Feiran Wang

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Ann Arbor, Michigan - 48103, United States

Research Interests

- **3D Vision**: physically-based 3D Reconstruction, 3D Segmentation, visual SLAM, scene understanding
- **Embodied AI**: vision-language-action models, world models, sim-to-real transfer
- **Generative AI**: diffusion models, 3D generation, synthetic data for robotics

Education

- **University of Michigan Ann Arbor** — *Jan. 2026 - Present*
  Visiting Ph.D. Student, Advisor: Prof. Dawen Cai — Ann Arbor, United States
- **Illinois Institute of Technology** — *Jan. 2024 – Expected 2028*
  Ph.D. Student in Computer Science, Advisor: Prof. Yan Yan — Chicago, United States
- **University of Illinois Urbana-Champaign** — *Aug. 2022 – Dec. 2023*
  M.S. in Engineering, Advisor: Prof. David Forsyth — Urbana, United States
- **Shanghai University** — *Aug. 2018 – Jul. 2022*
  B.Eng. in Computer Science, Advisor: Prof. Xiaoqiang Li — Shanghai, China

Publications

C=Conference, J=Journal, U=Under Review

[U.1] **Feiran Wang**, Yan Yan. **RayMap3R: Inference-Time RayMap for Dynamic 3D Reconstruction**.

[C.1] **Feiran Wang**, Junyi Wu, Dawen Cai, Yuan Hong, Yan Yan. **CogniMap3D: Cognitive 3D Mapping and Rapid Retrieval**. **ICLR 2026**.

[C.2] **Feiran Wang***, Jiachen Tao*, Junyi Wu*, Haoxuan Wang, Bin Duan, Zongxin Yang, Yan Yan. **X-Field: A Physically Informed Representation for 3D X-ray Reconstruction**. **NeurIPS 2025 (★Spotlight★)**.

[C.3] **Feiran Wang**, Bin Duan, Jiachen Tao, Nikhil Sharma, Gaowen Liu, Dawen Cai, Yan Yan. **ZECO: ZeroFusion Guided 3D MRI Conditional Generation**. **MVA 2025 (Oral)**.

[J.1] **Feiran Wang**, Xiaoqiang Li, Jitao Liu. **PCCN-RE: Point Cloud Colourisation Network Based on Relevance Embedding**. *IET Computer Vision*, 2022.

Skills

- **Programming Languages:** Python, C++, C#, MATLAB, Javascript
- **Deep Learning & Training:** PyTorch, CUDA, TensorFlow, HPC Distributed Training
- **3D Vision & Reconstruction:** Open3D, OpenCV, SLAM, NeRF, 3DGS, VR
- **Robotics & Simulation:** ROS, MuJoCo, MoveIt, Blender, Unity
- **Cloud & Web:** Alibaba Cloud, Huawei Cloud, AWS, Flask, React, MySQL

Experience

- **Robotics Software Engineer** — *May 2023 - Aug. 2023*
  Foxconn Interconnect Technology, San Jose, CA, Intern
  - **Simulation Development Platform**: Built Blender-to-MuJoCo toolchain for automatic URDF generation with joint dynamics calibration and collision geometry definition for rapid prototyping.
  - **Motion Planning & Control**: Integrated MoveIt for trajectory planning and collision detection in MuJoCo; designed PD controllers with real-time state feedback for precise trajectory tracking; developed visualization dashboard for monitoring joint positions, velocities, and torques.
  - **Sim-to-Real Deployment**: Optimized control parameters through simulation-hardware closed-loop iteration; validated grasping tasks on low-cost 3D-printed hardware platform.
- **Algorithm Engineer** — *Apr. 2022 - Aug. 2022*
  NPLACE Startup, Shanghai, China, Intern
  - **Image-Based 3D Reconstruction**: Independently explored pure vision reconstruction as alternative to company's LiDAR solution; built end-to-end pipeline from multi-view image capture through MVS reconstruction to point cloud completion, providing lightweight solution for mobile 3D scanning.

