

XIN CAI

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🎓 EDUCATION

The Chinese University of Hong Kong, Hong Kong, China 2023 – Present

Ph.D. in Information Engineering, expected June 2027 **Supervisor: Prof. Tianfan Xue**

University of Chinese Academy of Sciences (UCAS), Beijing, China 2020 – 2023

M.Eng. in Applied Computer Technology **Supervisor: Prof. Shiguang Shan**

University of Chinese Academy of Sciences (UCAS), Beijing, China 2016 – 2020

B.S. in Computer Science and Technology **Cumulative GPA: 3.90/4.00 Rank: 2/69**

🔍 RESEARCH INTERESTS

Generative Model: Unified model; Controllable editing and generation; Inverse problem with generative model

Computational Imaging and Photography: Image reconstruction; Image and video processing

3D Computer Vision: 3D reconstruction; rendering and generation

Applied Computer Vision Techniques: Gaze estimation; Emotion recognition

👥 RESEARCH EXPERIENCE

Research Intern **Tencent Hunyuan Foundation Model Team** Mar. 2026 – Present

- Topic: Unified video model and pixel diffusion.
- Tencent 2026 Project UP (Qingyun Program).

Research Scientist Intern **Adobe Research**, San Jose, CA, USA June. 2025 – Nov. 2025

- Topic: high compression ratio image tokenizer for generation.
- Worked with Zhoutong Zhang.

Research Scientist Intern **Adobe Nextcam**, San Jose, CA, USA June. 2024 – Sep. 2024

- Topic: mobile burst matting from the fusion of parallax cues.
- Worked with Marc Levoy's computational photography team.

Research Assistant **MMLab@CUHK**, Hong Kong, China Sep. 2023 – Present

- Topic: generative model for inverse imaging problems.
- Worked with Prof. Tianfan Xue.

📖 PUBLICATIONS

- Kaixiong Gong*, **Xin Cai***, Bin Lin, Hao Wang, Yunlong Lin, Mingzhe Zheng, Bohao Li, Jian-Wei Zhang, Miles Yang, Zhao Zhong, Liefeng Bo, Xiangyu Yue. "Twins: Learn to Predict Unified Representations with Focal Loss." International Conference on Machine Learning (ICML), 2026.
- **Xin Cai**, Jiawen Chen, Lars Jebe, Tianfan Xue, Zhoutong Zhang. "Parallax Portrait Matting." *under review*, 2026.
- **Xin Cai**, Zhiyuan You, Zhoutong Zhang, Tianfan Xue. "DA-VAE: Plug-in Latent Compression for Diffusion via Detail Alignment." IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.
- **Xin Cai**, Hailong Zhang, Chenchen Wang, Wentao Liu, Jinwei Gu, Tianfan Xue. "LenslessFace: An End-to-End Optimized Lensless System for Privacy-Preserving Face Verification." IEEE Transactions on Image Processing (TIP), 2026.
- **Xin Cai**, Zhiyuan You, Hailong Zhang, Wentao Liu, Jinwei Gu, Tianfan Xue. "PhoCoLens: Photorealistic and Consistent Reconstruction in Lensless Imaging." NeurIPS, 2024, **Spotlight**.

- **Xin Cai**, Jiabei Zeng, Shiguang Shan, Xilin Chen. “Source-free Adaptive Gaze Estimation with Uncertainty Reduction.” The IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023.
- **Xin Cai**, Jiabei Zeng, Shiguang Shan. “Landmark-aware Self-supervised Eye Semantic Segmentation.” IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021.
- **Xin Cai**, Boyu Chen, Jiabei Zeng, Jiajun Zhang, Yunjia Sun, Xiao Wang, Zhilong Ji, Xiao Liu, Xilin Chen, Shiguang Shan. “Gaze Estimation with an Ensemble of Four Architectures.” *arXiv:2107.01980*, 2021. (Technical report for the **winner** solution in ETH-XGaze Gaze Estimation Challenge@CVPR 2021)
- Junhao Zhuang, Shi Guo, **Xin Cai**, Xiaohui Li, Yihao Liu, Chun Yuan, Tianfan Xue. “FlashVSR: Towards Real-Time Diffusion-Based Streaming Video Super-Resolution.” IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.
- Zhiyuan You, Ke Wang, He Zhang, **Xin Cai**, Jinjin Gu, Tianfan Xue, Chao Dong, Zhoutong Zhang. “PhotoFramer: Multi-modal Image Composition Instruction.” IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.
- Chenjian Gao, Lihe Ding, **Xin Cai**, Zhanpeng Huang, Zibin Wang, Tianfan Xue. “LoRA-Edit: Controllable First-Frame-Guided Video Editing via Mask-Aware LoRA Fine-Tuning.” International Conference on Learning Representations (ICLR), 2026.
- Zhiyuan You, **Xin Cai**, Jinjin Gu, Tianfan Xue, Chao Dong. “Teaching Large Language Models to Regress Accurate Image Quality Scores using Score Distribution.” The IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2025.
- Zixuan Chen, Yujin Wang, **Xin Cai**, Zhiyuan You, Zheming Lu, Fan Zhang, Shi Guo, Tianfan Xue. “UltraFusion: Ultra High Dynamic Imaging using Exposure Fusion.” The IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2025, **Highlight, Best Demo Honorable Mention**.
- Zhiyuan You, Jinjin Gu, **Xin Cai**, Zheyuan Li, Kaiwen Zhu, Chao Dong, Tianfan Xue. “Descriptive Image Quality Assessment in the Wild.” IEEE Transactions on Image Processing (TIP), 2025.
- Lifan Xia, Yong Li, **Xin Cai**, Zhen Cui, Chunyan Xu, Antoni B Chan. “Collaborative Contrastive Learning for Cross-domain Gaze Estimation.” Pattern Recognition 161:111244, 2025.
- Ken Deng, Yuanchen Guo, Jingxiang Sun, Zixin Zou, Yangguang Li, **Xin Cai**, Yanpei Cao, Yebin Liu, Ding Liang. “DetailGen3D: Generative 3D Geometry Enhancement via Data-Dependent Flow.” 3DV, 2025.

TEACHING

<i>Teaching Assistant</i> , CSCI2100B Data Structures	Fall 2023, CUHK
<i>Teaching Assistant</i> , IERG2080/ESTR2306 – Introduction to Systems Programming	Spring 2024, CUHK
<i>Teaching Assistant</i> , IERG5670 – Computational Imaging Systems and Algorithms	Fall 2024, CUHK

SERVICES

Conference Reviewer: CVPR, ICCV, ECCV, NeurIPS, ICLR, AACL, ICML

Journal Reviewer: IEEE TPAMI, IEEE TIP, IEEE TCI, CVIU

HONORS AND AWARDS

Academy Scholarship of University of Chinese Academy of Science	2017, 2018 and 2019
The Tang Lixin Academic Excellence Scholarship	Jun. 2020
<i>1st Prize</i> , Award on ETH-XGaze Challenge	Jun. 2021
Merit Student of University of Chinese Academy of Sciences	2018, 2021 and 2023
Postgraduate Studentship	Mar. 2023
Outstanding Tutors Award	2024

SKILLS

- Programming Languages: Python == C > C++
- Framework: PyTorch > TensorFlow
- Development: FFmpeg, Qt, Git