

ZHIRUI GAO

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SELF INTRODUCTION

This is Zhirui Gao, 26 years old. I am a third-year computer science doctoral student. My research interests mainly include neural rendering (**NeRF and 3D Gaussian Splatting**), 3D reconstruction and AIGC (**Diffusion**).

EDUCATION

National University of Defense Technology

Mar.2023 – Now

Ph.D. Candidate of [iGRAPE lab](#) | Research With [Prof. Kai Xu](#) and [AProf. Renjiao Yi](#) | Computer Science and Technology

National University of Defense Technology

Sep.2021 – Dec. 2022

Master Research With [Prof. Kai Xu](#) Computer Science and Technology | GPA:88.1/100 (Rank:18/153)

China University of Geosciences

Sep.2017 – Jun.2021

Bachelor | Computer Science and Technology | **GPA:4.08/5.00 (Rank:1/151)**

PUBLICATION

- **Zhirui Gao**, Renjiao Yi, Yuhang Huang, Wei Chen, Chenyang Zhu, and Kai Xu. ‘Self-supervised Learning of Hybrid Part-aware 3D Representations of 2D Gaussians and Superquadrics’. ICCV 2025, CCF-A.
- **Zhirui Gao**, Renjiao Yi, Yaqiao Dai, Xuening Zhu, Wei Chen, Chenyang Zhu and Kai Xu. ‘Curve-Aware Gaussian Splatting for 3D Parametric Curve Reconstruction’. ICCV 2025, CCF-A.
- **Zhirui Gao**, Renjiao Yi, Chenyang Zhu, Ke Zhuang, Wei Chen and Kai Xu. ‘General Objects as Pose Probes for Few-view NeRFs’. TCSVT 2025, CCF-B/ Top Journal of Chinese Academy of Sciences Division.
- **Zhirui Gao**, Renjiao Yi, Zheng Qin, Yunfan Ye, Chenyang Zhu and Kai Xu. ‘Learning accurate template matching with differentiable coarse-to-fine correspondence refinement’. CVMJ 2024 IF:18.3.
- Huachen Gao, Shihe Shen, Zhe Zhang, Kaiqiang Xiong, Rui Peng, **Zhirui Gao**, Qi Wang, Yugui Xie, Ronggang Wang. ‘Fdc-nerf: Learning pose-free neural radiance fields with flow-depth consistency’. ICASSP 2024, CCF-B.
- Minhao Li, Zheng Qin, **Zhirui Gao**, Renjiao Yi, Chenyang Zhu, Yulan Lan and Kai Xu. ‘2d3d-matr: 2d-3d matching transformer for detection-free registration between images and point clouds’. ICCV 2023, CCF-A.
- Yunfan Ye, Renjiao Yi, **Zhirui Gao**, Chenyang Zhu, Zhiping Cai and Kai Xu. ‘Nef: Neural edge fields for 3d parametric curve reconstruction from multi-view images’. CVPR 2023, CCF-A.
- Yunfan Ye, Renjiao Yi, **Zhirui Gao**, Zhiping Cai and Kai Xu. ‘Delving into crispness: Guided label refinement for crisp edge detection’. TIP 2023, CCF-A.

RESEARCH EXPERIENCE

Scene graph generation. Work in progress.

Mar,2025 – Now

- A scene graph generation pipeline based on diffusion.

Interpretable multi-view modeling. (2 ICCV 2025)*

Jan,2024 – Mar, 2025

- Proposed the integration of **meshes or parametric curves and Gaussian Splatting** for scene reconstruction.
- An interpretable scene representation through scene decomposition into 3D primitives or parametric curves.

General Objects as Pose Probes for Few-view NeRFs. (TSCVT 2025)

Apr,2023 – Jan,2024

- Introduced a **Pose-NeRF pipeline** for few-view inputs, without requiring any pose priors.
- Achieved SOTA performance on benchmarks and completed by only a single student author.

Learning accurate template matching. (CVMJ 2024)

Fec,2022 – Dec,2022

- Proposed a **structure-aware and fully differentiable** template matching pipeline, avoiding the use of RANSAC found in other feature-matching approaches.
- Porposed An accurate template matching method, robust in challenging scenarios including cross-modality images, cluttered backgrounds, and untextured objects.

2D-3D matching transformer. (ICCV 2023)

Jan,2023 – June,2023

- Algorithm improvement, and code completion.
- Benchmark test, baseline implementation, and the rebuttal.

Neural edge fields. (CVPR 2023)

July,2022 – Oct,2022

- Dataset preparation, baseline implementation, experiment, and result analysis.

HONARS & AWARDS

Second Prize Scholarship (2024)

First Prize Freshman Scholarship (2023)

Second Prize Scholarship (2023)

Outstanding Graduates, Top 5% (2021)

Outstanding Bachelor's Degree Thesis, Top 5% (2021)

National Encouragement Scholarship, Top 5% (2019, 2020)

Silver Medal in the Asian Region of International Collegiate Programming Contest (ACM-ICPC), (2019)

National Scholarship, Top 2% (2018)