

Mridul Sharma

Rock and Fluid Multiphysics Laboratory, IIT Roorkee, Roorkee-247667, India

My motivation for research stems from a personal conviction that science should serve humanity, and I aim to use my skills in hydrology and remote sensing to tackle pressing issues such as water scarcity and climate resilience.

Educational Qualification

- **Integrated M.Tech. in Geophysical Technology** **Expected July 2025**
 - Indian Institute of Technology, Roorkee
 - CGPA: 9.09

Areas of Interest

Satellite Remote Sensing, Hydrological Modeling, AI/ML Applications in Water Resources Management

Projects

- **Bridging the GRACE-FO Gap: Spline Interpolation and GLDAS Model Integration**
SPARK Research Internship Program, IIT Roorkee *May–July 2024*
 - Addressed the 10-month data gap between GRACE and GRACE-FO missions using spline interpolation techniques, creating a seamless TWSA record.
- **Moho Discontinuity Modeling using Parker-Oldenburg Spectral Inversion**
SPARK Research Internship Program, IIT Roorkee *June–July 2023*
 - Modeled Moho depths for NW India using Parker-Oldenburg spectral inversion, aligning results with published geological data. Providing insights into crustal dynamics.
- **Earthquake Source Parameter Analysis and Stress Drop Calculation**
Summer Internship, Wadia Institute of Himalayan Geology *May–July 2022*
 - Analyzed 900+ seismic datasets, deriving empirical relationships between source parameters and stress drops. Enhancing earthquake source modeling relevant to seismic hazard assessments.

Ongoing Research Projects

- **Dissertation Thesis – Integrating GRACE & In-situ Well Data for Aquifer Behavior Analysis**
IIT Roorkee *July 2024–April 2025*
 - Investigating the effects of varying geology and groundwater storage anomalies on aquifer behavior using GRACE satellite data and in-situ well measurements.
 - Developing models to integrate satellite-derived and ground-based data for improved aquifer management and prediction of water storage changes.
- **A Mechanistic Approach to Model Aquifer Compaction Dynamics**
IIT Roorkee & University of Lausanne *July 2023–April 2025*

- Identifying subsidence pockets in Ahmedabad municipality and analyzing the correlation between hydraulic head variation and subsidence.
- Modeling clay compaction dynamics with time-lapse well log data and geophysical methods like Electrical Resistivity Tomography.
- Assessing the rate and time association of subsidence over clay layers to aid urban development.

Research Fieldworks

- **Ahmedabad, Gujarat, India (4th–11th December 2024)**

Electrical Resistivity Tomography (ERT) Survey

- Planned and conducted ERT surveys to identify subsurface structures and clay compaction zones linked to subsidence.

- **Geophysical Field Trip, Mohand District, Uttarakhand**

Feb–Mar 2023

- Conducted field surveys using gravity, magnetic, seismic, and electromagnetic methods.
- Analyzed crustal formations and subsurface features relevant to structural stability.

Software Skills

- **Programming Languages:** MATLAB, Python, Fortran
- **Data Analysis Tools:** TensorFlow, Scikit-Learn, Pandas, GeoPandas, GDAL
- **Remote Sensing and Climate Data:** rasterio, ArcGIS Pro, NETCDF4

Extracurriculars & Achievements

- UGTA for academic courses, including mentoring undergraduates.
- Conducted teaching activities in rural villages, promoting education and awareness.
- Founded a study circle focused on exploring the philosophy of great thinkers and conducting meditation sessions.
- Awarded **Dean's Appreciation Award** for achieving the highest increase in CGPA (2021–22).

Publications and Presentations

- **Mridul Sharma**, Anuradha Karunakalage, Mohammad Taqi Daqiq, Kaustubh Raj, Ravi Sharma. "Filling the Gap between GRACE missions for India using LSTM: Positive Trends in 2017 and Negative Trends in 2018." *AGU Fall Meeting 2024*, Terrestrial Water Storage Session, iPoster Presentation.
View poster: [AGU iPoster Link](#)
- **Mridul Sharma**. "Machine Learning Integration for Groundwater Level Prediction using GRACE Data." *CoDS Conference 2024*, Indian Institute of Technology Roorkee, Oral Presentation.

References

Dr. Ravi Sharma

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Dr. M. Israil

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