

# Yi-Ruei Liu

## Education

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**University of Illinois Urbana-Champaign** Aug. 2024 - Present  
*Master of Computer Science; GPA: 4.0/4.0* Champaign, IL

- Courses: Computer Vision, Applied Parallel Programming, Robot Learning, 3D Vision

**National Yang Ming Chiao Tung University** Sep. 2021 - Jan. 2025  
*Bachelor of Computer Science; GPA: 4.27/4.3* Hsinchu, Taiwan

- Courses: Deep Learning, Machine Learning, Edge AI, Computer Graphics.
- Ranked 1st out of 167 students in the Department of Computer Science.
- Phi Tau Phi Honor Society inductee (top 1% nationwide).

## Experience

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**AllU Lab, Academia Sinica** Jul. 2025 - Aug. 2025  
*Research Assistant (Advisor: Prof. Jun-Cheng Chen)* Taipei, Taiwan

- Authored a research paper on synthesizing camera effects from real-world videos.
- Led the project development, including dataset construction, method implementation, and evaluation.

**Comp Photo Lab, National Yang Ming Chiao Tung University** May. 2023 - Jun. 2024  
*Research Assistant (Advisor: Prof. Yu-Lun Liu)* Hsinchu, Taiwan

- Researched and implemented algorithms for 3D shape reconstruction from single-view images under dynamic lighting.
- Co-authored a research paper on dynamic scene reconstruction with specular objects, contributing to method development and experiment analysis.

## Publications

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**Skyfall-GS: Synthesizing Immersive 3D Urban Scenes from Satellite Imagery** arXiv 2025  
*Jie-Ying Lee, Yi-Ruei Liu, Shr-Ruei Tsai, Wei-Cheng Chang*  
*Chung-Ho Wu, Jiewen Chan, Zhenjun Zhao, Chieh Hubert Lin, Yu-Lun Liu*

- The first method to synthesize immersive, real-time navigable 3D urban scenes solely from multi-view satellite imagery.
- Enables state-of-the-art 3D urban city reconstruction with superior realism and quality.
- Contributed to core algorithm development and experiment design.

**Every Camera Effect, Every Time, All at Once:** NeurIPS 2025 Workshop on SpaVLE  
**4D Gaussian Ray Tracing for Physics-based Camera Effect Data Generation**

*Yi-Ruei Liu, You-Zhe Xie, Yu-Hsiang Hsu, I-Sheng Fang, Yu-Lun Liu, Jun-Cheng Chen*

- Proposed a novel pipeline to synthesize realistic videos with physically-correct camera effects from real-world videos using dynamic 3D Gaussian Splatting and Ray Tracing.
- Achieved superior reconstruction and synthesis quality to existing baselines.
- Led the overall project development, contributed to dataset construction, method implementation, and evaluation.

## **SpectroMotion: Dynamic 3D Reconstruction of Specular Scenes**

CVPR 2025 (Accepted)

*Cheng-De Fan, Chen-Wei Chang, **Yi-Ruei Liu**, Jie-Ying Lee, Jiun-Long Huang, Yu-Chee Tseng, Yu-Lun Liu*

- Proposed a novel method that combines dynamic 3D Gaussian splatting with physically-based rendering for accurate reconstruction of dynamic, specular scenes.
- Achieved state-of-the-art dynamic 3D reconstruction of specular scenes.
- Contributed to core algorithm development, implementation, and experiment design.

### *Skills*

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- Programming Languages: Python, C/C++, CUDA, bash, Javascript, SQL, MATLAB, Verilog.
- Frameworks and Tools: PyTorch, Git, PostgreSQL, Blender.
- Languages: Mandarin (Native), English (TOEFL 100/120), Japanese (JLPT N1)