

SIDDHARTH GUPTA

Geospatial Software Engineer | Python, 3D Point Clouds, LiDAR Simulation, Sensor Fusion

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PROFESSIONAL SUMMARY

Geospatial and software engineer with 7 years of professional experience. Core focus spanning geospatial data processing, 3D point-cloud analysis, LiDAR simulation, and application quality assurance. Experienced in developing Python-based geospatial workflows, building sensor simulation tools, and translating research concepts into practical software applications. Contributed to peer-reviewed research at IIT Kanpur, and IIRS Dehradun. Also developed open-source tools, including four published QGIS plugins with over 10,000 downloads and QuickPointForge, a tool for generating LiDAR-style point clouds from 3D Gaussian Splat scenes. Combines geospatial domain knowledge with software development, testing, and problem-solving skills to build reliable data-processing tools and engineering workflows.

CORE SKILLS

- **3D Perception & Point Cloud Processing:** Point-cloud generation, labelling, and ML-based classification; Gaussian Splatting → point-cloud conversion via spherical binning; LiDAR-camera sensor fusion for 3D reconstruction; mesh/point-cloud QA and inspection
- **Sensor Simulation & Synthetic Data:** Custom LiDAR/camera sensor simulation engine in Python (octree spatial indexing, ray-casting); Blender-based configurable LiDAR/camera sensor object; synthetic dataset generation and SOPs for ML training data
- **Spatial Mapping & Geospatial Data:** Photogrammetry, remote sensing, multi-source (LiDAR + imagery) data integration; QGIS, ArcGIS; scalable multiprocessing raster/point-cloud pipelines
- **QA, Test Automation & Reliability:** Functional/regression testing, browser-based test automation (Selenium, Cypress), defect management (JIRA), deployment validation, OWASP-oriented security testing

SELECTED PROJECTS

QuickPointForge — Gaussian Splat → LiDAR Point-Cloud Simulator — Open-source, public repo 2026

- Built a tool that simulates LiDAR point clouds directly from 3D Gaussian Splat. It bins splats by sensor beam angle and keeping the process lighter than the ray-casting approach.
- Built a desktop UI with a dual-panel viewport: the source Gaussian splat with the sensor pose shown as a gizmo, and the resulting simulated LiDAR scan.

Tools/Skills: Python, Gaussian Splatting,

Pixly (gopixly.com) — Wedding Photo-Sharing Platform

2025-26

- Designed and developed a distributed application comprising a REST API backend, host administration desktop app, and an android app for guest and admin.
- Built a self-hosted face-recognition pipeline using InsightFace, ONNX Runtime, and DBSCAN clustering, deployed as a separate background worker for asynchronous photo processing.
- Separated computationally intensive image processing from the core application to support photo uploads and user interactions without blocking.

Tools/Skills: Python, REST APIs, SQL, ONNX Runtime, InsightFace, DBSCAN

PROFESSIONAL EXPERIENCE

Independent GIS & Software Consultant (Freelance) — Kanpur, India

- Delivered geospatial data engineering and processing workflows across QGIS, LiDAR, and remote sensing for consulting clients, handling large-scale spatial datasets.
- Developed scalable, multiprocessing Python pipelines for efficient geospatial data processing.
- Published and maintained 4 QGIS plugins (QuickMapCine, QuickMapCompare, QuickMapGif, QuickMapLink) on the QGIS Plugin Repository, achieving 10,000+ cumulative downloads within a month and 5-star ratings.

Tools/Skills: Python, QGIS, Point Cloud Visualization

Junior Research Fellow — Indian Institute of Technology, Kanpur

Mar 2021 – Apr 2023

Project: Generation and Labelling of LiDAR Point Cloud for Classification through Machine Learning Approaches

- Built a new version of Limulator, the lab's synthetic LiDAR simulator, in Python using octree spatial indexing and ray casting, then rebuilt it as a Blender plugin with a configurable LiDAR/camera sensor object that outputs synthetic point clouds and images
- Produced synthetic datasets used to train ML models for point-cloud classification, and authored SOPs standardizing labelled dataset preparation
- Co-authored a peer-reviewed paper analyzing the role of simulated LiDAR data in training 3D deep learning models (see Publications)

Tools/Skills: Python, octree, ray casting, Blender (Python API), Cloud Compare**QA Consultant** — Waggingtail.co, New Zealand (Remote)

Feb 2021 – May 2026

- Owned functional and regression testing for multiple web applications, including full user-workflow and post-deployment validation, and built browser-based test automation with Selenium, and Cypress
- Established test planning and QA documentation practices and applied OWASP-oriented security testing, coordinating remotely with developers to verify fixes and validate releases

Tools/Skills: Selenium, Cypress, Python, JIRA, OWASP, functional & regression testing, deployment validation**Senior Research Fellow** — Indian Agricultural Statistics Research Institute (IASRI), New Delhi

Dec 2020 – Jan 2021

- Trained end users on a GIS portal and sample-selection application through detailed documentation and live interactive sessions

Tools/Skills: QGIS, ArcGIS**Test Engineering Analyst** — Accenture Solutions Pvt. Ltd., Bengaluru

Aug 2015 – Dec 2016

- Owned test planning, preparation, and execution through closure; conducted requirement analysis for new and modified products

Tools/Skills: HP Quality Center, JIRA, SQL**EDUCATION**

M.Tech, Remote Sensing & GIS — Indian Institute of Remote Sensing (IIRS), Dehradun

2020

- CGPA 8.20 | GATE Score 508 (2021), All-India Rank 171
- Thesis: Framework for multi-source data integration (LiDAR + camera/drone imagery) for 3D documentation of heritage sites, using fractal analysis to reconstruct damaged areas

B.E., Civil Engineering — M.S. Ramaiah Institute of Technology, Bengaluru

2015

- CGPA 8.45 | GATE Score 490 (2018)

PUBLICATIONS

- Tiwari, P. S., Pande, H., Gupta, S., Grover, C., Semwal, E., & Agarwal, S. (2023). "Damage Detection and Virtual Reconstruction of Built Heritage: An Approach Using High-Resolution Range and Intensity Data." *Journal of the Indian Society of Remote Sensing*, 51(4), 787–798. <https://doi.org/10.1007/s12524-022-01661-1>
- Lohani, B., Khan, P., Kumar, V., & Gupta, S. (2024). "Role of Simulated Lidar Data for Training 3D Deep Learning Models: An Exhaustive Analysis." *Journal of the Indian Society of Remote Sensing*, 52(9), 2003–2019. <https://doi.org/10.1007/s12524-024-01905-2>