Computer Science, University of Massachusetts Amherst, MA

+1 4132752620 | [lijunzhang@umass.edu](mailto:lijunzhang@umass.edu)

<https://zhanglijun95.github.io/resume/>

Lijun Zhang

**WORK EXPERIENCES**

June.2025 – Present

**Amazon Robotics,** Seattle, WA, USA

*Postdoc Scientist*

**Summary:** Conduct independent research bridging cutting-edge machine learning techniques with practical system-level applications.

May.2024-August.2024

**Dolby Laboratories,** Sunnyvale, CA, USA

*PhD Research Intern*

**Summary**: Create a universal solution to image restoration tasks with pre-trained diffusion models in a zero-shot manner.

* Designed an unsupervised learning-based image restoration framework to recover a given distorted image, e.g., blurry images or low-light images, using pre-trained image generation diffusion models.
* Restored details in distorted images even with complex distortion types, such as low-light blurry images, with real time performance.

May.2023-August.2023

**Amazon Robotics,** Seattle, WA, USA

*Applied Scientist II Summer Intern*

**Summary:** Design and provide multi-task solution to the multiple vision tasks involved in the Amazon Robotics Stow system.

* Designed a multi-task framework that can solve semantic segmentation, instance segmentation, depth estimation, and surface normal prediction simultaneously.
* Overcame the challenge from disjoint training datasets for different tasks and successfully constructed a multi-task model with high accuracy as single-task models and much lower latency and computations.

**EDUCATION**

Sept.2019 – May. 2025

Overall GPA: 4.0/4.0

**University of Massachusetts,** Amherst, Amherst MA, USA

*Ph.D. in the College of Computer Science*

Sept.2016 - Mar.2019

Overall GPA: 4.63/5.0

**Tongji University,** Shanghai, China

*M.Sc. in Software Engineering*

Sept.2012 - Jun.2016

Overall GPA: 4.78/5.0

**Tongji University,** Shanghai, China

*B.Eng. in* *Software Engineering*

**RESEARCH INTERESTS**

My research interests lie in *Automated Machine Learning Engineering and Computer Vision*. My current research focuses on developing multi-task models that achieve high task accuracy, small memory footprint, and low computation cost simultaneously for vision tasks. My previous works have spanned low-light image enhancement, image resolution, and image quality assessment.

