Xuhai **Chen**

Shandong Province, China

Email | Homepage | Github | Google Scholar

"Our greatest glory is not in never falling, but in rising every time we fall."

Education

Zhejiang University — *Hangzhou, China*

M.S. in Control Science and Engineering — *Sep. 2022 - PRESENT*

TongJi University — *Shanghai, China*

B.S. in Electronics and Information Engineering — *Sep. 2018 - Jun. 2022*

Selected Publications

➤ **Contact Matrix: Enhancing Dance Motion Synthesis with Precise Interaction Modeling** — *Submitted to **CVPR'26***

Xuhai Chen, Zhi Cen, Huaijin Pi, Sida Peng, Yong Liu, Xiaowei Zhou

➤ **Better "CMOS" Produces Clearer Images: Learning Space-Variant Blur Estimation for Blind Image Super-Resolution** — ***CVPR'23***

Xuhai Chen, Jiangning Zhang, Chao Xu, Yabiao Wang, Chengjie Wang, Yong Liu

➤ **CLIP-AD: A Language-Guided Staged Dual-Path Model for Zero-Shot Anomaly Detection** — ***IJCAIW'24***

Xuhai Chen, Jiangning Zhang, Guanzhong Tian, Haoyang He, Wuhao Zhang, Yabiao Wang, Chengjie Wang, Yunsheng Wu, Yong Liu

Selected Research Projects

Dynamic 3D Scene Reconstruction with Diffusion-based Completion — *Ongoing*

Xuhai Chen, Lingjie Liu — *Jue. 2025 - PRESENT*

- **Motivation:** Filling occlusion-caused holes in dynamic 3D scene reconstruction with minimal computational resources.
- **Approach:** Designed a method to leverage a diffusion prior to naturally fill missing regions in dynamic 3D scenes, maintaining both spatial consistency with the original scene and temporal continuity across frames.

Contact-Aware Follower Motion Generation for Two-Person Dance — *Submitted to **CVPR'26***

Xuhai Chen, Zhi Cen, Huaijin Pi, Sida Peng, Yong Liu, Xiaowei Zhou — *Apr. 2024 - May 2025*

- **Motivation:** In reactive motion generation for dyadic dance, the complexity and frequency of physical interactions often lead to missing intended contacts or interpenetration artifacts between the dancer pairs.
- **Approach:** Introduced an explicit contact representation into a diffusion model with gradient guidance, improving physical realism and interaction coordination. Proposed a part-aware VQ-VAE that encodes body segments separately and decodes them jointly, improving motion representation learning even with limited data.

Space-Variant Blur Estimation for Blind Image Super-Resolution — ***CVPR'23***

Xuhai Chen, Jiangning Zhang, Chao Xu, Yabiao Wang, Chengjie Wang, Yong Liu — *Oct. 2021 - Nov. 2022*

- **Motivation:** The assumption of space-invariant degradation fails in many real-world scenarios, while existing methods addressing space-variant degradation rely on overly simplistic and unrealistic degradation simulations.
- **Approach:** Constructed two defocus blur datasets using the thin lens model. Observed that sharp semantic edges align with blur boundaries, and leveraged this information to guide blur kernel estimation, which also improved the restoration of fine structures in super-resolved images.

Zero-Shot Visual Anomaly and Novelty Detection (CVPRW Challenge 2023) — ***CVPRW'23** & **IJCAIW'24***

Xuhai Chen, Jiangning Zhang, Guanzhong Tian, Haoyang He, Wuhao Zhang, Yabiao Wang, Chengjie Wang, Yunsheng Wu, Yong Liu — *Jan. 2023 - Jun. 2023*

- **Motivation:** Although foundation models like CLIP excel at zero-shot classification, their performance ceiling remains limited when directly applied to dense prediction tasks such as anomaly segmentation.
- **Approach:** Developed a simple yet effective adaptation strategy with trainable linear layers on multi-level CLIP features, enabling anomaly segmentation while improving classification accuracy, achieving 1st Place in the zero-shot track, and resulting in a paper submitted to IJCAIW'24.

Research & Work Experience

Penn Computer Graphics Lab, the University of Pennsylvania — *Advisor: Prof. Lingjie Liu*

Research Intern, focusing on Dynamic 3D Scene Reconstruction — *July. 2025 - PRESENT*

State Key Laboratory of CAD&CG, Zhejiang University — *Advisor: Prof. Xiaowei Zhou, Prof. Sida Peng*

Research Intern, focusing on Reactive Motion Generation — *Apr. 2024 - Apr. 2025*

Advanced Perception on Robotics and Intelligent Learning Lab, Zhejiang University *Advisor: Prof. Yong Liu*

M.S. Student, focusing on Image Super-Resolution and Anomaly Detection *Nov. 2022 - Jun. 2025*

Academic Service

Conference reviewer NeurIPS, CVPR, AAAI

Journal reviewer IEEE Transactions on Multimedia (TMM)

Honors & Awards

Graduate

2023 National Scholarship

2023 Outstanding Student Honor, Zhejiang University

2024 Outstanding Student Honor, Zhejiang University

2023 Winner (Zero-shot Track), Honorable Mention (Few-shot Track), CVPR Visual Anomaly and Novelty Detection Challenge (VAND)

Undergraduate

2020 Outstanding Student Award, Tongji University

2022 Outstanding Graduate, Tongji University

2020 Meritorious Winner (Top 6%), Mathematical Contest in Modeling (MCM)

2020 2nd Place, Medical Robotics Track, China Robot Competition

2020 First Prize (Shanghai), Third Prize (National), “Challenge Cup” Extracurricular Academic & Technological Works Competition

Extracurricular Activities

2019-2021 Vice Minister, Student Council – Organized multiple college-level events and coordinated teams.

2019-2022 Class Monitor – Managed class affairs and served as liaison between students and faculty.

2018-2023 Host – Emceed 5 college and university-level ceremonies, demonstrating public speaking skills.