

Tek Narayan Bhattarai

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Google Scholar: <https://scholar.google.com/citations?user=DWA1WkAAAAJ>

Education

Ph.D. in Civil and Environmental Engineering Aug 2025 – Present

Carnegie Mellon University, Pittsburgh, United States

M.Sc. in Water Science and Engineering Sep 2022 – Sep 2024

Specialization in Flood Risk Management

IHE Delft Institute for Water Education, Delft, the Netherlands

Partners: Technische Universität Dresden; Universitat Politècnica de Catalunya; University of Ljubljana

Bachelor's Degree in Civil Engineering Nov 2017 – Apr 2022

Tribhuvan University, Institute of Engineering, Pulchowk Campus, Nepal

Professional Experiences

Graduate Research Assistant, Carnegie Mellon University Aug 2025 – Present

- Integrating multi-source weather forecast datasets (precipitation, surge, river discharge) into a hydrodynamic model for operational compound-flood hazard prediction.
- Quantifying model and input uncertainties using ensemble forecasting, sensitivity analysis, and perturbation-based scenarios.
- Performing validation and comparative assessment of Surface Water and Ocean Topography (SWOT) data products with previous missions.

Research Associate, Tribhuvan University, Nepal Jan – Aug 2025

- Delivered Google Earth Engine training for irrigation performance assessment (Government of Nepal engineers).
- Conducted multi-hazard risk assessment training for local-level engineers.

Graduate Research Intern, Haskoning, the Netherlands Feb – Aug 2024

- Improved existing methodologies for monitoring morphological changes of large rivers and reservoirs using Google Earth Engine and open-source satellite data.
- Estimated bed topography and quantified morphological changes using remote sensing (Landsat, Sentinel-1, Sentinel-2, ICESat-2, and SWOT) and in-situ data.

Project Researcher, Tribhuvan University, Nepal

Apr 2021 – Apr 2022

- Investigated historical and future hydro-climatic changes in medium-sized watersheds of Nepal.
- Conducted data quality assessment and trend analysis using R and ClimPACT2.
- Linked hydrological extremes with climatic extremes.
- Projected extreme indices (2021–2100) using CMIP6 outputs with bias correction.

Undergraduate Research Assistant, Tribhuvan University, Nepal

Jul 2020 – Sep 2022

- Worked on research related to contemporary environmental issues of Nepal like energy management, greenhouse emission, water, sanitation and hygiene issues, and food security in Himalayan region.
- Mentored junior student's research projects and organized discussion sessions to encourage research enthusiasts to get into research.

Research Publications

1. **Bhattarai, T. N.**, Aryal, S., Pokhrel, Y., and Pandey, V. P. (under preparation). *SWOT vs Legacy Missions: Accuracy of Water Surface Elevation and Surface Water Extent in Complex River Settings*.
2. **Bhattarai, T. N.**, Giri, S., Moreno-Rodenas, A. M., Omer, A., Bakker, M., and Bateman, A. (2026). *Quantifying River Morphological Changes Using In-situ Measurements and Remote Sensing Observations. Earth Surface Processes and Landforms*.
DOI: <https://doi.org/10.1002/esp.70263>.
3. Pandey, A., **Bhattarai, T. N.**, Adhikari, N. P., Shakya, S. R., and Paudel, S. R. (2025). *Catalytic Pyrolysis of Mixed Plastic Wastes from Public Places to Liquid Oil: A Case of Kathmandu Valley, Nepal. Results in Engineering*, Article 107408.
DOI: <https://doi.org/10.1016/j.rineng.2025.107408>
4. Parajuli, S., **Bhattarai, T. N.**, Gorjian, S., Vithanage, M., and Paudel, S. R. (2023). *Assessment of Potential Renewable Energy Alternatives for a Typical Greenhouse Aquaponics in the Himalayan Region of Nepal. Applied Energy*.
DOI: <https://doi.org/10.1016/j.apenergy.2023.121270>
5. Shrestha, A., **Bhattarai, T. N.**, Acharya, G., Timalisina, H., Marks, S. J., Uprety, S., and Paudel, S. R. (2023). *Water, Sanitation, and Hygiene of Nepal: Status, Challenges, and Opportunities. ACS ES&T Water*.
DOI: <https://doi.org/10.1021/acsestwater.2c00303>
6. **Bhattarai, T. N.** and Ghimire, S. (2023). *Flood Susceptibility Analysis in the West Rapti River Basin Using the Frequency Ratio Model. Jalawaayu*.
DOI: <https://doi.org/10.3126/jalawaayu.v3i1.52053>
7. **Bhattarai, T. N.**, Ghimire, S., Aryal, S., Baaniya, Y., Bhattarai, S., Sharma, S., Bhattarai, P., and Pandey, V. P. (2022). *Projected Changes in Hydro-Climatic Extremes with CMIP6 Climate Model Outputs: A Case of Rain-fed River Systems in Western Nepal. Stochastic*

Environmental Research and Risk Assessment.

DOI: <https://doi.org/10.1007/s00477-022-02312-0>

8. Shrestha, A., **Bhattarai, T. N.**, Ghimire, S., Mainali, B., Triechel, H., and Paudel, S. R. (2022). *Greenhouse Gas Emissions from Domestic Wastewater Treatment Plants in Nepal: A Scenario-Based Analysis Applicable for Developing Countries.* *Chemosphere.*

DOI: <https://doi.org/10.1016/j.chemosphere.2022.134501>

9. **Bhattarai, T. N.**, Ghimire, S., Mainali, B., Gorjian, S., Triechel, H., and Paudel, S. R. (2022). *Applications of Smart Grid Technology in Nepal: Status, Challenges, and Opportunities.* *Environmental Science and Pollution Research.*

DOI: <https://doi.org/10.1007/s11356-022-19084-3>

Other Articles

- *Drawing inspiration from Everglades restoration efforts for Nepal.* The Invading Sea, Florida (2023).
- *Save Soil: Phytoremediation to Restore Nepal's Contaminated Soils.* NBSEH (2025).

Computer Skills

MS Office; Geographics Information System (GIS); Google Earth Engine; Python; R; Adobe Illustrator; Hydrodynamic modeling (HEC-RAS); Hydrological modeling (HEC-HMS) ; Compound flood modeling (SFINCS)

Achievements and Awards

- Center for Engineering Resilience and Climate Adaptation Fellowship, Carnegie Mellon University (2025)
- Best Paper Award 2023, ACS ES&T Water (2024)
- Erasmus Mundus Scholarship, IHE Delft (2022)
- Merit-based Scholarship, Tribhuvan University (2017)
- Outstanding High-School Performer, Ministry of Education, Nepal (2017)
- Merit-based Scholarship, Usha Bal Vatika H.S. School (2015)

Professional & Organizational Involvements

- Chi Epsilon Civil Engineering Honor Society, Member (2026–Present)
- Nepal Engineering Council, Class A License (2022–Present)