**PUBLICATIONS**

* **Lijun Zhang**, Xiao Liu, Hui Guan, [Reimagining Parameter Space Exploration with Diffusion Models](https://arxiv.org/pdf/2506.17807), in EXAIT workshop at International Conference on Machine Learning (ICML), 2025.
* **Lijun Zhang**, Xiao Liu, Antoni Viros Martin, Cindy Xiong Bearfield, Yuriy Brun, Hui Guan, [Attack-Resilient Image Watermarking Using Stable Diffusion](https://arxiv.org/pdf/2401.04247v1.pdf), in Neural Information Processing Systems (NeurIPS), 2024.
* Kunjal Panchal, Nisarg Parikh, Sunav Choudhary, **Lijun Zhang**, Yuriy Brun, Hui Guan, [Thinking Forward: Memory-Efficient Federated Finetuning of Language Models](https://arxiv.org/pdf/2405.15551), in Neural Information Processing Systems (NeurIPS), 2024.
* Xiao Liu, **Lijun Zhang**, Hui Guan, [Information-Enhanced Graph Neural Network for Transcending Homophily Barriers](https://ieeexplore.ieee.org/abstract/document/10810421/), IEEE Access 2024.
* Qizheng Yang, Tianyi Yang, Mingcan Xiang, **Lijun Zhang**, Haoliang Wang, Marco Serafini, Hui Guan, [GMorph: Accelerating Multi-DNN Inference via Model Fusion](https://guanh01.github.io/files/2024eurosys-gmorph.pdf), European Conference on Computer Systems (EuroSys), 2024.
* Kunjal Panchal, Sunav Choudhary, Nisarg Parikh, **Lijun Zhang**, Hui Guan, [Flow: Per-instance Personalized Federated Learning](https://guanh01.github.io/files/2023flow.pdf), in Conference on Neural Information Processing Systems (NeurIPS), 2023.
* **Lijun Zhang**, Xiao Liu, Hui Guan, [A Tree-Structured Multitask Model Architectures Recommendation System](https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=10171463), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2023
* **Lijun Zhang**, Qizheng Yang, Xiao Liu, Hui Guan, [An Alternative Hard-Parameter Sharing Paradigm for Multi-Domain Learning](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10028984), IEEE Access, 2023.
* **Lijun Zhang**, Xiao Liu, Hui Guan, [AutoMTL: A Programming Framework for Automating Efficient Multi-Task Learning](https://arxiv.org/pdf/2110.13076.pdf), in Conference on Neural Information Processing Systems (NeurIPS), 2022.
* **Lijun Zhang**, Xiao Liu, Hui Guan, [A Tree-Structured Multi-Task Model Recommender](https://arxiv.org/pdf/2203.05092.pdf), in International Conference on Automated Machine Learning (AutoML), 2022.
* **Lijun Zhang**, Qizheng Yang, Xiao Liu, Hui Guan, [Rethinking Hard-Parameter Sharing in Multi-Domain Learning](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9859706), in IEEE International Conference on Multimedia and Expo (ICME), 2022.
* **Lijun Zhang**, Hui Guan, Yufei Ding, Xipeng Shen, Hamid Krim, [Reuse-centric K-means Configuration](https://www.sciencedirect.com/science/article/pii/S0306437921000430), in Information Systems, 2021.
* Hui Guan, Umang Chaudhary, Yuanchao Xu, Lin Ning, **Lijun Zhang**, and Xipeng Shen, [Recurrent Neural Networks Meet Context-Free Grammar: Two Birds with One Stone](https://guanh01.github.io/files/2021rnn.pdf), in IEEE International Conference on Data Mining (ICDM), 2021.
* Lin Zhang, **Lijun Zhang**, Xiao Liu, Ying Shen, Shengjie Zhao, Shaoming Zhang, [Zero-Shot Restoration of Back-lit Images Using Deep Internal Learning](https://dl.acm.org/doi/pdf/10.1145/3343031.3351069), in ACM International Conference on Multimedia (ACM MM), 2019.
* **Lijun Zhang**, Lin Zhang, Xiao Liu, Ying Shen, and Dongqing Wang, [Image exposure assessment: A benchmark and a deep convolutional neural networks based model](https://ieeexplore.ieee.org/abstract/document/8486569), in IEEE International Conference on Multimedia and Expo (ICME), 2018.
* **Lijun Zhang**, Lin Zhang, and Lida Li, [Illumination quality assessment for face images: a benchmark and a convolutional neural networks based model](https://link.springer.com/chapter/10.1007%2F978-3-319-70090-8_59), in International Conference on Neural Information Processing (ICONIP), 2017.

**PREPRINTS**

* Xiao Liu, **Lijun Zhang**, Deepak Ganesan, Hui Guan, [Communication-Efficient Multi-Device Inference Acceleration for Transformer Models](https://arxiv.org/pdf/2505.19342?), in ArXiv, 2025.
* **Lijun Zhang**, Xiao Liu, Kaleel Mahmood, Caiwen Ding, Hui Guan, [Dynamic Gradient Balancing for Enhanced Adversarial Attacks on Multi-Task Models](https://arxiv.org/pdf/2305.12066.pdf), in ArXiv, 2023.
* Yuezhou Sun, Wenlong Zhao, **Lijun Zhang**, Xiao Liu, Hui Guan, Matei Zaharia, [Toward Compact Parameter Representations for Architecture-Agnostic Neural Network Compression](https://arxiv.org/pdf/2111.10320.pdf), in ArXiv, 2021.
* **Lijun Zhang**, Xiao Liu, Erik Learned-Miller, Hui Guan, [SID-NISM: A Self-supervised Low-light Image Enhancement Framework](https://arxiv.org/pdf/2012.08707.pdf), in ArXiv, 2020.

**RESEARCH EXPERIENCES**

Sept.2023-May.2025

**Exploring Stable Diffusion Models**

*Research Assistant, Advised by Prof. Hui Guan, MLSys Lab, UMass Amherst*

**Summary**: Rapid evolution in deep generative models has led to methods capable of synthesizing high-quality, realistic images. As a representative, stable diffusion models become popular in both traditional and emerging computer vision tasks. We would like to explore whether powerful diffusion models could serve as an off-the-shelf tool for downstream tasks, and whether the philosophy of multi-task learning and the power of stable diffusion models could facilitate each other.

