Rm 338, Hughes Aircraft Electrical Engineering Center, USC
Los Angeles, CA 90089, USA
(213) 271 8317
yhu57782@usc.edu
https://ergowho.github.io/
yue-hu-64561b253

Yue Hu

Education

01/2021–05/2026 (Expected) **Ph.D. in Computer Engineering (GPA 3.83/4.0)**, *University of Southern California*, Los Angeles, CA
Viterbi School of Engineering
Faculty Advisor: Prof. Peter Beerel

01/2021–12/2023 **MS in Computer Engineering (GPA 3.88/4.0)**, *University of Southern California*, Los Angeles, CA
Viterbi School of Engineering

09/2018–12/2020 **Ph.D. in Software Engineering (Transferred to USC)**, *Northwest University*, Xi'an, China
School of Information Science and Technology
Faculty Advisors: Prof. Dingyi Fang, Prof. Xiaojiang Chen

09/2013–06/2017 **B.S. in Computer Science and Technology (Graduated with Honors)**, *Northwest University*, Xi'an, China
School of Information Science and Technology

Research Interests

Computer Vision & Machine Learning: High-fidelity 3D Reconstruction, 3D vision, 3D geometry, 3D Gaussian Splatting, Neural Radiance Fields (NeRF), Simultaneous Localization and Mapping (SLAM), Structure from motion (SfM), Relighting
2D Object Detection: YOLO, DETR, and related architectures

Communication Systems: Wireless Application, Backscatter Communication, Passive Long-Range Low-Power Systems, LoRa-based IoT Networks, FPGA, Embedded System

Work Experience

05/2024–08/2024 **Institute for Creative Technologies**
- Role: Graduate Researcher Internship
- Instant LeRF: Language Embedded Fast 3D Scene Generation and Segmentation
- Developed a system combining 3D Gaussian splatting, CLIP, SLAM, Mast3R/Dust3R, Colmap

10/2023–05/2024
09/2024–Current **Institute for Creative Technologies**
- Role: Graduate Research Assistant
- Rapid Online Visualization Combining Dense Visual SLAM & 3D Gaussian Splatting
- High-Fidelity Point cloud rendering with Feature Splatting

Research Experience

10/2024–Present **FireLoc2.0: Few-Shot 3D Scene Refinement and Vegetation-Based Fuel Segmentation for Wildfire Mapping**
- Integration of spatial DEM data for enhanced 3D reconstruction and wildfire mapping.
- Adaptation and optimization of new imagery with pre-existing 3D scenes to refine and update the mapping system.

10/2023–10/2024 **Rapid Online Visualization Combining Dense Visual SLAM & 3D Gaussian Splatting**

- Developed and implemented a real-time 3D reconstruction and rendering framework by integrating DROID-SLAM with 3D Gaussian Splatting, featuring adaptive densification of point clouds, geometry-guided optimization, and a unified pipeline for dense monocular reconstruction with high fidelity and real-time performance.

09/2024–12/2024 **Instant LeRF: Real-time 3D Feature Field in a Minute**

- Accelerated 3D Reconstruction: Integrated DUST3R/MaSt3r and SLAM to achieve SfM with 3D features in under a minute, reduced processing time while maintaining dense point cloud quality.
- Open-Vocabulary 3D Segmentation on Clip: Developed a system combining 2D feature extraction with 3DGS, enabling few shot object segmentation, and support scene manipulation in 3D space based on arbitrary language queries.

07/2023–06/2024 **Samsung Research with USC: In-Pixel Computing Project**

- Designed, generated, and analyzed global shutter and rolling shutter datasets on Unreal Engine 5 sample city and analyzed the impact of rolling shutter results with YOLOv8 and DETR models.

01/2021–07/2023 **Wildfire Ember Detection and Dataset Generation**

- Generated synthetic data using the Unreal Engine 4 3D computer graphics game engine.
- Evaluated multi-target detection models, including Faster RCNN, Sparse RCNN, RetinaNet, DETR, and YOLOv7.

01/2023–10/2023 **FireLoc: Wildfire Intelligent Real-time Perimeter Mapping, Spotting Detection, and Deep Inspection System**

- Designed and implemented a simulation of wildfire propagation, rendering real-world terrain on Unreal Engine.
- Conducted wildfire mapping using historical wildfire data in a simulated environment.

2017–2018 **Passive Long-Distance Low-Power Communication System**

- Prototyped the system on Microsemi IGLOO nano FPGA (Libero SoC):
  - Designed the modulation module for LoRa signal backscatter tag.
  - Implemented blind modulation and band splicing for the LoRa signal.
  - Frequency mixing module and sensor information acquisition module.

Selected Publications (Citations: 368)

2025 Xu R., **Hu, Y.**, Meida, c., et al. "SOL-2DGS: Outdoor Scene Relighting" Under Dynamic Lighting Conditions with Differentiable Ray Tracer and Sunlight Modeling". *under review at* **SIGGRAPH 2025**.

