JIAYI WU

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EDUCATION

University of Maryland, College Park — *College Park, MD, US*

Ph.D in Computer Science — GPA:3.833/4.000 — *Aug. 2023- Present*

- Advisor: Prof. Yiannis Aloimonos

University of Florida — *Gainesville, FL, US*

M.S. (Thesis) in Electrical and Computer Engineering — GPA:3.83/4.00 — *Aug. 2021- May. 2023*

- Advisor: Prof. Md Jahidul Islam

Zhejiang Sci-Tech University (ZSTU) — *Hangzhou, CN*

B.E. in Mechatronic Engineering — GPA: 86/100 — *Sept. 2017- Jun. 2021*

- 2021 Outstanding Graduate, Zhejiang Sci-Tech University

PUBLICATIONS AND PATENTS

[1] ***Wu, Jiayi****, *Tianfu Wang**, *Md Abu Bakr Siddique, Md Jahidul Islam, Cornelia Fermuller, Yiannis Aloimonos, and Christopher A. Metzler. "Single-Step Latent Diffusion for Underwater Image Restoration." IEEE Transactions on Pattern Analysis and Machine Intelligence* ***(TPAMI)*** [Project Page] [IEEE Xplore] [Code]

[2] *Yuan, Dehao, Levi Burner,* ***Jiayi Wu****, Minghui Liu, Jingxi Chen, Yiannis Aloimonos, and Cornelia Fermüller. "Learning Normal Flow Directly From Event Neighborhoods" International Conference on Computer Vision* ***(ICCV 2025)*** [Pre-print] [Code]

[3] ***Wu, Jiayi****, Xiaomin Lin, Botao He, Cornelia Fermuller, and Yiannis Aloimonos. "ViewActive: Active viewpoint optimization from a single image." IEEE/RSJ International Conference on Intelligent Robots and Systems* ***(IROS 2025)*** [Pre-print]

[4] *Siddique, Md Abu Bakr,* ***Jiayi Wu****, Ioannis Rekleitis, and Md Jahidul Islam. "AquaFuse: Waterbody Fusion for Physics-Guided View Synthesis of Underwater Scenes." IEEE Robotics and Automation Letters* ***(RA-L)*** [Project Page] [Pre-print] [Demo]

[5] ***Wu, Jiayi****, Xiong, Tianyi*, He, Botao, Fermüller, Cornelia, Aloimonos, Yiannis, Huang, Heng, and A. Metzler, Christopher. " Event3DGS: Event-Based 3D Gaussian Splatting for High-Speed Robot Egomotion." Conference on Robot Learning* ***(CoRL 2024)*** [Project Page] [Pre-print] [Demo]

[6] ***Wu, Jiayi****, Lin, Xiaomin*, Negahdaripour, Shahriar, Fermüller, Cornelia, and Aloimonos, Yiannis. "MARVIS: Motion & Geometry Aware Real and Virtual Image Segmentation." IEEE/RSJ International Conference on Intelligent Robots and Systems* ***(IROS 2024)*** [IEEE Xplore] [Pre-print]

[7] ***Wu, Jiayi****, Yu, Boxiao, Islam, Md Jahidul. "3D Reconstruction of Underwater Scenes using Nonlinear Domain Projection."* ***Best Paper Award*** *at the IEEE Conference on Artificial Intelligence* ***(IEEE CAI 2023)*** [IEEE Xplore] [Poster] [Demo]

[8] *Yu, Boxiao, **Wu, Jiayi**, Islam, Md Jahidul. "UDepth: Fast Monocular Depth Estimation for Visually-guided Underwater Robots." IEEE International Conference on Robotics and Automation **(ICRA 2023)*** [IEEE Xplore] [Code] [Demo]

[9] ***Wu, Jiayi**. "Low-Cost Depth Estimation and 3D Reconstruction in Scattering Medium." **Master's Thesis**. 2023* [UFDC]

[10] *A. K. Roberts, **J. Wu**, A. Monsivais-Huertero, J. Judge, R. C. Moore and K. Sarabandi, "Microwave Backscatter Phenomenology of Corn Fields at L-Band Using a Full-Wave Electromagnetic Solver." IEEE Transactions on Geoscience and Remote Sensing **(IEEE TGRS)*** [IEEE Xplore]

[11] *A. Kaleo Roberts, Kamal Sarabandi, Jasmeet Judge, Alejandro Monsivais-Huertero, **Jiayi Wu**. "Validation of a Full-wave Backscatter Model for Corn Fields using Measurements from a Ground-based Scatterometer." IEEE International Geoscience and Remote Sensing Symposium **(IGARSS 2023)***

[12] ***Wu, Jiayi**. "Unmanned automobile automatic charging system and charging docking method." A **National Invention Patent** has been granted.* [CN113511087A]

[13] ***Wu, Jiayi**. "Stilt type deformation wheel." A **Utility Model Patent** has been granted.* [CN212400777U]

