

PhD Position in Physics-Informed Machine Learning For Mechanics of Material Failure

The **Data-Driven Mechanics Laboratory** is seeking a highly motivated doctoral student to study physics- and thermodynamics-informed machine learning (ML) for the mechanics of material failure. The project focuses on learning the effective behavior of materials of civil engineering interest (granular geomaterials, structural materials) arising from complex microstructural mechanisms involving inelasticity and friction, as well as potential multiphysics couplings. It promises to push the boundaries of constitutive and multiscale modeling for these materials.

Main roles and responsibilities:

Research in this project involves a synergistic combination of numerical modeling, and physics-informed ML with the following key aspects:

- Data mining through micromechanical/mesoscale simulations (Discrete/Finite Elements).
- Collaboration with experimentalists towards validation of the simulations.
- Development and implementation of the machine learning framework.
- Dissemination in journals and international conferences.

Requirements:

- Passion about working at the intersection of mechanics and machine learning.
- Bachelor/Master's degree in Civil Engineering, Mechanical Engineering, Applied Mathematics, Computational Science or related areas.
- Background in computational mechanics, experience in scientific machine learning.
- Proficiency in Python, and familiarity with low level languages (e.g. C++).
- Excellent English communication skills (oral and written).

We offer:

- World-class multi-cultural environment on the shores of beautiful Lake Lemman.
- Innovative interdisciplinary research at the Data-Driven Mechanics Lab.
- Competitive salary and employment conditions.

Application procedure:

Please email a **single PDF** consisting of:

- Curriculum vitae (max. 2 pages) that includes contact details of at least 2 referees,
- Motivation letter (max. 1 page),
- Detailed transcript of records (both Bachelor's and Master's)

to konstantinos.karapiperis@epfl.ch, indicating in the subject "PhD Application PI-ML" until July 1st 2024. Applications will be evaluated in the order that they are received. For inquiries please contact Prof. Kostas Karapiperis at the same email.

Expected Start Date: Fall/Winter 2024

Duration: 4 years (1-year fixed-term contract renewable annually according to EPFL rules)