

Postdoctoral Openings in Landslide Mechanics

Topic: Assessment of slope stability conditions via satellite remote sensing

Landslides are prime damaging agents for infrastructures, habitat, and human life. In this project, modern satellite-borne remote sensing will be used in conjunction with computationally efficient geomechanical models to derive time-varying metrics of slope stability from the observed landslide kinematics. Specifically, open-access satellite and airborne interferometric synthetic aperture radar (InSAR) technology will be used to resolve vertical and horizontal ground movements, eventually using these measurements to formulate, initialize, and verify mechanical models of slope instability and subsequent landslide motion for multiple mechanisms of failure.

One Ph.D. position and one Postdoctoral position are about to be opened on these topics in the Geomechanics Group at Northwestern University, both aimed at creating a diversified team exploring this intriguing topic. Both positions will focus on the formulation and implementation of elastoplastic and viscoplastic constitutive laws into numerical models of slope failure and subsequent landslide motion, as well as on the use of spatially distributed satellite data for model formulation, calibration, and validation.

Position Descriptions

The selected candidates will work under the supervision of Prof. Giuseppe Buscarnera. Both the Ph.D. student and the Postdoctoral scholar will be part of a highly multi-disciplinary team, covering expertise in geomechanics, geomorphology, and remote sensing and including partners from numerous institutions at national and international level. In terms of constitutive modeling, the project activities will focus on the use of soil mechanics, elastoplasticity, viscoplasticity, and hydro-mechanical coupling, as well as on the implementation of constitutive equations into numerical modeling platforms. In terms of numerical modeling, the project activities will involve the use and development of computational models for heterogeneous natural slopes, with emphasis on the interaction among mechanical and hydraulic processes under static and dynamic conditions. Competitive salary, exposure to a dynamic, collaborative, and multi-disciplinary international environment and opportunities for professional development will be essential elements of the two positions. While the two positions are considered independent, opportunities for collaboration exist and will be encouraged.

Selection Criteria

- An M.S. or B.S. in Civil Engineering, Mechanical Engineering, or related fields (for applicants to the Ph.D. position).
- A Ph.D. in Engineering, Geomechanics, Mechanics or related fields (for applicants to the Postdoctoral position).
- Expertise and/or interest in constitutive modeling and soil mechanics.
- Expertise and/or interest in numerical methods for hydro-mechanical problems.
- Excellent preparation and/or interest in computer coding.
- Ability to work independently.
- Excellent communication skills.

How to Submit Your Application

Applicants interested in the Ph.D. position can find more information about how to apply to the Ph.D. program at Northwestern University at the following website <https://www.mccormick.northwestern.edu/civil-environmental/academics/graduate/>. They are also encouraged to contact Prof. Giuseppe Buscarnera (g-buscarnera(at)northwestern.edu) for enquiries about the selection process and its timeline. Applicants interested in the Postdoctoral position can forward a single PDF consisting of a 1-page cover letter, a curriculum vitae, contacts of two references and two representative publications to Prof. Buscarnera. For additional information you can contact the above email address or visit the website <http://www.civil.northwestern.edu/people/buscarnera/>.

Selection Process

The review of candidates for the Ph.D. position will follow the timeline of the general admission to the Ph.D. program, thus starting on December 15th, 2022. Admission decisions will be finalized no later than April 15th, 2023. The review of candidates for the postdoctoral position will instead begin on January 1st, 2023. In this case, applications will be accepted until the position is filled.