Chemical & Physical Sciences
UNIVERSITY OF TORONTO
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Colloquium Seminar Series
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Inferring Himalaya Glacier Dynamics with Cosmogenic Nuclides

Landscapes often contain evidence of past glaciations. Glaciers carve u-shaped valleys and deposit thick mounds of entrained debris along their margins. During warm climate periods, glacial features gradually erode, and the role of glaciers in setting a landscape's appearance becomes less clear. Perched at 4.3-4.8 km elevation in the steep mountains of the west Nepal Himalaya lies a puzzlingly flat ~115 km2 patch of land called the Bhumichula Plateau. Bhumichula is littered with glacial morphology, though it is unknown if glaciers were primary geomorphic agents or simply left imprints on a pre-existing flat area. Upon wider inspection, Bhumichula is not unique, with many similar surfaces existing throughout the Himalaya and other mountain ranges. The finding that glaciers bevelled Bhumichula under favourable climate conditions would have implications for identifying areas prone to dramatic future landscape change under a warming climate. My research uses cosmogenic 10Be and 26Al to explore the timing and erosivity of past glaciations on Bhumichula. These isotopes form as cosmic radiation impacts rock located near Earth's surface, and their concentrations accumulate with time. Glacial coverage blocks incoming cosmic radiation from reaching underlying rock and reduces the production rate of these isotopes. Since 10Be and 26Al decay at different rates, the presence and depth of erosion of past glacial coverage are preserved in the ratio of 10Be to 26Al in rock at Earth's surface. In this talk, I briefly discuss applying cosmogenic nuclides to study glaciers and my sampling plan from fieldwork in fall 2022. I then dive into sample processing procedures performed during CPS funded research visits to the University of Vermont's Community Cosmogenic Facility in 2023. Lastly, I contextualize recently acquired isotope data received from Purdue University's accelerator mass spectrometer.