2025 **Hu, Y.**, Rong, L., Meida, c., et al. "SplatMap: Online Dense Monocular SLAM with 3D Gaussian Splatting". *2025 ACM SIGGRAPH SYMPOSIUM ON INTERACTIVE 3D GRAPHICS AND GAMES(***I3D 2025***)*.

2024 **Hu, Y.**, Datta, G., Beerel, K., et al. "Let's Roll: Synthetic Dataset Analysis for Pedestrian Detection Across Different Shutter Types". **SiPS 2024**, *MIT, USA*.

2024 Liu, R., Xu, R., **Hu, Y.**, Chen, M., & Feng, A. (2024). "AtomGS: Atomizing Gaussian Splatting for High-Fidelity Radiance Field". **BMVC 2024**, *Glasgow, UK*.

2023 **Hu, Y.**, Ye, X., Liu, Y., et al. "FireFly: A Synthetic Dataset for Ember Detection in Wildfire". *The 5th Workshop on AI for Humanitarian Assistance and Disaster Response,* **ICCV 2023**, *Paris, France*.

2023 Fu, X., **Hu, Y.**, Sutrave, P., et al. "FireLoc: Low-latency Multi-modal Wildfire Geolocation". *The 22nd ACM Conference on Embedded Networked Sensor Systems (***SenSys 2024***), Hangzhou, China*.

2018 Peng, Y., Shangguan, L., **Hu, Y.**, et al. "PLoRa: A Passive Long-Range Data Network from Ambient LoRa Transmissions". **SIGCOMM 2018**, *Budapest, Hungary*. **(First student author)**

2018 Liu, C., Fang, D., **Hu, Y.**, et al. "EasyGo: Low-cost and Robust Geographic Opportunistic Sensing Routing in a Strip Topology Wireless Sensor Network". *Computer Networks*, Volume 143, 9 October 2018, Pages 191-205. (JCR Computer Science, Hardware & Architecture Q1)

2017 He, J., **Hu, Y.**, Liu, X., et al. "LiReT: A Fine-Grained Self-Adaption Device-Free Localization with Little Human Effort". *IEEE International Conference on Smart Computing* (pp. 1-3).

2016 **Hu, Y.**, Liu, C., Xu, D., Wang, W., Wang, A. "A Lightweight Robust Routing in Strip Wireless Sensor Network with Edge Detect Based Region Divided". In Proceedings of the 14th Annual International Conference on Mobile Systems, Applications, and Services Companion. **(MobiSys 2016)**, Singapore

2015 Liu, C., Fang, D., Chen, X., **Hu, Y.**, et al. "LSVS: Bringing Layer Slicing and Virtual Sinks to Geographic Opportunistic Routing in Strip WSNs". *IEEE Fifth International Conference on Big Data and Cloud Computing* (pp. 281-286). IEEE Computer Society.

Teaching Experience & Services

Conference Program Committee:

2024 ACM Conference on Embedded Networked Sensor Systems (*SenSys 2024*)

Conference Paper Reviewer:

2025 *SIGGRAPH 2025*: Technical Papers Reviewer

2023 *NeurIPS 2023*: SyntheticDataGenAI Workshop

2022 *NeurIPS 2022*: Workshop on Synthetic Data for Empowering ML Research

Graduate Teaching Assistant:

2023 EE450: Introduction to Computer Networks, University of Southern California (USC)

Mentorship:

2022 Viterbi Summer Institute (*VSI*), USC. Mentee: Xinan Ye (Now at ByteDance)

2023 Viterbi Summer Undergraduate Research Experience (*SURE*), USC. Mentee: Yifei Liu (Now M.S. student at CMU)

2024 Center for Undergraduate Research in Viterbi Engineering (CURVE) Fellowship, USC. Mentee: Justin Liu (USC MHI Undergraduate Scholarship)

Selected Honors & Awards

2024 SiPS2024 Students and Young Professionals Funding

2024–2025 Travel Grant for PhD Students and Postdoctoral Scholars

2018–2019 Second-class University Scholarship, Northwest University

2013–2018 First-class University Scholarship (**Top 10%**) every year, Northwest University

2017 Provincial Students' Platform for Innovation and Entrepreneurship Training Program *Outstanding Project (Project leader)*

2017 Excellent Student Source Scholarship (**3/190**), Northwest University

2017 Outstanding Graduates Award, Northwest University

2016 Interdisciplinary Contest in Modeling *Honorable Mention (***Top 15.35%***)*

2015/2016 'TI Cup' National Undergraduate Electronics Design Contest *Provincial Second Prize (twice)*

2015 Mathematical Contest in Modeling *Meritorious Winner (***Top 7.09%***)*

Skills

Frameworks & Tools: PyTorch, MMdetection, NeRFstudio, SDFstudio, Unreal Engine, Unity, Unix/Linux, GNU Radio, Universal Software Radio Peripheral (USRP)

Vision Models: 3DGS, NeRF, Dust3R/MaSt3r, CLIP, SLAM, YOLOv7, YOLOv8, DETR

Programming: Python, Verilog, C++, C, MATLAB, Git, SQL, Postgre, LaTeX