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My research focuses on the intersection of Computer Vision (CV) and Computer Graphics (CG). I did my Ph.D focused on 3D vision and computer graphics at Tsinghua University, where I was advised by Prof. Zhang Li.

I'm especially interested in 1) Neural Fields (robot navigation/robot manipulation/autonomous driving/digital human/thermal/underwater/etc.), 2) Large Vision-Language Models (training-free/efficient algorithms for the post-training of SAM/Diffusion Model/LLaVA/Qwen-VL/VLA/VLN/etc.), 3) Small Image/Video Processing Models (style transfer/super-resolution/denoising/relighting/retouching/etc.), and 4) AI for Sciences (neural field for medical data compression/etc.).

I have published over 50 papers on top-tier journals and conference proceedings. I also have about 30 PCT/US/EP patents approved for filing. Some of my works have been used in Intel GPU/CPU, Chris Lee's MV, and the opening ceremony of the Winter Olympic Games 2022.

## Education

- 2013-2019 **Ph.D Candidate of Information and Communication Engineering**, *Tsinghua University*, China,  
Research Topics: 3D Vision and Computer Graphics
- 2009-2013 **Bachelor of Electronic Information Engineering**, *Tianjin University*, China, Rank: 1/107

## Work Experience

- 2023/06- **Staff Researcher**, INTEL LAB, CHINA, Beijing  
2025/06 Research topic: Neural Fields, VLM, Image/Video Processing
- 2019/10- **Senior Researcher**, INTEL LAB, CHINA, Beijing  
2023/06 Research topic: Neural Fields, VLM, Image/Video Processing
- 2015/01- **Intern**, INTEL LAB, CHINA, Beijing  
2019/10 Research topic: 3D face reconstruction and tracking, image processing based on Deep Convolutional Neural Network
- 2014/07- **Summer Intern**, NEC RESEARCH, CHINA, Beijing  
2014/12 Research topic: Image classification and object detection based on Deep Convolutional Neural Network
- 2013/06- **Summer Intern**, INSTITUTE OF AUTOMATION, CHINESE ACADEMY OF SCI-  
2013/09 ENCES, Beijing  
Research topic: 3D reconstruction based on high-resolution light field images

## Skills

Basic JAVA, WEBGL

Intermediate PYTHON, LUA  
Advanced C,C++,CUDA,OPENGL,TORCH, PYTORCH

## — Languages

Chinese Mothertongue  
English Intermediate

*Con conversationally fluent*

## — Publication

## — Neural Fields

- [1] Real-time 3D Eyelids Tracking from Semantic Edges, Quan Wen, Feng Xu, Ming Lu, Jun-Hai Yong, ACM Transactions on Graphics (TOG), 2017
- [2] Emotion-preserving Blendshape Update with Real-time Face Tracking, Zhibo Wang, Jingwang Ling, Chengzeng Feng, Ming Lu, Feng Xu, IEEE Transactions on Visualization and Computer Graphics (TVCG), 2020
- [3] Semantically Disentangled Variational Autoencoder for Modeling 3D Facial Details, Jingwang Ling, Zhibo Wang, Ming Lu, Quan Wang, Chen Qian, Feng Xu, IEEE Transactions on Visualization and Computer Graphics (TVCG), 2022
- [4] Structure-aware Editable Morphable Model for 3D Facial Detail Animation and Manipulation, Jingwang Ling, Zhibo Wang, Ming Lu, Quan Wang, Chen Qian, Feng Xu, European Conference on Computer Vision (ECCV), 2022
- [5] NTO3D: Neural Target Object 3D Reconstruction with Segment Anything, Xiaobao Wei, Renrui Zhang, Jiarui Wu, Jiaming Liu, Ming Lu, Yandong Guo, Shanghang Zhang, Conference on Computer Vision and Pattern Recognition (CVPR), 2024
- [6] Superpixel-based Efficient Sampling for Learning Neural Fields from Large Input, Zhongwei Xuan, Zunjie Zhu, Shuai Wang, Haibing Yin, Hongkui Wang, Ming Lu, International Conference on Multimedia (MM), 2024
- [7] Graphavatar: Compact Head Avatars with GNN-Generated 3D Gaussians, Xiaobao Wei, Peng Chen, Ming Lu, Hui Chen, Feng Tian, Conference on Artificial Intelligence (AAAI), 2025
- [8] ThermalGaussian: Thermal 3D Gaussian Splatting, Rongfeng Lu, Hangyu Chen, Zunjie Zhu, Yuhang Qin, Ming Lu, Le Zhang, Chenggang Yan, Anke Xue, International Conference on Learning Representations (ICLR), 2025
- [9] SliceOcc: Indoor 3D Semantic Occupancy Prediction with Vertical Slice Representation, Jianing Li, Ming Lu, Hao Wang, Chenyang Gu, Wenzhao Zheng, Li Du, Shanghang Zhang, International Conference on Robotics and Automation (ICRA), 2025
- [10] PLGS: Robust Panoptic Lifting with 3D Gaussian Splatting, Yu Wang, Xiaobao Wei, Ming Lu,

