang, Xinwei Long, Tianyang Wang, Hao Xu. *Sensitivity-LoRA: Low-Load Sensitivity-Based Fine-Tuning for Large Language Models*. **Findings of EMNLP 2025**.

[C.13] Yanshu Li, Hongyang He, Yi Cao, Qisen Cheng, Xiang Fu, **Xi Xiao**, Tianyang Wang, Ruixiang Tang. *M²IV: Towards Efficient and Fine-grained Multimodal In-Context Learning in Large Vision-Language Models*. **COLM 2025**.

[P.1] Li Zhengji, **Xiao Xi**, Li Xinrui. (2023). *Road Surface Defect Detection Model Building Method, Detection Method, Storage Medium and Device*. China Patent No. 202211675037.5. Registration Date: 2022.12.26.

[P.2] Li Zhengji, **Xiao Xi**, Li Xinrui. (2023). *A Targeted Forest Fire Detection Algorithm for YOLO-ForestFire*. (Patent Pending).

[P.3] Li Zhengji, **Xiao Xi**, Li Xinrui. (2024). *A Pavement Disease Detection Method Based on CycleGAN and Improved YOLOv5*. (Patent Pending).

[P.4] Zhou Li, **Xiao Xi**, Ge Yuque. (2022). *A Security Trolley for Hand Trajectory Violence Detection Based on AI Technology*. China Patent No. 20222219620.1. Granted: 2022.05.24.

[P.5] Li Zhengji, Li Xinrui, Dai Changyi, **Xiao Xi**. (2022). *Forest Fire Detection Device and Its Collection Module*. China Patent No. 202222756942.5. Granted: 2022.10.19.

Honors and Awards

- **ACM Gordon Bell Prize Finalist** *2025*
- **SC Best Paper Award** *2025*
- **Tinker Research Grant ($5,000 USD), Thinking Machines Lab** *2025*

Academic Services

- **Conference Reviewer**
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026
  - Association for the Advancement of Artificial Intelligence (AAAI), 2026
  - Annual Conference on Neural Information Processing Systems (NeurIPS), 2025
  - International Conference on Machine Learning (ICML), 2025
  - ACM International Conference on Multimedia (ACM MM), 2025
  - International Conference on Neural Information Processing (ICONIP), 2024,2025
  - International Joint Conference on Neural Networks (IJCNN), 2025
  - International Conference on Artificial Neural Networks (ICANN), 2025
  - European Conference on Computer Vision (ECCV), 2024
- **Journal Reviewer**
  - IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
  - npj Digital Medicine
- **Area Chair**
  - IEEE International Conference on Pattern Recognition and Artificial Intelligence (PRAI), 2022
- **Professional Memberships**
  - IEEE Student Member
  - APNNS Member