- **MVS Network Optimization**: Applied network pruning and multi-scale feature aggregation to MVSNet; compressed model via knowledge distillation achieving 10% inference speedup.

- **Backend Engineer** *Sep. 2021 - Dec. 2021*
  ZIPLUNCH, Toronto, Canada, Intern
  - **Backend System Development**: Built restaurant order management platform backend; led database schema design and Flask RESTful API development for order lifecycle management and user authentication.
  - **Data Migration & Testing**: Designed and implemented database merge solution for legacy system migration with transaction control and validation mechanisms; built comprehensive unit and integration test suites ensuring code quality and system stability.

PROJECTS

- **3D Medical Image Analysis** *Sep. 2024 - Jan. 2026*
  University of Michigan Ann Arbor, Cai Lab Project Page
  - **3D Medical Data Generation**: Designed ControlNet-conditioned diffusion model for controllable 3D volume generation, achieving **50**× synthetic data expansion to address medical image annotation scarcity.
  - **Semi-Automatic Annotation Platform**: Built interactive 3D annotation tool based on nnInteractive and nnUNet with morphological processing and connected component analysis, improving annotation efficiency.
  - **Neuron Instance Segmentation**: Benchmarked nnUNet and Mask2Former on neuron data; adapted architectures and loss functions for elongated topology and dense interweaving characteristics; explored SAM3 foundation model with domain-specific fine-tuning for 3D medical segmentation.
  - **Large-Scale Distributed Training**: Deployed 240-GPU multi-node training environment on HPC cluster with MPI optimization for large-batch parallel processing.

- **Multimodal Agent System** *Dec. 2025 - Jan. 2026*
  Independent Development
  - **End-to-End AI Companion System**: Built from scratch a multimodal AI system integrating voice conversation, image understanding, and 3D virtual avatar; packaged as iOS native app.
  - **Large Model Deployment Optimization**: Deployed Qwen2.5-VL-72B with AWQ 4-bit quantization and multi-GPU auto-allocation, compressing memory from 150GB to 40GB.
  - **Streaming Voice Interaction**: Integrated FunASR speech recognition and GPT-SoVITS voice cloning for streaming TTS playback with response latency optimized to under 1 second.
  - **3D Virtual Avatar Engine**: Built Three.js + VRM rendering engine with automatic Mixamo skeleton to VRM mapping and 17 animation state transitions.

- **Depth Fusion Visual SLAM** *Feb. 2023 - May 2023*
  UIUC, *Advised by Prof. Shenlong Wang*
  - **Outdoor NeRF-SLAM**: Extended NICE-SLAM to outdoor scenes with learned monocular depth prediction providing geometric priors for NeRF implicit mapping on a single GPU.
  - **Pose Optimization & Validation**: Adopted quaternion-based pose estimation with sliding window for long-sequence tracking; validated on driving data with ZED 2 stereo camera.

- **Autonomous Vehicle Perception System** *Sep. 2022 - Dec. 2022*
  UIUC, *Advised by Prof. David Forsyth* Project Video
  - **End-to-End Autonomous Driving System**: Built complete ROS-based autonomous driving system on real vehicle platform covering perception, planning, and control.
  - **Multimodal Perception**: Integrated YOLO object detection for obstacle recognition and emergency braking; combined learning methods with Kalman filtering for robust lane tracking.
  - **Localization & Navigation**: Implemented LiDAR SLAM for environment mapping and localization.

ACADEMIC SERVICES & ACTIVITIES

Conference Reviewer: CVPR 2026, ICLR 2026, ICMR 2026 (PC), ICCV 2025, ICMR 2025, MVA 2025

Journal Reviewer: Computer Vision and Image Understanding (CVIU)

Invited Talk: Midwest Machine Learning Symposium (MMLS), 2025: Medical Imaging 3D Reconstruction

Competition: ALCF GPU Hackathon, Argonne National Laboratory, 2025

HONORS AND AWARDS

Cyrus Tang Scholarship, Illinois Institute of Technology 2024 – 2025
International Exchange Scholarship, Shanghai University 2020 – 2021
Academic Excellence Scholarship, Shanghai University 2019 – 2020