Guoliang Kang, Transactions on Image Processing (TIP), 2025

[11] K-Buffers: A Plug-in Method for Enhancing Neural Fields with Multiple Buffers, Haofan Ren, Zunjie Zhu, Xiang Chen, Ming Lu, Rongfeng Lu, Chenggang Yan, International Joint Conference on Artificial Intelligence (IJCAI), 2025

[12] GazeGaussian: High-Fidelity Gaze Redirection with 3D Gaussian Splatting, Xiaobao Wei, Peng Chen, Guangyu Li, Ming Lu, Hui Chen, Feng Tian, International Conference on Computer Vision (ICCV), 2025

[13] EMD: Explicit Motion Modeling for High-Quality Street Gaussian Splatting, Xiaobao Wei, Qingpo Wuwu, Zhongyu Zhao, Zhuangzhe Wu, Nan Huang, Ming Lu, Ningning Ma, Shanghang Zhang, International Conference on Computer Vision (ICCV), 2025

[14] 3DRealCar: An In-the-wild RGB-D Car Dataset with 360-degree Views, Xiaobiao Du, Haiyang Sun, Shuyun Wang, Zhuojie Wu, Hongwei Sheng, Jiaying Ying, Ming Lu, Tianqing Zhu, Kun Zhan, Xin Yu, International Conference on Computer Vision (ICCV), 2025

## Large Vision-Language Models

[1] MoVE-KD: Knowledge Distillation for VLMs with Mixture of Visual Encoders, Jiajun Cao, Yuan Zhang, Tao Huang, Ming Lu, Qizhe Zhang, Ruichuan An, Ningning Ma, Shanghang Zhang, Conference on Computer Vision and Pattern Recognition (CVPR), 2025

[2] Beyond Text-Visual Attention: Exploiting Visual Cues for Effective Token Pruning in VLMs, Qizhe Zhang, Aosong Cheng, Ming Lu, Zhiyong Zhuo, Minqi Wang, Jiajun Cao, Shaobo Guo, Qi She, Shanghang Zhang, International Conference on Computer Vision (ICCV), 2025

[3] Beyond Attention or Similarity: Maximizing Conditional Diversity for Token Pruning in MLLMs, Qizhe Zhang, Mengzhen Liu, Lichen Li, Ming Lu, Yuan Zhang, Junwen Pan, Qi She, Shanghang Zhang, NeurIPS Submission, 2025

[4] FastInit: Fast Noise Initialization for Temporally Consistent Video Generation, Chengyu Bai, Yuming Li, Zhongyu Zhao, Jintao Chen, Peidong Jia, Qi She, Ming Lu, Shanghang Zhang, NeurIPS Submission, 2025

[5] AutoV: Learning to Retrieve Visual Prompt for Large Vision-Language Models, Yuan Zhang, Chun-Kai Fan, Tao Huang, Ming Lu, Sicheng Yu, Junwen Pan, Kuan Cheng, Qi She, Shanghang Zhang, NeurIPS Submission, 2025

[6] MC-LLaVA: Multi-Concept Personalized Vision-Language Model, Ruichuan An, Sihan Yang, Ming Lu, Renrui Zhang, Kai Zeng, Yulin Luo, Jiajun Cao, Hao Liang, Ying Chen, Qi She, Shanghang Zhang, Wentao Zhang, arXiv, 2025

[7] Concept-as-Tree: Synthetic Data is All You Need for VLM Personalization, Ruichuan An, Kai Zeng, Ming Lu, Sihan Yang, Renrui Zhang, Huitong Ji, Qizhe Zhang, Yulin Luo, Hao Liang, Wentao

Zhang, arXiv, 2025

[8] UniCTokens: Boosting Personalized Understanding and Generation via Unified Concept Tokens, Ruichuan An, Sihan Yang, Renrui Zhang, Zijun Shen, Ming Lu, Gaole Dai, Hao Liang, Ziyu Guo, Shilin Yan, Yulin Luo, Bocheng Zou, Chaoqun Yang, Wentao Zhang, NeurIPS Submission, 2025