EXPERIENCES

Ph.D. Research in PRG Lab *University of Maryland, College Park, MD, US*

Teaching Assistant & Research Assistant *Aug. 2023- Present*

- Proposed ***SLURPP***, a single-stage latent diffusion model with dual-branch tailored for physically accurate scattering medium decomposition, achieving ~3dB PSNR gain and 200× speedup for underwater image restoration. **(accepted by TPAMI)**
- Proposed a point-based normal flow estimator using a local point cloud encoder to predict per-event flow, enabling sharp, robust, and transferable predictions with uncertainty quantification, and supporting an IMU-based egomotion solver for challenging scenarios. **(accepted by ICCV 2025)**
- Proposed ***ViewActive***, a novel framework for active viewpoint optimization that mimics human-like spatial reasoning to enhance robotic perception. **(accepted by IROS 2025)**
- Proposed ***Event3DGS***, an event-based 3D Gaussian Splatting method that achieves state-of-the-art reconstruction quality and significantly accelerates training and rendering. **(accepted by CoRL 2024)**
- Proposed ***MARVIS***, a cutting-edge solution for real-virtual image segmentation near water surfaces, effectively leveraging synthetic data and domain-invariant features. **(accepted by IROS 2024)**

Ph.D. Research Intern in Dolby Labs *Dolby Labs, Sunnyvale, CA, US*

Summer Internship (supervised by Dr. Guan-Ming Su) *May. 2025- Aug. 2025*

- Proposed a 3D live broadcasting solution for large-scale sports, integrating a 3D tracking foundation model prior to 4D sparse-view inverse rendering for high-fidelity scene reconstruction. **(Patent pending)**

Underwater 3D Vision Research Intern in RoboPI Lab *University of Florida, Gainesville, FL, US*

Master's Thesis *Jan. 2022- Jun. 2023*

- Proposed ***AquaFuse***, a physics-based waterbody fusion method for underwater imagery that preserves depth and object geometry, enabling geometry-consistent data augmentation and accurate 3D view synthesis with 94% depth and 90–95% structural similarity. **(accepted by RA-L)**
- Proposed a 3D underwater reconstruction pipeline using pixel-wise depth guidance for sparse-to-semi-dense point clouds, reducing 2D feature reliance and achieving 3× faster inference with higher reconstruction accuracy. **(Best Paper Award at IEEE CAI 2023)**
- Formulated a robust and efficient monocular depth estimation model named ***UDepth***, by incorporating underwater domain knowledge into its supervised learning pipeline. **(accepted by ICRA 2023)**

Digital Audio and Video Algorithm Engineer *Vobile, Santa Clara, CA, US*

R&D Summer Internship (supervised by Dr. Jian Zhao, CTO of Vobile, Inc.) *May. 2022- Aug. 2022*

- Developed and implemented a learning-based video retrieval system based on global feature and local feature fusion. And also wrote the user manual and targeted model performance optimization guidelines document of the system.
- Conducted a number of qualitative phase-shift auditory tests and found a relationship between the phase-shift cases and the psychoacoustic model. Upgraded the audio fingerprint encoding algorithm based on the classic psychoacoustic model. The upgraded algorithm can encode not only the sound pressure level of the audio fingerprint but also the threshold of its phase shift. (Implemented in C and MATLAB)

Python Toolkit Development in Remote Sensing Lab *University of Florida, Gainesville, FL, US*

Graduate Student Assistant *Jan. 2022- Jan. 2023*

- Completed 3D model generation code packages for corn and soybean plants, the packages can load data from the database and automatically generate 3D models of plants in large batches.
- Toolkit updates and optimizations for speed and data irregularities.
- 3 papers ***accepted by IGARSS 2023, IEEE TGRS and IEEE JSTARS***.

HONORS & AWARDS

SCHOLARSHIPS

UMIACS Fellowship	2024
UF Herbert Wertheim College of Engineering Engineering Achieve Award	2022 | 2021
Zhejiang Government Scholarship	2020 | 2018
First Class School Financial Aid for Overseas Exchange Program	2019

COMPETITIONS

Individual first prize in the National University Graduate Design Competition (Only two people won this award nationwide)	06/2021
Provincial First Prize of National 3D Digital Innovative Design Competition	10/2019
Second Prize of National 3dds Competition Classic	09/2019
Third Prize of The 16th Zhejiang Province Mechanical Design Competition for College Student	06/2019
Third Prize of The *Challenge Cup* Extracurricular Academic Works Competition	04/2019

Second Prize of *Internet* + School Competition 04/2019

PROFESSIONAL SKILLS

PROGRAMMING

- **Proficient:** C, Python (TensorFlow, PyTorch, OpenCV, Open3d, etc), MATLAB
- **Familiar:** C++

SOFTWARES

- **Proficient:** MATLAB, ROS, SolidWorks, Ansys, SpaceClaim (by code), Altium Designer
- **Familiar:** Verilog, Catia, Labview

ACADEMIC SERVICES

- Reviewer for NeurIPS, ICML, ICLR, ICCV, CVPR, etc.
- Reviewer for ICRA, IROS, etc.
- Reviewer for TPAMI, RA-L, JOE, etc.