

Aman Kumar Singh

LiDAR Perception | 3D Point Clouds | Geometric Modelling | Autonomous Mobility

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Education

Indian Institute of Technology (IIT) Kanpur, India Aug 2023 – Jun 2025
Master of Technology (M.Tech) in Geoinformatics, Civil Engineering
Thesis: Understanding and Modeling Motion-Induced Point Cloud Distortions in Mobile Laser Scanning
Supervisor: Prof. Bharat Lohani

Indian Institute of Technology (IIT) Kanpur, India Sep 2020 – Jun 2025
Bachelor of Technology (B.Tech) in Civil Engineering
Dual-degree (B.Tech–M.Tech) program; converted from the four-year B.Tech.

Research Interests

LiDAR-Based 3D Perception; Point-Cloud Processing and Geometric Estimation; Autonomous Mobility; Multi-Sensor Fusion; Intelligent Transportation Systems; Computer Vision and Machine Learning

Publications

Journal Publication

Singh, A. K., & Lohani, B. (2026). *Modeling Point Cloud Distortions in Mobile Laser Scanning for Surveying*. Journal of Surveying Engineering (ASCE), 152(3). **Editor's Choice**. DOI: 10.1061/JSUED2.SUENG-1663

Thesis

Singh, A. K. (2025). *Understanding and Modeling Motion-Induced Point Cloud Distortions in Mobile Laser Scanning*. B.Tech–M.Tech (Dual Degree) Thesis, Indian Institute of Technology Kanpur. DOI: 10.6084/m9.figshare.32005947

Selected Presentations

Singh, A. K., & Lohani, B. (2026). *Modeling Motion-Induced Distortions in Mobile Laser Scanning Point Clouds*. Poster, GeodCon-26, Indian National Science Academy (INSA), New Delhi. DOI: 10.6084/m9.figshare.32005995

Singh, A. K., & Lohani, B. (2025). *Modeling Point Cloud Distortions of Moving Objects in Mobile Laser Scanning*. Poster, Geospatial Technologies and Smart Cities Workshop, IIT Kanpur & University of Melbourne. DOI: 10.6084/m9.figshare.28200089

Research Experience

M.Tech. Research: Mobile Laser Scanning Distortion Modelling, IIT Kanpur Aug 2023 – Oct 2024
Supervisor: Prof. Bharat Lohani

- Derived geometric models to quantify motion-induced point-cloud distortions in mobile laser scanning.
- Validated predicted distortions in LiDAR simulation; illustrated them qualitatively in real-world point clouds.
- Published the resulting work in the ASCE Journal of Surveying Engineering as an Editor's Choice article.

Research Project: LiDAR-Based Aircraft Classification (SVDGS), IIT Kanpur Aug 2024 – May 2025
Supervisors: Prof. Bharat Lohani, Prof. Gaurav Pandey

- Investigated aircraft classification from sparse LiDAR point clouds for airport docking guidance.
- Built a synthetic LiDAR simulation pipeline in Unreal Engine to generate aircraft point clouds and images.
- Analysed the effects of point density, sensor resolution, and object geometry on classification performance.

Research Intern: LiDAR-Camera Calibration (SURGE), IIT Kanpur May 2022 – Jul 2022
Supervisor: Prof. Salil Goel

- Calibrated LiDAR and camera data using geometric targets and coordinate transformations.
- Projected camera imagery onto LiDAR observations to generate coloured point clouds.
- Developed experience in multi-sensor integration and 3D spatial data processing.

Selected Projects

LiDAR Data Preparation for 3D Segmentation (CE676A)

Report | Slides

Supervisor: Prof. Bharat Lohani

Annotated LiDAR point clouds in CloudCompare to build instance-level labelled datasets for deep learning; analysed approaches to automate LiDAR labelling with semantic segmentation.

LiDAR-Based Detection & Tracking on Roads (CE687)

Literature Review

Supervisor: Prof. Aditya Medury

Reviewed LiDAR-based detection and tracking of vehicles and pedestrians (clustering, SVMs, Kalman filtering, background subtraction) and proposed a study design for Indian road conditions.

Technical Skills

Programming: Python, C++ , MATLAB

Machine Learning & Computer Vision: PyTorch, TensorFlow, scikit-learn

LiDAR & 3D Data Processing: PDAL, Open3D, CloudCompare

GIS & Remote Sensing: ArcGIS Pro, QGIS

Simulation & Visualization: Unreal Engine, Autodesk Fusion 360

Awards & Honors

Editor's Choice Selection, ASCE Journal of Surveying Engineering

2026

Selected by the journal's Chief Editor for recognition in the journal's Editor's Choice section for the paper *Modeling Point Cloud Distortions in Mobile Laser Scanning for Surveying*.

MAY Award for Engineering Excellence, IIT Kanpur Academic Excellence Awards

2025

Awarded for excellence in solving real-world engineering problems through innovative engineering approaches.

Teaching Experience

Teaching Assistant, Geographic Information Systems (CE432), IIT Kanpur

Spring 2025

Teaching Assistant, Principles of Geoinformatics (CE331), IIT Kanpur

Fall 2024

- Created and published a QGIS map-making tutorial video for CE331 students (watch on YouTube).

Academic Mentor, Fundamentals of Computing (ESC101), IIT Kanpur

2021–22

Relevant Coursework

Laser Scanning and Photogrammetry | Image Processing | Geographic Information Systems | Global Navigation Satellite Systems | Introduction to Inertial and Multi-Sensor Navigation | Traffic Simulation | Transportation Network Analysis | Statistical and Econometric Methods for Transportation Engineering | Artificial Intelligence, Machine Learning, Deep Learning and Its Applications

Professional Experience

Assistant Manager (Operations), Godrej Properties Ltd.

Jul 2025 – Present

- Supported planning, execution and progress monitoring of large-scale residential construction projects.
- Coordinated across civil, MEP, quality, and planning functions for project delivery.
- Applied digital workflows for schedule tracking, progress monitoring and reporting.

Leadership & Service

- Led the Society of Civil Engineers, IIT Kanpur (2022–23), coordinating academic and technical events.
- Regular contributor to *The Spark*, IIT Kanpur's alumni-initiated magazine.
- Attended the SPARC Workshop on UAVs and AI in Construction, IIT Delhi (2024, 2025).

Academic References

Prof. Bharat Lohani

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Indian Institute of Technology Kanpur
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Prof. Gaurav Pandey

Associate Professor, Engineering Technology & Industrial Distribution
Texas A&M University
Email: gpandey@tamu.edu

Prof. Salil Goel

Associate Professor, Department of Civil Engineering
Adjunct Faculty, Department of Aerospace Engineering
Indian Institute of Technology Kanpur
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