## Small Image/Video Processing Models

[1] Decoder Network over Lightweight Reconstructed Feature for Fast Semantic Style Transfer, Ming Lu, Hao Zhao, Anbang Yao, Feng Xu, Yurong Chen, Li Zhang, International Conference on Computer Vision (ICCV), 2017

[2] A Closed-Form Solution to Universal Style Transfer, Ming Lu, Hao Zhao, Anbang Yao, Yurong Chen, Feng Xu, Zhang Li, International Conference on Computer Vision (ICCV), 2019

[3] Single Image Portrait Relighting via Explicit Multiple Reflectance Channel Modeling, Zhibo Wang, Xin Yu, Ming Lu, Quan Wang, Chen Qian, Feng Xu, ACM Transactions on Graphics (ToG), 2020

[4] Overfitting the Data: Compact Neural Video Delivery via Content-aware Feature Modulation, Jiaming Liu, Ming Lu, Kaixin Chen, Xiaoqi Li, Shizun Wang, Zhaoqing Wang, Enhua Wu, Yurong Chen, Chuang Zhang, Ming Wu, International Conference on Computer Vision (ICCV), 2021

[5] Deep Likelihood Network for Image Restoration With Multiple Degradation Levels, Yiwen Guo, Ming Lu, Wangmeng Zuo, Changshui Zhang, Yurong Chen, Transactions on Image Processing (TIP), 2021

[6] SamplingAug: On the Importance of Patch Sampling Augmentation for Single Image Super-Resolution, Shizun Wang, Ming Lu, Kaixin Chen, Jiaming Liu, Xiaoqi Li, Ming Wu, British Machine Vision Conference (BMVC), 2021

[7] Efficient Meta-Tuning for Content-Aware Neural Video Delivery, Xiaoqi Li, Jiaming Liu, Shizun Wang, Cheng Lyu, Ming Lu, Yurong Chen, Anbang Yao, Yandong Guo, Shanghang Zhang, European Conference on Computer Vision (ECCV), 2022

[8] Adaptive Patch Exiting for Scalable Single Image Super-Resolution, Shizun Wang, Jiaming Liu, Kaixin Chen, Xiaoqi Li, Ming Lu, Yandong Guo, European Conference on Computer Vision (ECCV Oral), 2022

[9] CABM: Content-Aware Bit Mapping for Single Image Super-Resolution Network with Large Input, Senmao Tian, Ming Lu, Jiaming Liu, Yandong Guo, Yurong Chen, Shunli Zhang, Conference on Computer Vision and Pattern Recognition (CVPR), 2023

[10] A Comprehensive Comparison of Projections in Omnidirectional Super-Resolution, Huicheng Pi, Senmao Tian, Ming Lu, Jiaming Liu, Yandong Guo, Shunli Zhang, International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023

[11] DanceU: Motion-and-Music-based Automatic Effect Generation for Dance Videos, Yanjie Pan, Yaru Du, Shandong Wang, Yun Ye, Yong Jiang, Zhen Zhou, Li Xu, Ming Lu, Yunbiao Lin, Jiehui Lu, International Conference on Multimedia and Expo (ICME), 2023

[12] HQRetouch: Learning Professional Face Retouching via Masked Feature Fusion and Semantic-aware Modulation, Gangyi Hong, Fangshi Wang, Senmao Tian, Ming Lu, Jiaming Liu, Shunli Zhang, International Conference on Multimedia and Expo (ICME), 2023

## AI for Sciences

[1] I-MedSAM: Implicit Medical Image Segmentation with Segment Anything, Xiaobao Wei, Jiajun Cao, Yizhu Jin, Ming Lu, Guangyu Wang, Shanghang Zhang, European Conference on Computer Vision (ECCV), 2024

[2] A Generalist Foundation Model and Database for Open-World Medical Image Segmentation, Siqi Zhang, Qizhe Zhang, Shanghang Zhang, Xiaohong Liu, Jingkun Yue, Ming Lu, ..., Guangyu Wang, Nature Biomedical Engineering (NBE), 2025

[3] Implicit Neural Image Field for Biological Microscopy Image Compression, Gaole Dai, Cheng-Ching Tseng, Qingpo Wuwu, Rongyu Zhang, Shaokang Wang, Ming Lu,..., Jianxu Chen, Shanghang Zhang, Nature Computational Science (NCS), 2025