



Wednesday Talk Series

Date: Wednesday, September 17, 2025

Time: 04:00 PM-5:00 PM

Venue: Mithal Hall, Department of Earth Sciences, IIT Roorkee



Title of the presentation

Magnetic Fabric as an Indicator of Sheath Folding; an Example from the Neoproterozoic Berach Granitoid,
Aravalli Craton, India

Speaker: Bhagirathi Panigrahi



Abstract:

This study is based on the field observations, structural analysis, and anisotropy of magnetic susceptibility (AMS) analysis in ~ 2.5 Ga Berach Granite (BG) in the Aravalli craton. Situated on the hanging wall of the Great Boundary Fault, the BG is juxtaposed against the Vindhyan Group rocks on the footwall. Devoid of mesoscopic or microscopic tectonic fabric, the BG occurs as a massive pluton except in SW, where a km-scale ductile shear zone cuts through it. It intrudes the Hindoli metasediments that show a systematic variation in fold geometry with ductile shearing intensity. Unsheared Hindoli rocks are mildly deformed into NNW-trending, low-plunging upright folds. By contrast, the intensely sheared Hindoli rocks are mylonitised into an L-S tectonite, characterised by NNW-trending vertical folds.

Field and microstructural evidence indicate that the BG preserves signatures of magmatic and solid-state deformation. AMS results suggest that massive BG is also deformed into sheath folds that are geometrically similar to sheath folds in the Hindoli rocks and in the sheared part of the granite. Kinematic axes from AMS, together with vorticity analysis, imply a synchronous deformation of BG and Hindoli metasediments by top-to-NE bulk simple shear in a thrust regime. This deformation event is constrained between ~2440 and 1700 Ma.

Brief introduction: Mr. Bhagirathi Panigrahi is pursuing his Ph.D. in Structural Geology and Tectonics under the supervision of Prof. Deepak C. Srivastava and Prof. Sandeep Bhatt at IIT Roorkee. His research integrates field observations, microstructural analysis, and magnetic fabric studies to unravel the deformation history of granites. He holds an M.Sc. in Geology from Banaras Hindu University and a B.Sc. in Geology from Utkal University.