Saurabh Kaushik

Postdoctoral Research Associate — Geospatial Data Science, Earth Observation, Foundation Models

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Education

Ph.D., Earth & Environmental Sciences — Academy of Scientific and Innovative Research (AcSIR) / CSIR-CSIO, India, with the German Aerospace Center (DLR), Germany (2023)

Specialization: Remote Sensing, Glaciology, Deep Learning and Image Processing

M.Sc., Remote Sensing & GIS — Kumaun University, Nainital, India

Grants and Awards

- 2026 — NASA Early Career Investigator Program (ECIP) grant, “Physics-Aware Multimodal Foundation Model for Earth's Evolving Cryosphere” ($300,000, 3 years)
- 2025 — Young Scientist Travel Award, Debris Cover Glacier Workshop, ISTA Austria ($1,000)
- 2024 — Professional Development/Travel Award, Office of Postdoctoral Affairs, OSU ($700)
- 2019 — IASC Early Career Scientist Travel Award, ISMASS Workshop, Reykjavik ($1,500)
- 2019 — DAAD Bi-Nationally Supervised Doctoral Degree Fellowship (€24,000)
- 2019 — Best Poster Award (3rd), 5th International YES Congress, Berlin
- 2018 — INSPIRE Fellowship, DST-India ($13,000)

Work Experience

Postdoctoral Research Associate, Tellman Lab — University of Wisconsin-Madison
January 2026 – Present

- Lead development of FloodDuo, a dual foundation-encoder architecture for generalizable high-resolution flood mapping (ISPRS Journal of Photogrammetry and Remote Sensing)
- Flood inundation mapping using CNNs, Vision Transformers, and geo-foundational models
- Data fusion of Sentinel-1 and Sentinel-2 via feature-based fusion (Transformer and CNN models)

Postdoctoral Research Associate — University of Arizona
June 2024 – January 2026

- NASA-sponsored flood inundation mapping project
- Data fusion of Sentinel-1 and Sentinel-2; large-scale satellite data pipelines (PlanetScope, Sentinel-1/2)

Postdoctoral Researcher — Byrd Polar and Climate Research Center, Ohio State University
March 2023 – May 2024

- Developed the Normalized Difference Depression Index (NDDI) for efficient surface depression mapping
- Built Python pipelines to process and visualize Sentinel-2 data and model results; SAR analysis at selected sites

Guest Scientist — German Remote Sensing Data Center (DLR)
October 2021 – March 2023

- Developed GLNet, a deep-learning framework for mapping glacial lakes from multisource remote sensing data

Senior/Junior Research Fellow — CSIR-Central Scientific Instruments Organisation
February 2018 – October 2021

- Developed GLNet for supraglacial debris mapping; generated long-term glacier velocity time series
- Glacial Lake Outburst Flood modelling in the Western Himalaya

Project Associate — Punjab Remote Sensing Center
September 2016 – January 2018

- Land use/land cover and wetland mapping; spatial data analysis and field data collection

Skills

Programming: Python (proficient); Linux, MATLAB, SQL, Git, Bash scripting

ML/DL: PyTorch, TensorFlow, CNNs, Vision Transformers, geospatial foundation models, adapters/fine-tuning, NumPy, pandas, scikit-learn

Remote sensing/GIS: GDAL, rasterio, QGIS, ArcGIS, ENVI, ERDAS IMAGINE, SNAP, GMTSAR, ISCE2, COSI-Corr, SAR processing, high-performance computing

Publications

FloodDuo: A Dual Foundation-Encoder Architecture for Generalizable High-Resolution Flood Mapping
ISPRS Journal of Photogrammetry and Remote Sensing, 2026

Glacial-Lake-Bench: A Global Multi-Sensor Benchmark Dataset for Evaluating Deep Learning Models for Glacial Lake Mapping
Earth System Science Data (ESSD), 2026

Cryo-Bench: Benchmarking Foundation Models for Cryosphere Applications
Pre-Print, 2026

Prithvi-Complimentary Adaptive Fusion Encoder (CAFE): unlocking full-potential for flood inundation mapping
WACV (CV4EO-Workshop), 2026

GLACIA: Instance-Aware Positional Reasoning for Glacial Lake Segmentation via Multimodal Large Language Model
WACV (GeoCV-Workshop), 2026

Assessing Geo-Foundational Models for Flood Inundation Mapping: Benchmarking models for Sentinel-1, Sentinel-2, and Planetscope
IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2025

Declining groundwater storage in the Indus basin revealed using GRACE and GRACE-FO data
Water Resources Research, 2025

Debris covered glacier mapping using newly annotated multisource remote sensing data and geo-foundational model
Science of Remote Sensing, 2025

Combining machine learning algorithms for bridging gaps in GRACE and GRACE Follow-On missions using ERA5-Land reanalysis
Science of Remote Sensing, 2025

Automatic extraction of glacial lakes from Landsat imagery using deep learning across the Third Pole
Remote Sensing of Environment, 2024

Increasing risk of glacial lake outburst flood in Sikkim, Eastern Himalaya under climate warming
Remote Sensing Applications: Society and Environment, 2024

Landslide susceptibility assessment at the landscape level using multivariate analysis coupled with statistical algorithms: An insight from India's Kailash Sacred Landscape, Western Himalaya
Geomatics Natural Hazards and Risk, 2023

Automated mapping of glacial lakes using multisource remote sensing data and deep convolutional neural network
International Journal of Applied Earth Observation and Geoinformation, 2022

Automated delineation of supraglacial debris cover using deep learning and multisource remote sensing data

Remote Sensing, 2021

Long-term spatiotemporal variability in the glacier surface velocity of Eastern Himalayan glaciers, India
Earth Surface Processes and Landforms, 2021

Examining the Glacial Lake dynamics in a warming climate and GLOF modelling in parts of Chandra basin, Himachal Pradesh, India
Science of the Total Environment, 2020

Development of glacier mapping in Indian Himalaya: a review of approaches
International Journal of Remote Sensing, 2019

Climate change drives glacier retreat in Bhaga basin located in Himachal Pradesh, India
Geocarto International, 2018

Conference Presentations

- Analysis of Climate Variability and Anticipated Risk of Glacial Lake Outburst in Sikkim Himalaya — 5th International YES Congress, Berlin, 2019
- Linking glacial lake expansion with glacier dynamics: South Lhonak Lake, Sikkim Himalaya — EGU General Assembly 2020
- Automated mapping of Eastern Himalayan glacial lakes using deep learning — EGU General Assembly 2022
- Deep learning framework for automated glacial lake mapping — ISMASS Workshop, Reykjavík, 2022
- Searching for Geological Hydrogen with Multisource Remote Sensing Data and AI — AGU Fall Meeting 2023
- Mapping and Analyzing Geological Hydrogen-related ‘Fairy Circles’ using AI-Driven Remote Sensing — AGU Fall Meeting 2024
- Improving urban flood inundation observations using masked autoencoder-based transformers — AGU 2024
- Combining multisource remote sensing data and CNNs for debris cover mapping — Debris Cover Glacier Workshop, ISTA, Austria, 2024

Invited Talks

Mapping and Analyzing Geological Hydrogen related 'Fairy Circles' using AI-Driven Remote Sensing at American Geophysical Union 2024
American Geophysical Union (AGU) 2024, 2024

Towards automated mapping of glacial features using multisource remote sensing and deep learning
Byrd Polar and Climate Research Centre, The Ohio State University., 2023

Teaching

Course material contributor, University of Wisconsin-Madison — “AI for Sustainability” and “AI for Earth Observation”