* Adapted well-trained stable diffusion models to image watermarking task without additional training process; our research demonstrates that stable diffusion is a promising approach to robust watermarking, able to withstand even stable-diffusion-based attacks. (A paper accepted to NeurIPS’24)
* Exploring possibility of efficiently generating parameters for multi-task models from single-task models, utilizing the generation power of stable diffusion models. (A paper accepted to EXAIT@ICML’25)

Oct.2020-June.2023

**Programming Systems for Efficient Multi-Task Learning**

*Research Assistant, Advised by Prof. Hui Guan, MLSys Lab, UMass Amherst*

**Summary:** A fundamental challenge in multi-task learning is to determine the set of parameters to share across tasks to achieve the best performance for tasks. Existing manually designed network architectures and learning-based methods have limitations on either task performance or application generality. There is a strong need to develop programming systems for efficient multi-task learning that overcome current issues.

* Conducted an empirical study on how to share model parameters in multi-domain learning and concluded insights that challenge the common practice in hard parameter sharing and promote an alternative parameter sharing strategy as a stronger baseline. (A paper published on ICME’22, IEEE Acess’23)
* Designed a tree-structured multi-task models recommender that explore the architecture design space completely and automatically in a white-box manner via building recursive space enumerator and reliable task accuracy estimator; our recommended multi-task architectures are competitive with state-of-the-art under specified computation budgets. (A paper published on AutoML’22, TNNLS’23)
* Proposed a programming framework that largely automates architecture search of multi-task models given an arbitrary backbone model and a set of tasks via compiler support and policy-architecture co-training; the framework could identify compact multi-task models that outperform state-of-the-art approaches in task performance. (A paper accepted by NeurIPS’22)

Jan.2020-June.2020

**Zero-shot Low-light Image Enhancement**

Jan.2018-June.2020

*Research Assistant, Advised by Prof. Erik G. Learned-Miller, Vision Lab, UMass Amherst*

*Prof. Lin Zhang, Computer Vision Lab, Tongji University*

**Summary:** To get rid of the restriction of using training data when conducting image restoration via neural networks, it is necessary to design self-supervised image enhancement approaches to restore the quality of any single back-lit image only relying on the visual information of the image itself.

* Proposed a self-supervised image decomposition network based on Retinex Theory, an image decomposition theory, which takes a low-light image and its histogram equalization image as only inputs for image illumination extraction and noise removal. (A preprint posted on ArXiv’20)
* Modeled the S-curve adjustment procedure in the back-lit image restoration with Markov Random Field (MRF) and proposed the first self-supervised learning solution to estimate the S-curve parameters that best fit the back-lit image; as an image-specific framework with low computation cost, the proposed method could be applied to video stream directly. (A paper published on ACMMM’19)

May.2018-Sept.2018

**No-reference Image Quality Assessment**

Jan.2016-Dec.2018

*Research Assistant, Advised by Prof. Lin Zhang, Computer Vision Lab, Tongji University*

**Summary:** No-reference image quality assessment aims to design computerized algorithms that can evaluate the quality of a given image without reference in consistency with the perception of human observers, which could be objective metrics for many image processing problems.

* Established an image exposure database containing real-scene images captured in various scenarios under seven exposure levels as well as artificial images generated via a proposed image illumination adjustment tool, based on which an algorithm towards automatic image exposure level assessment is designed as a baseline. (A paper published on ICME’18)
* Established a database of face images with various illumination patterns and proposed a CNN-based method to evaluate face images illumination quality in high consistency (SROCC 0.95) with human perception. (A paper published on ICONIP’17)

**RECOGNITION**

UMass Amherst CICS, MA, 2024

IBM, 2023-2024

NeurIPS, 2022

Conf-AutoML, 2022

UMass Amherst CICS, MA, 2020

Tongji University, Shanghai, 2016 & 2019

Education Committee, Shanghai, 2016 & 2019

Ministry of Education, China, 2018

UMass CICS PhD Dissertation Writing Fellowship

IBM PhD Fellowship

Scholar Award & Top Reviewer

Travel Grant Award

The Lori a. Clarke Scholarship

Best Undergraduate & Graduate Thesis

Outstanding Graduates in Shanghai

National Scholarship for Graduate Students