

# Xinyuan Yan

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My personal academic website



## Education

**Beijing University Of Civil Engineering And Architecture (BUCEA)** Beijing, China 09/2022 - 07/2025

Specialization: Perception Algorithm for Autonomous Driving in Adverse Weather

**Supervisor:** Prof. He Huang

GPA: 90.95/100; Rank: 10/130

**North China University of Water Resources and Electric Power (NCWU)** Henan, China 09/2018 - 06/2022

Major: Surveying and Mapping Engineering

GPA: 88.34/100; Rank: 6/100

## Publications

**A Review of Point Cloud Denoising for Vehicle-Mounted LiDAR in Adverse Weather Conditions (Chinese Core Journal)** March 2025

- He Huang, **Xinyuan Yan**, Junxing Yang\*, Yida Li, Yu Liang, and Yidan Zhang
- Accepted for publication in **Journal of Geomatics**

**SnowSTNet: A Spatial-Temporal LiDAR Point Cloud Denoising Network for Autonomous Driving in Snowy Weather (Conference Paper)** February 2025

- Yida Li, **Xinyuan Yan**, He Huang, Yu Liang, Yidan Zhang, and Junxing Yang\*
- Accepted for oral presentation at **ISPRS Geospatial Week 2025 (Dubai)**

**AdverseNet: A LiDAR Point Cloud Denoising Network for Autonomous Driving in Rainy, Snowy, and Foggy Weather (JCR:Q1 IF=4.5)** 07 January 2025

- Xinyuan Yan**, Junxing Yang\*, Yu Liang, Yanjie Ma, Yida Li, and He Huang
- Published in **IEEE Sensors Journal**

**Denoising Framework Based on Multiframe Continuous Point Clouds for Autonomous Driving LiDAR in Snowy Weather (JCR:Q1 IF=4.5)** 31 January 2024

- Xinyuan Yan**, Junxing Yang, Xinyu Zhu, Yu Liang, and He Huang\*
- Published in **IEEE Sensors Journal**

**LIDSOR: A Filter for Removing Rain and Snow Noise Points from LiDAR Point Clouds in Rainy and Snowy Weather (Conference Paper)** 13 December 2023

- He Huang, **Xinyuan Yan**, Junxing Yang\*, Yuming Cao, and Xin Zhang
- Accepted for poster presentation at **ISPRS Geospatial Week 2023 (Cairo)**

## Research Experience

**Project on the Review of Point Cloud Denoising for Vehicle-Mounted LiDAR in Adverse Weather Conditions**  
Leader, Co-First Author BUCEA, China 07/2024 - 09/2024

- To fill the research gap** in domestic studies on denoising of vehicle-mounted LiDAR point clouds, this work systematically reviews research progress over the past decade, comprehensively covering the development of technologies under adverse weather conditions such as rain, snow, and fog.

- Conducted an in-depth analysis of representative public datasets and mainstream denoising algorithms, synthesizing fragmented information into a structured overview.
- Summarized current challenges and future directions, offering guidance for follow-up research. The paper has been accepted by the Chinese core journal **Journal of Geomatics**.

### Research Project on Point Cloud Denoising Network for Adverse Weather

Leader, First Author

BUCEA, China 03/2024 - 06/2024

- Inspired by the concept and methodology of **large language models**, proposed a unified and efficient point cloud denoising network, AdverseNet, which effectively removes noise points caused by rain, snow, and fog.
- **First** to introduce an efficient cylindrical tri-perspective view representation and a two-stage training strategy for point cloud denoising. The first stage learns general noise features, while the second stage focuses on weather-specific characteristics.
- Conducted comprehensive comparative experiments, showing that AdverseNet significantly outperforms current SOTA methods on the DENSE and SnowyKITTI datasets (**achieving MIoUs of 94.67% and 99.33%, respectively**). The work has been published in the **IEEE Sensors Journal**.

### Research Project on Removing Noise Points from Multi-Frame Continuous Point Clouds in Snowy Weather

Leader, First Author

BUCEA, China 09/2023 - 11/2023

- Led the point-wise annotation work based on the Boreas dataset released by the University of Toronto in 2023, contributing over **135 hours** of manual labeling.
- **First** to introduce the prior knowledge that snow noise points are inherently disordered, enabling mutual reinforcement among ordered objects and mutual suppression among disordered ones.
- Proposed the **first** temporal-feature-based filter, TOR, and a complete denoising framework for snowy point clouds; conducted extensive experiments under varying snowfall intensities and road conditions. The work has been published in the **IEEE Sensors Journal**.

### Research Project on Removing Noise Points from LiDAR Point Clouds in Rainy and Snowy Weather

Co-First Author

BUCEA, China 09/2022 - 07/2023

- Built a custom data collection platform based on the **AgileX Robot Hunter 1.0** (equipped with LiDAR, Radar, Camera, IMU, and GPS) to collect point cloud data under rain and snow conditions on the BUCEA campus, with manual annotation of noise points.
- Performed distance and intensity feature analysis on the annotated point clouds, and further modeled the distance features using gamma distribution fitting.
- Proposed the LIDSOR filtering algorithm, which demonstrated strong denoising performance under both rain and snow conditions. The work was accepted for poster presentation at **ISPRS Geospatial Week 2023 (Cairo)**.

## Internship Experience

### Autonomous Driving Internship

Algorithm Engineer

Tsinghua University, China 11/2023 - 12/2023

- Joined the team of Professor Xinyu Zhang at the School of Vehicle and Mobility, Tsinghua University, under the direct supervision of Postdoctoral Fellow Dr. Li Wang. Mainly responsible for research on **3D object detection algorithms**.
- Improved the Pillar Feature Network module in the PointPillars algorithm by replacing the PointNet-based global feature extraction with a self-attention mechanism.

## Selected Awards and Honors

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|---------|----------------------------------------------------------------------------------------|------|
| ▪ BUCEA | <b>Beijing Outstanding Graduate Award (Top 5% among graduate peers in the college)</b> | 2025 |
| ▪ BUCEA | <b>National Graduate Scholarship (Top 7% among graduate peers in the college)</b>      | 2024 |

▪ BUCEA	2 Software Copyrights	2024
▪ BUCEA	Second-Class Academic Scholarship	2023
▪ BUCEA	First-Class Academic Scholarship	2022
▪ NCWU	Undergraduate Innovation and Entrepreneurship Training Program—Rated “Good”	2021
▪ NCWU	Surveying Skills Competition—First Prize	2021

## Skills

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- Proficient in programming languages like Python and C++.
- Skilled in deep learning frameworks such as PyTorch, TensorFlow, and Caffe, with a good understanding of model and framework optimization techniques.
- Familiar with fundamental knowledge and algorithms of computer vision and deep learning, and possess relevant research experience.
- Well-versed in the Ubuntu operating system and the ROS1/ROS2 robot operating system.
- CET-6 score: 483, TOEFL score: 84.