Hao-Yu (Max) Hsu

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Research Interests

3D Computer Vision, Neural Rendering, Inverse Rendering, Multi-modal 3D Generation, Computer Graphics, AR/VR

Education

University of Illinois Urbana-Champaign (UIUC) *Aug. 2023 - May. 2025 (Expected)*

Master of Science in Computer Science **(Siebel Scholar '25, GPA: 4.0/4.0)** *Champaign, IL*

National Tsing Hua University (NTHU) *Sep. 2017 - Jun. 2021*

Bachelor of Science in Electrical Engineering **(top 1% student, GPA: 4.23/4.3)** *Hsinchu, Taiwan*

Publications (* indicates equal contribution)

[1] **Hao-Yu Hsu**, Zhi-Hao Lin, Albert J. Zhai, Hongchi Xia, Shenlong Wang. "AutoVFX: Physically Realistic Video Editing from Natural Language Instructions". *International Conference on 3D Vision (3DV), 2025.*

[2] **Hao-Yu Hsu***, Sheng-Yu Huang*, Yu-Chiang Frank Wang. "SPoVT: Semantic-Prototype Variational Transformer for Dense Point Cloud Semantic Completion". *Conference on Neural Information Processing Systems (NeurIPS), 2022.*

[3] Zhi-Hao Lin, Wei-Chiu Ma*, **Hao-Yu Hsu***, Yu-Chiang Frank Wang, Shenlong Wang. "NeurMiPs: Neural Mixture of Planar Experts for View Synthesis". *IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR), 2022.*

[4] Yu-Shan Huang, Sheng-Yu Huang, **Hao-Yu Hsu**, Yu-Chiang Frank Wang. "Interpreting Latent Representation in Neural Radiance Fields for Manipulating Object Semantics". *IEEE International Conference on Image Processing (ICIP), 2023.*

Research Experience

Physically Realistic Video Editing with Text Instructions [1] *Sep. 2023 - Present*

Graduate Research Assistant at Shenlong's Lab, UIUC *Advisor: Prof. Shenlong Wang*

- Developed a system that creates highly realistic dynamic visual effects (VFX) from natural language instructions.
- Leveraged 3D scene modeling techniques to estimate geometry, appearance, semantics, and lighting from a single video.
- Employed a physical simulator and renderer to create effects like rigid-body dynamics and particle effects.
- Demonstrated text-aligned, photorealistic video editing with superior physical realism compared to other methods.

Robot Learning on Object Assembly *Jun. 2022 - Feb. 2023*

Research Assistant at Robot Learning Lab, National Taiwan University *Advisor: Prof. Shao-Hua Sun*

- Developed a robot learning framework by leveraging multi-view observations for solving tasks like doing tangram puzzles and stacking blocks.

Point Cloud Semantic Completion on 3D Objects [2] *Feb. 2022 - Jun. 2022*

Research Assistant at Vision & Learning Lab, National Taiwan University *Advisor: Prof. Yu-Chiang Frank Wang*

- Proposed a point cloud semantic completion framework to complete partial point clouds of 3D objects.
- Exploited both geometry and semantic cues to construct a variational Transformer featuring part prototypes.
- Outperformed other methods **13%** on chamfer distance and **11%** on mIoU scores.

Novel View Synthesis on 3D Indoor Scenes [3] *Sep. 2021 - Feb. 2022*

Research Assistant at Vision & Learning Lab, National Taiwan University *Advisor: Prof. Yu-Chiang Frank Wang*

- Designed a novel 3D planar representation to effectively capture the geometry and appearance of 7 indoor scenes.
- Boosted indoor scene rendering time by **60x** with custom CUDA acceleration on parallel model inference.
- Outperformed NeRF method by **1.03** PSNR in extreme view extrapolation and by **0.68** PSNR in novel view synthesis.

Honors & Awards

2024	**Siebel Scholar, Class of 2025**, - awarded annually for academic excellence and demonstrated leadership to over 80 top students from the world's leading graduate schools.	*UIUC*
2021	**Phi Tau Phi Scholastic Honor Society Honorary Membership**, - Graduated top 1% in NTHU EE	*NTHU*
2017-2021	**Academic Achievement Award * 4**, - Top 5% GPA in each semester	*NTHU*

Teaching Experience

CS543 Computer Vision, UIUC *Aug. 2024 - Dec. 2024*

CS233 Computer Architecture, UIUC *Feb. 2024 - May. 2024*

Embedded System Laboratory 2020 Fall, NTHU *Feb. 2020 - Jun. 2020*