Hongru Yan

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EDUCATION

Tsinghua University — Beijing, China

Bachelor in Mathematics and Physics+Measurement Control Technology and Instruments — 2021.09-2025.07

- **GPA**:3.95 (Rank 2, with 8 courses A+ and 20 courses A)
- **Major Courses**: Programming Fundamentals (A 4.0), Fundamentals of Physics (1) (A+ 4.0), Mathematical Physics Equations (A+ 4.0), Data Structures and Algorithms (A+ 4.0), Design and Practice of Circuit System (A+ 4.0), Probability Theory (A 4.0)

ACADEMIC RESEARCH

Research Projects at UCSD

Instructed by Prof. Zhuowen Tu, Department of Cognitive Science at UCSD — 2024.06-2024.11

PhysEditing: Real-time Physics Aware Object Editing with 3D Gaussians (On-Going)

- Explored advanced Material Point Method(MPM) for more efficient and realistic simulation
- Proposed a two-stage framework for simulation of rigid-soft coupling

Epi-Inpainter: Learning Multi-view Aware 3D Inpainting via Epipolar Diffusion Prior

- Explored deep into implementing epipolar prior into the pipeline of generative model(i.e. NeRF)
- Proposed a novel method that seamlessly incorporates epipolar constraints with score distillation sampling, thus improving multi-view consistency and reducing artifacts
- Wrote the code and conducted nearly all the experiments and made the illustration
- Completed the project that as a team. We developed a masked encoder that leverages epipolar geometry for feature extraction across the two views, with the encoded features serving as conditions for a diffusion-based inpainter that produces the final inpainting results, conducted experiments that demonstrate the effectiveness of Epi-Inpainter in the 3D in-painting task, showing that it achieves competitive performance compared to state-of-the-art methods, with significantly faster convergence times due to its consistent multiview inpainting capability, and yielded a paper

Gaussian-Det: Learning Closed-surface Gaussians for 3D Object Detection

Instructed by Prof. Yueqi Duan, Department of Electronic Engineering at Tsinghua University — 2024.01-2024.05

- Utilized Gaussian splatting as scene representation for object detection with high accuracy and efficiency in an elegant way
- Proposed the use of closure as a major indicator of detection, balancing simplicity and correctness
- Proposed a framework named Closure Inference Module(CIM) to infer closure to find geometry clues in 3D object detection
- Completed the overall structure, wrote code, produced datasets, and accomplished the project paper.

ShadowNeRF: Learning Neural Radiance Field with Sight Degradation and Recovery

Instructed by Prof. Yueqi Duan, Department of Electronic Engineering at Tsinghua University — 2023.09-2023.11

- Proposed a method for sight degradation and recovery in neural rendering through pre-training and fine-tuning.
- Contributed to the idea, illustrations, code development, and experiment validation.
- Experimentally validated the effectiveness of the proposed method in downstream tasks like segmentation, detection, and rendering

Neural Rendering based on One-Point-One NeRF (OPONeRF)

Instructed by Prof. Yueqi Duan, Department of Electronic Engineering at Tsinghua University — 2023.05-2023.09

- Proposed OPONeRF to address the limitations of Neural Radiance Fields (NeRF) in handling scene changes
- Introduced a point-to-point NeRF approach for improved stability and rendering accuracy in dynamic scenes
- Developed a variational inference method to overcome computational and spatial resource challenges
- Conducted independent experiments, including perturbation tests, cross-scene rendering, and validation on simulated datasets

Construction of Multimodal System and Annotation of Multimodal Dataset

Department of Precision Instruments at Tsinghua University — 2023.04-present

- Constructed a multimodal system combining Dynamic Vision Sensor (DVS) and RGB camera to capture events triggered by object motion
- Simultaneous annotation of datasets containing event and color images from different cameras
- Played a crucial role in scene capture, algorithm optimization, and dataset annotation
- Significant workload in manual dataset annotation

PUBLICATIONS

- **Hongru Yan***, Yu Zheng*, Yueqi Duan. Gaussian-Det: Learning Closed-Surface Gaussians for 3D Object Detection. Under Review [ArXiv][paper]
- Zeyuan Chen*, **Hongru Yan***, Fangyin Wei, Xiang Zhang, Xinyue Wei, Hao Su, Zhuowen Tu. Epi-Inpainter：Learning Multi-View Aware 3D Inpainting via Epipolar Diffusion Prior. Under Review

- Yu Zheng, **Hongru Yan**, Yueqi Duan, Jiwen Lu. ShadowNeRF: Learning Neural Radiance Field with Sight Degradation and Recovery, TMM. (Under Review)
- Yu Zheng, Yueqi Duan, Kangfu Zheng, **Hongru Yan**, Jiwen Lu. OPONeRF: One-Point-One NeRF for Robust Neural Rendering. IJCV. (Under Review) [ArXiv][paper]

COMPETITIONS

Electronic Design Competition (Tsinghua University, 3rd Prize)	2023.04
The 14th Mathematics competition of Chinese College Students (Chinese Mathematical Society, 1st Prize)	2022.12
The 8th China Undergraduate Physics Experiment Competition (Organizing Committee of CUPEC,2nd Prize)	2022.10
Mechanical and Electrical Design Competition (Department of Precision Instrument at THU,3rd Prize)	2021.12

SERVICES

Conference Review: ICLR 2025	
Associate Chair of Technological Innovation Department of Weixian College at Tsinghua University	2024.01-present
Head of Technological Innovation Department of Weixian College at Tsinghua University	2023.09-2024.01
Class League Secretary	2023.09-present
Student Union Officer at Tsinghua University	2021.09-2023.08
Officer of the science and technology association oftheDepartment of Precision Instrument at THU	2021.09-2023.08

OTHERS

- **Computer skills**: Python, Pytorch, Matlab, Origin, JAVA, C++, C
- **Language skills**: Mandarin, English (TOEFL 106, GRE 331)