Post-doctoral Position in Geomorphology, Landscape Evolution, and Remote Sensing Focusing on Landslide Dynamics

Project: Redefining Landslide Dynamics: Landslide-Driven Divide Migration and Carbon Sequestration
Supervisor: Dr. Sumit Das
Host Institution: Charles University, Faculty of Science, Prague, Czech Republic
Duration: One-year initial contract, with **possibility of extension for an additional two years**, subject to performance evaluation
Starting Date: 1 June 2026 at the latest
Application Deadline: 20 January 2026

Introduction
Landslides are a pervasive natural hazard, yet their role extends far beyond isolated destructive events. They are agents in sculpting mountainous landscapes, influencing the evolution of river networks, and mobilizing vast quantities of sediment. This project, funded by the Czech Science Foundation (GACR), challenges the traditional hazard-centric view by investigating landslides as integrated drivers of landscape evolution and as potential actors in the carbon cycle. We hypothesize that landslides serve as a mechanism for drainage divide migration, and that the resulting sediment pulses and carbon burial constitute a significant but poorly understood carbon sequestration pathway. Verifying this would represent a major step forward in understanding the feedback between surface processes, tectonic activity, and the long-term carbon cycle.

The Research Plan
This project is built upon several scientific work-packages (WP), combining advanced remote sensing, geomorphic analysis, and numerical modeling.
- The first WP will quantify how landslides actively drive the migration of drainage divides and the reorganization of river networks. This will involve creating a high-resolution landslide inventory and performing detailed morphometric analysis to establish a statistical linkage between landslide spatial patterns and anomalous signals in river profiles, thereby measuring landscape adjustment.
- WP2 will develop a new, mechanically grounded Thermal Stress Landslide Susceptibility Index. This model will integrate diurnal thermal stress cycles and fracture density maps with slope geometry to move beyond statistically based susceptibility assessments.
- The third WP will detect, quantify, and model the geomorphic impact of landslide-induced sediment pulses. Using remote sensing to track turbidity and quantify sediment volumes, this research will parameterize landscape evolution models to simulate channel response and long-term geomorphic feedback under different climate scenarios.

Role and Responsibilities
The successful candidate will lead these WPs by employing methods from remote sensing, GIS, and geomorphic tools. Primary duties include developing algorithms for landslide mapping and thermal stress modeling, processing and analyzing multi-sensor satellite data, and applying landscape

evolution models. The role requires conducting fieldwork in the Alps and the Himalayas. The postdoc will work under the supervision of the PI and collaborate closely with an interdisciplinary team, publish findings in high-impact international journals, and present results at major scientific conferences.

Required Qualifications and Skills

Applicants must hold a **PhD degree** in **Geology**, **Geomorphology**, **Remote Sensing**, **Engineering Geology**, **Earth Sciences**, or **a closely related field**. Essential skills include strong expertise in **remote sensing** and **GIS**, **proficiency in scientific programming** (e.g., MATLAB, Python, or R). **Experience with geomorphic analysis tools** (e.g., TopoToolbox, LSDTopoTools) is highly advantageous. Furthermore, **a solid background** in **landslide studies**, **fluvial geomorphology**, or **landscape evolution** is strongly preferred. The candidate must be **self-motivated**, creative, proactive, capable of leading research tasks with limited supervision, and an **effective collaborator** within an interdisciplinary team. Excellent written and verbal communication skills in English are required. The candidate should be willing to participate in fieldwork in challenging mountainous terrain.

We Offer

The employment is a **full-time** (**40 hours/week**) research position in a dynamic and internationally recognized department. The position offers significant opportunities for professional development, international collaboration, and career advancement. A salary of **60,000 CZK gross/month** will be provided. The researcher will be able to participate in **one to two international conference**s each year.

How to Apply

Interested candidates should submit the following documents: (i) **a motivation letter** (max. 2 pages), shortly describing personal motivation for applying to this postdoctoral position and the candidate's role in contributing to the project, as well as relevant skills, qualifications, and research interests. (ii) A comprehensive **CV including a full publication list**. (iii) **PhD degree certificate** (*candidates with a thesis submitted* but will be defended by the **end of February 2026** *are also eligible*). (iv) **Two recommendation letters**. The application should be sent to Dr. Sumit Das (sumit.das@natur.cuni.cz) with the subject line "[Postdoc Application] Landslide Dynamics".

For any further information about the position, please contact Dr. Sumit Das (sumit.das@natur.cuni.cz).

Charles University is an equal opportunity employer committed to fostering a diverse and inclusive academic community.