



The Institute of Mountain Risk Engineering is currently looking for

2 Postgraduate Research Associates

Project employment / PhD positions

for the project:

Flow behavior of debris flows at different scales

Extent of employment for each position: 30 hours per Week

Duration of employment: 36 months, starting in December 2024.

Workplace: Peter Jordan Strasse 82, 1190 Vienna, Institute of Mountain Risk Engineering

We are seeking two motivated PhD students to work in the project "*Flow behavior of debris flows at different scales (Behave)*", funded by the Austrian Science Fund FWF.

Debris flows are highly concentrated mixtures of sediment and water, including grain sizes from clay to boulders. For predicting runout, erosion and impact dynamics, a quantitative understanding of the flow resistance for a wide range of mixture compositions is needed. Systematic experimental data as well as high-quality field data on the internal shear behavior and stress state for validation of the constitutive models are not yet available.

The overall aim of the proposed project is to (a) quantify the vertical velocity distribution of natural debris flows at a high temporal and spatial resolution, (b) investigate the role of sediment mixture composition on the internal deformation together with the development and decay of pore fluid pressure in excess of hydrostatic, and to (c) link systematic measurements in the lab (controlled boundary conditions at a small scale) with the observations in natural debris flows (field scale) and compare with constitutive flow laws.

The responsibilities and research will include field investigations and laboratory experiments. Internal dynamics of natural debris flows will be derived from data of a monitoring station at the Gatria creek, IT. At the laboratory scale systematic experiments will be carried out to investigate velocity profiles and fluid pressure in a wide range of sediment-water mixtures. In the course of the project, a modified sensor type shall be developed.

The results of the project shall be published in scientific journals and presented at scientific conferences and stakeholder workshops. For inquiries on the topic: roland.kaitna@boku.ac.at

Responsibilities – PhD 1

- Installation and maintenance of monitoring equipment
- Periodic field work
- Processing and analyzing of monitoring data
- Further development of sensors
- Collaborating with other members of the project
- Support of project management
- Writing scientific publications

- Participating in training courses, workshops and conferences

Responsibilities – PhD 2

- Laboratory experiments with sediment-water mixtures in a large-scale drum facility
- Processing and analyzing of experimental data
- Testing of sensors
- Collaboration with members of the project
- Support of project management
- Writing scientific publications
- Participating in training courses, workshops and conferences.

Required skills and qualifications

- Master's degree in Engineering, Earth Sciences, Environmental Sciences, Physics or related disciplines
- Ability to work in a team and independently
- Motivation and the enthusiasm for scientific work
- Eligibility to enroll in a PhD program at BOKU University

Desirable skills and qualifications

- Fundamentals in hydraulics, geotechnics, geomorphology, physics
- Advanced programming skills (e.g. with R, Python, Matlab) and experience in data analysis
- Good presentation skills, stress resilience, reliability
- Driving license

We offer

- Two 3-year fully funded PhD positions in the framework of the FWF project *Behave*
- Interdisciplinary and international work environment including a frequent exchange with project colleagues and scientific cooperation partners
- Opportunity to enroll in the BOKU Doctoral School HADRIAN (<https://boku.ac.at/docservice/doktoratsstudien/doktoratsschulen/hazards-and-risks-in-alpine-regions-under-global-change-hadrian>)
- Opportunity to present results at international scientific conferences
- Gross monthly salary based on standard personnel costs and salaries for FWF project proposals: www.fwf.ac.at/en/funding/steps-to-your-fwf-project/further-information/personnel-costs

Applications can be submitted until: **August 31, 2024**

BOKU University seeks to increase the number of its female faculty and staff members. Therefore, qualified women are strongly encouraged to apply. In case of equal qualification, female candidates will be given preference unless reasons specific to an individual male candidate tilt the balance in his favor.

Please send your application per email, including (1) motivation letter, (2) CV, (3) scan of degrees and certificates, (4) abstract of master's thesis, and (5) name of two referees as a single PDF-file (< 5 MB) to ian@boku.ac.at, reference code: "Behave".