



Wednesday Talk Series
Date: Wednesday, January 07, 2026
Time: 04:00 PM-5:00 PM
Venue: Mithal Hall, Department of Earth Sciences, IIT Roorkee



Rockfall Fragmentation: Mechanics and Hazard Assessment

Speaker: Rishi Yadav



Abstract: Rockfall fragmentation is a critical aspect of landslide hazard assessment, influencing rockfall mobility, trajectory, and impact energy distribution. This study examines the mechanics and dynamics of rockfall fragmentation, emphasizing its role as an energy-consuming process that alters hazard potential. The work integrates field observations, UAV-based image analysis, and statistical modeling to identify key indicators such as block-size distribution, power-law scaling, and mobility indices (H/L ratio, reach angle). The research demonstrates that fragmentation patterns ranging from meridian to parallel disaggregation are controlled by factors like impact angle, discontinuity orientation, and material heterogeneity. A case study from Gallivaggio illustrates trend reversals in block-size distribution and multifractal behavior in frequency-volume data, revealing dynamic fragmentation during propagation. Results highlight that neglecting fragmentation can lead to overestimation of rockfall runout and hazard frequency. The findings contribute to refining predictive models for slope stability and improving risk mitigation strategies in mountainous terrains.

Brief introduction: Rishi yadav is a Research Scholar in the Department of Earth Sciences at IIT Roorkee, working under the supervision of Prof. S. P. Pradhan. He holds a B.Sc. and M.Sc. degree in Geology from University of Lucknow, Lucknow. His research is focused on rockfall processes, with particular emphasis on rockfall dynamics and fragmentation during rockfall events.