Wednesday Talk Series
Date: Wednesday, November 26, 2025
Time: 04:00 PM-5:00 PM
Venue: Mithal Hall, Department of Earth Sciences, IIT Roorkee

Multi-Source Geotechnical Evaluation of the Balia Nala Landslide, Nainital, India

Speaker: Saurabh Prakash Aher

Abstract: This study presents a comprehensive geotechnical evaluation of the Balia Nala landslide through the integration of UAV-based mapping, detailed field investigations, laboratory testing, and advanced 3D slope stability analysis. High-resolution UAV photogrammetry was employed to generate accurate digital elevation models (DEMs), orthomosaics, and 3D surface models, enabling precise delineation of the landslide boundaries, identification of scarps, and characterization of surface deformation patterns. Field studies provided essential geological and engineering geological observations viz. discontinuity orientations, borehole data, Seismic refraction tomography, groundwater conditions, and in-situ density measurements, which were critical for understanding the subsurface structure and failure conditions. Samples collected from the site were subjected to laboratory tests to determine shear strength parameters. The combined datasets were integrated into 3D Finite Element numerical models to assess the factor of safety under present and potential triggering scenarios. The results reveal the significant influence of slope geometry, weak lithological units, and pore-water pressure on slope instability. Overall, the multi-source approach improves the accuracy of landslide characterization and offers a robust framework for hazard assessment and mitigation planning in the Balia Nala region.

Brief introduction: Saurabh Prakash Aher is a research scholar in the Department of Earth Sciences at IIT Roorkee, working under the supervision of Prof. S. P. Pradhan. His research mainly focuses on investigating the behavior and evolution of large progressive landslides in the Himalayan region using InSAR, photogrammetry, numerical modelling and both field and laboratory investigations. He completed his undergraduate degree in Geology at Fergusson College, Pune, followed by a master's in Geology from Savitribai Phule Pune University.