

# Ziyu Sun

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Know me from my webpage: [Zysun2002.github.io](https://Zysun2002.github.io)

## EDUCATION

Jilin University (Project 985&211)

Jilin, China

*Bachelor of Science Candidate (Expected 2025)*

Sept. 2021-Jun. 2025

Tang Ao-qing Honors Program in Computer Science, **GPA 3.93/4.0, 93.55/100**

**Relevant Coursework:** Mathematical Analysis I (99), II (96), III (99), Probability and Statistics A (95.5), Linear Algebra A (94), Discrete Mathematics I (94), Space Analytic Geometry (98), Object Oriented Program Design (95.8).

## RESEARCH EXPERIENCE

**Cuda-Accelerated Rasterization and Ray-tracing from Scratch**

Alberta, Canada

*3-month Research Internship Program, University of Alberta*

Jul. 2024-Oct. 2024

- Implemented the graphics pipelines (both rasterization and ray tracing) to build a renderer.
- Enhanced rendering quality by utilizing techniques such as ambient occlusion mapping and shadow mapping.
- Achieved over 100x rendering speedup through parallel computation using CUDA
- The project is available [here](#).

**From Incomplete Coarse-Grained to Complete Fine-Grained: A Two-Stage Framework for Spatiotemporal Data Reconstruction**

Jilin, China

*Tang Ao-qing Honors Program Research Supervised by [Prof. Wenbin Liu](#), Jilin University*

Jan. 2024-Jul. 2024

- Introduced generative models from CV (computer vision) into spatiotemporal data mining.
- Proposed a novel task called spatial-temporal data reconstruction. Enhanced our two-stage diffusion model with spatial-temporal attention and time-series processing capabilities through improvements to the denoising network at each stage.
- Achieved state of the art performance compared with seven benchmark methods across three datasets in three task settings.
- This paper is submitted to **IEEE Transactions on Knowledge and Data Engineering (TKDE)**, which is available [here](#).

**Dynamic 3D Gaussian Prediction for Motion Extrapolation and Free View Synthesis**

Zhejiang, China

*Research Supervised by [Prof. Zhaopeng Cui](#), CAD & CG, Zhejiang University*

Nov. 2023-Jan. 2024

- Acquired foundational knowledge in computer graphics & vision under the guidance of [Prof. Rui Ma](#), Jilin University.
- Implemented the extrapolation stage of our 3D Gaussian Splatting model, achieving satisfactory results across most datasets.
- Assisted in training the reconstruction stage of our 3D Gaussian Splatting model, enhancing model performance.
- This paper is accepted by **SIGGRAPH 2024**, which is available [here](#).

**Application of Wavelet Transforms in Image Processing and Graphics**

Alberta, Canada

*Summer Program Research Supervised by [Prof. Bin Han](#), University of Alberta*

Jul. 2023-Aug. 2023

- Learned computational geometry such as parametric curve representation and geometry subdivision.
- Gained knowledge on wavelet theory and its application in image processing and computer graphics.
- Compared wavelet transform-based image processing methods with deep learning-based algorithms.
- Analyzed the source code of the Wavelet Toolbox in MATLAB and implemented a Python version.

**Towards Time-Continuous Data Inference in Sparse Urban CrowdSensing**

Jilin, China

*Tang Ao-qing Honors Program Research Supervised by [Prof. Wenbin Liu](#), Jilin University*

Jan. 2022-Jul. 2023

- Developed a broad range of research skills and started with the first leading research project.
- Challenged a widely existing assumption in spatiotemporal data mining by introducing a novel method called TIME-DMF.
- Progressed from DMF to RNN-DMF to TIME-DMF through a step-by-step approach, introducing a novel encoder, time-gates, and a new completion strategy.
- Conducted experiments of five types on four datasets with seven benchmark methods to prove model efficiency.
- This paper is submitted to **Internet of Things Journal (IOTJ)**, which is available [here](#).

## PUBLICATIONS & PREPRINTS

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(Conference article) Boming Zhao, Yuan Li, **Ziyu Sun**, et al, "[Dynamic 3D Gaussian Prediction for Motion Extrapolation and Free View Synthesis](#)" **SIGGRAPH 2024**. Accepted.

(Journal article) **Ziyu Sun**, Wenbin Liu, et al, "[From Incomplete Coarse-Grained to Complete Fine-Grained: A Two-Stage Framework for Spatiotemporal Data Reconstruction](#)" **IEEE Transactions on Knowledge and Data Engineering**. Submitted.

(Journal article) **Ziyu Sun**, Wenbin Liu, et al, "[Toward Time-Continuous Data Inference in Sparse Urban CrowdSensing](#)" **IEEE Internet of Things Journal**. Submitted.

## HONORS & AWARDS

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Tang Ao-qing Scholarship	Mar. 2023
Tang Ao-qing Honors Program Second Class Scholarship (Top 3 in the major)	Dec. 2023
Jilin University Liberation Navigator Scholarship (Top 20 out of Jilin University)	Nov. 2023
19th CCF Conference on Information Systems and Applications Innovative Design Competition, 4th Place in China	Feb. 2022

## SKILLS

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Language: Chinese(native), English (with IELTS overall score of 7.5)

Programming Language: Python, C/C++, MATLAB, Java

Professional Skill: PyTorch, Cuda, Latex, Git