Dev Shree Saini

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Education

- **Masters in Geomatics Engineering, ETH Zurich** — Zurich, Switzerland
  GPA: 5.25 — *Sept 2024 – July 2026*
  Semester Project: Detection of Heavy Precipitation using GNSS Zenith Wet Delay
  Relevant Coursework: GIS, Cartography, Machine Learning, Deep Learning, Image Based Mapping

- **BTech in Civil Engineering, VIT-Vellore** — Vellore, India
  CGPA: 9.33/10.0 – Ranked 2nd in department (~150 students), Best outgoing student — *July 2019 - May 2023*
  Thesis topic: Flood Risk Analysis using Arc-SWAT in the Dhansiri River Watershed, India.
  Scholarship: Merit-based scholarship for 3 years for academic excellence.
  Relevant Coursework: GIS and Remote Sensing, Hydrology, Environmental engineering

Professional Experience

Indian Institute of Remote Sensing (IIRS), ISRO, *Spatial Data Analyst Intern* — Dehradun, India
As a part of the research group: — *Jan 2023 – Dec 2023*

- Developed a deep learning model (**U-Net**) using Sentinel-1 SAR data for flood-prone area detection in Bihar.
- Integrated 4 years of daily rainfall data into a rasterized format for training.
- Optimized **hyperparameters** (learning rate, kernel size, activation function) to obtain **92%** accuracy, F1 score of **0.69.**
- Key Skills: Deep Learning, SAR Data Processing, Flood Prediction, Python (NumPy, PyTorch)

Concordia University, *Research Intern* — Montreal, Canada
As a part of the research group: — *June 2022 – Aug 2022*

- Designed and implemented a geotextile-based filtration system reducing **particulate nutrients** in lake water by **50%**
- Conducted lab tests on Total Organic Carbon (TOC), Phosphorus, Nitrogen, and Suspended Solids for water analysis.
- Used spatial analysis to assess water pollution trends, aiding regulatory compliance for emerging pollutants.
- Key Skills: Water Quality Analysis, Environmental Engineering, Data Collection

Vellore Institute of Technology, *Teaching Assistant* — Vellore, India
Involved in some research projects and coursework: — *Sept 2021 – Jan 2023*

- Contributed to 3 different projects for Master's and PhD students, specializing in GIS tasks such as land use/land cover classification, flood inundation mapping, SWAT analysis, and dam break analysis.
- Trained and mentored juniors (~ 40 students) in QGIS & ArcGIS, troubleshooting their issues, and explaining them the GIS application in civil engineering topics like urban sprawl, traffic flow, and spatial-temporal analysis.
- Key Skills: Leadership, GIS Training, Spatial Data Analysis

Projects and papers

Projects:

- Detection of Heavy Precipitation using GNSS Zenith Wet Delay
  - Developing a machine learning model to predict heavy rainfall events a few hours in advance by analysing GNSS signal delay.
  - Working with GNSS and ERA5 datasets (Europe, 2024) from ~3200 stations over one year.
  - Integrated GNSS Zenith Wet Delay and meteorological data to enhance prediction accuracy.

- Analysing Land Use Dynamics and Hydrological Processes to Understand Flood Risks using Arc-SWAT
  - Developed a SWAT model to simulate surface runoff & flood risks in the Dhansiri River Basin, India
  - Achieved model accuracy (NSE: 0.84, R^2: 0.90) for runoff predictions
  - Conducted HEC-RAS flood modelling, identifying high-risk flood zones

- Geospatial Assessment of Groundwater Sustainability for Regulatory Decision-Making
  - Conducted a groundwater potential study in Ahmedabad, India, a region facing severe groundwater scarcity due to over-extraction.
  - Evaluated 8 key factors that influence groundwater availability and used the AHP weightage analysis method to identify potential zones.
  - Compared the results with actual well data, revealing that while 89% of the region showed medium to high groundwater potential, in actual excessive usage had reduced the available groundwater to only 65% of the area.

Research Papers:

- Ghosh, S et al., 2023, The impact of short-duration precipitation events over the historic Cauvery Basin: A study on altered water resource patterns and associated threats. *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-023-41417-6
- Saini, D. S., & Barik, D. K. (2024). Simulation of the hydraulic model HEC-RAS coupled with GIS and remote sensing to study the effect of river cross-section width in detecting flood-prone areas. *Journal of the Geological Society of India, 100(3), 367–376*. https://doi.org/10.17491/jgsi/2024/173843
- Land Use/Cover Dynamics and Associated Impacts on Eutrophication, Land Surface Temperature, and Ecosystem Service Values: An Eco-Climatological Investigation of Chilika Lake, India, *Estuaries and Coasts.* https://doi.org/10.1007/s12237-025-01509-0

Conferences:

- Antonio C. Pereira, Dileep Palakkeel Veetil, Catherine N. Mulligan, **Dev S. Saini**, Kareem Dajani, and Sam Bhat "Wetland Discharge Water Filtration of a Mesotrophic Lake" CSCE Annual Conference 2023, Moncton, Canada
- **Dev Shree Saini**, Dillip Kumar Barik. "Identifying flood prone zones by using hydraulic model, HEC-RAS in Ganga River basin, Bihar, India" Roorkee Water Conclave 2022, IIT Roorkee, India – 2022

Volunteering and Positions

- **Academic Head**: Founding member of an educational startup (KCHEF): led a team of 20 people to create STEM educational videos for school students.
- **ASCE**: Core member of university chapter ASCE-VIT, organized events, workshops, and an international conference
- **Discipline Head**: Served as the head of discipline in my school for two years (2015-2017)

Skills

- **Technical**: QGIS, ArcGIS, HEC-RAS, ENVI, Google Earth Engine, Microsoft Products, Latex
- **Programming and ML**: Python (TensorFlow, PyTorch, Pandas, NumPy), MATLAB, C++
- **Analytical:** Geospatial Risk Assessment, Deep Learning, Climate Modelling, Statistical data Analysis, Problem Solving

Languages, Hobbies, and Interests

- **Languages:** Hindi (Native), English (C1 Level), German (Took A1 course), French (A1- Duolingo)
- **Hobbies:** Cooking, Chess, Origami, Swimming, Collecting old coins
- **Interests:** Writing poetry, Reading, Watching sports

Honors, Awards, and Certificates

- **Certificates**: ML in GIS, Earthquake Geology, GIS Basics
- **Honors**: Scholarship Awards, Rank Certificate
- **Awards**: MITACS scholarship, Hackathon winner, All India Course Topper