Zhengfeng (Jeff) Lai, Ph.D.

Tel: +1 (530)-574-9480 | Email: zjujefflai@gmail.com | LinkedIn | Google Scholar

Current Position

ML Research Scientist, Apple AI/ML Nov. 2023 - Now
Team: Data & Machine Learning Innovation *Apple Park, Cupertino, CA*

Multimodal Large-Scale Pre-Training: CLIP (Vision Encoder), Multimodal LLM, Diffusion Model.

- CLOC: Contrastive Localized Language-Image Pre-Training [**ICML 2025**]
- Revisit Large-Scale Image-Caption Data in Pre-training Multimodal Foundation Models [**ICLR 2025**]
- VeCLIP: Improving CLIP Training via Visual-Enriched Captions [**ECCV 2024**]

Apple Intelligence and Foundation Model: Apple's foundation models.

- Apple Intelligence Foundation Language Models [Arxiv]
- MM1. 5: Methods, Analysis & Insights from Multimodal LLM Fine-tuning [**ICLR 2025**]
- MMAU: A Holistic Benchmark of Agent Capabilities Across Diverse Domains [**NAACL 2025 Findings**]

Video Foundation Model: online/offline video understanding and video generation.

- StreamBridge: Turning Your Offline Video Large Model into a Proactive Streaming Assistant [Arxiv]
- Breaking Down Video LLM Benchmarks: Knowledge, Spatial Perception, or True Temporal Understanding? [Arxiv]
- SlowFast-LLaVA-1.5: A Family of Token-Efficient Video Large Language Models for Long-Form Video Understanding [**COLM 2025**]
- SlowFast-LLaVA: A Strong Training-Free Baseline for Video Large Language Models [Arxiv]
- ETVA: Evaluation of Text-to-Video Alignment via Fine-grained Question Generation and Answering [**ICCV 2025**]
- STIV: Scalable Text and Image Conditioned Video Generation [**ICCV 2025**]

Education

University of California, Davis Davis, CA
Ph.D. in Electrical and Computer Engineering, advised by Prof. Chen-Nee Chuah *Sept. 2019 – Nov. 2023*

Zhejiang University Hangzhou, China
B.Eng. in Information Engineering *Sept. 2015 – June 2019*

2024 ECE Best Dissertation Award, 2024 College of Engineering Excellence in Graduate Student Research Award, EB1a Approved

Published/Accepted Papers

1. H-Y. Chen, **Z. Lai**, H. Zhang, X. Wang, M. Eichner, K. You, M. Cao, B. Zhang, Y. Yang, Z. Gan, "Contrastive Localized Language-Image Pre-Training," **ICML 2025**.
2. **Z. Lai**, H. Zhang, B. Zhang, W. Wu, H. Bai, A. Timofeev, X. Du, Z. Gan, J. Shan, C-N. Chuah, Y. Yang, M. Cao, "VeCLIP: Improving CLIP Training via Visual-enriched Captions," **ECCV 2024**.
3. **Z. Lai**, J. Chauhan, B. Dugger, C-N. Chuah, "Path-CLIP: Efficient Adaptation of CLIP for Pathology Image Analysis with Limited Data," **ECCV 2024**.
4. **Z. Lai**, J. Chauhan, D. Chen, B. Dugger, S-C. Cheung, C-N. Chuah, "Semi-Path: An Interactive Semi-supervised Learning Framework for Gigapixel Pathology Image Analysis", **Elsevier Smart Health 2024**.
5. **Z. Lai**, H. Bai, H. Zhang, X. Du, J. Shan, Y. Yang, C-N. Chuah, M. Cao, "Empowering Unsupervised Domain Adaptation with Large-scale Pre-trained Vision-Language Models," **WACV 2024**.
6. **Z. Lai**, S. Vesdapunt, N. Zhou, J. Wu, X. Li, C. Huynh, C-N. Chuah, "PADCLIP: Pseudo-labeling with Adaptive Debiasing in CLIP for Unsupervised Domain Adaptation," **ICCV 2023**.

7. **Z. Lai**, C. Wang, H. Gunawan, S-C. Cheung, and C-N. Chuah, "Smoothed Adaptive Weighting for Imbalanced Semi-Supervised Learning: Improve Reliability Against Unknown Distribution Data," **ICML 2022**. (**Won Participation Grant**)
8. **Z. Lai**, C. Wang, S-C. Cheung, and C-N. Chuah, "SaR: Self-adaptive Refinement on Pseudo Labels for Multiclass-Imbalanced Semi-supervised Learning," 2022 **CVPR** Workshop on Learning with Limited Labelled Data for Image and Video Understanding. (**Best Paper Award**)
9. **Z. Lai**, L. Cerny Oliveira, R. Guo, W. Xu, Z. Hu, K. Mifflin, C. DeCarlie, S-C. Cheung, C-N. Chuah, and B. N. Dugger, "BrainSec: Automated Brain Tissue Segmentation Pipeline for Scalable Neuropathological Analysis," **IEEE Access**, 2022.
10. **Z. Lai**, C. Wang, L. Cerny Oliveira, B. Dugger, S-C. Cheung, C-N. Chuah, "Joint Semi-supervised and Active Learning for Segmentation of Gigapixel Pathology Images with Cost-Effective Labeling," **ICCV 2021** Workshop on Computational Challenges in Digital Pathology.

Industrial Experience

ML Research Intern at Apple March 2023 – Sept. 2023
Team: AI/ML *Cupertino, CA*
- Foundation vision model, multimodal understanding.
- Data-centric approaches for large-scale pre-training.

Applied Scientist Intern at Amazon June 2022 – Sept. 2022
Team: Lab126 *Sunnyvale, CA*
- Unsupervised domain adaption with CLIP.
- Causal inference and counterfactual reasoning.

PhD Data Science Intern at Electronic Arts June 2021 – Sept. 2021
Advisor: Jason Park *Redwood city, CA*
- Designed a few-shot toxic object detection pipeline with transfer learning.
- Explored zero-shot learning for unseen classes in the dataset.

National Science Foundation's Innovation Corps Program (I-Corps) Jan. 2021 – Mar. 2021
Team with Dr. Heather Siefkes, Dr. Jim Swick, Pranjali Vadlaputi *Washington, D.C.*
- Successfully completed the requirements of I-Corps by finishing more than 100 interviews in pediatric field.
- Named as one of the inventors on a patent application **"Systems and Methods for Classifying Critical Heart Defects."**

Teaching & Mentoring Experience

Lead Teaching Assistant for EEC 193AB Sept. 2019 – Mar. 2021
University of California, Davis *Davis, CA*
- Helped develop and teach EEC 193 AB (AI Systems Senior Design) for two years.
- Independently hosted lab sessions and mentored four teams over 2 academic quarters.
- Designed three lab assignments involving classical ML algorithms (Logistic Regression, SVM), CNN and basic Python in the application of ML on health.

Summer Undergraduate Research Mentor June 2021 – Sept. 2021
University of California, Davis *Davis, CA*
- Mentored one undergraduate on website design for visualizing waveform from photoplethysmogram signals.
- Mentored one undergraduate on waveform artifact detection by using machine learning algorithms.
- Designed three lab assignments involving classical ML algorithms (Logistic Regression, SVM), CNN and basic Python in the application of ML on health.

Professional Services

Reviewer:

- NeurIPS 2021-2025
- ICML 2022 & 2023
- IEEE Transaction on Image Processing
- CVPR 2022-2025
- ICCV 2023, 2025
- ECCV 2024
- ICLR 2024-2025

Organizer/Co-Organizer:

- **2nd workshop on Vision-based InduStrial InspectiON (VISION) at ECCV 2024**

Technical Skills

Programming: Python, C/C++, Matlab
Developer Tools: Git, Docker, Google Cloud Platform, VS Code, Visual Studio, PyCharm
Frameworks: PyTorch, Tensorflow, Caffe, OpenCV, Scikit-Learn

Awards

- 2018 Interdisciplinary Contest In Modeling: Meritorious Winner
- Outstanding Senior Design Project Award of UC Davis, 2019
- The Best Senior Design of ISEE, ZJU in 2019: Multiple Objects Detection
- 2019 ZJU Overseas Senior Design Scholarship
- 2022 Smita Bakshi Digital Learning and Teaching Award
- 2022 ICML Participation Award
- 2022 CVPR Workshop **Best Paper Award**
- 2022 AANP R13 Grant Travel Award
- **2024 College of Engineering (COE) Excellence in Graduate Student Research Award**
- **2024 ECE Best Disseration Anil Jain Memorial Award**
- **2024 CVPR Doctoral Consortium**