

Joint PhD position at UCLouvain and Ecole des Ponts **in Geomechanics**

Experimental and numerical investigation of environmental factors affecting grain crushing

Context and objectives

Grain breakage is a common occurrence in granular media when the intergranular forces exceed the individual particle strength and is of major importance in many areas of geosciences. Experimental evidences suggest that particle breakage may significantly influence the mechanical behavior of the material promoting strain localization and favoring chemical interaction between reactive fluids and minerals. These effects are of major importance in geotechnical engineering for the design of geotechnical structures such as deep foundations or embankments, but also in geology for the understanding of fault mechanics and the propagation of landslides.

The objective of this PhD will be to understand and characterize the effect of environmental conditions like degree of saturation, stress-path, ambient temperature and chemical environment on the mechanism of grain crushing. To achieve this goal, the project proposes a multidisciplinary integrated research strategy that combines experiments using a state-of-the-art high pressure and high temperature triaxial device at Ecole des Ponts ParisTech, together with numerical modelling using an open-source parallel Finite Element framework specifically designed to study different geomechanical problems involving multi-physical couplings.

Candidate profile

The candidate should have a strong background in mechanics and be interested in experimental testing and numerical modelling. Curiosity, and willingness to learn and to develop new ideas are essential to accomplish the project.

Contact and application

Interested candidates should send an application (including a CV, a cover letter describing interests and qualifications related to the PhD Thesis and two reference Professors, all compiled in a single PDF file) to Hadrien Rattéz at UCLouvain (Hadrien.rattez@uclouvain.be) and Jean Sulem at Ecole des Ponts ParisTech (jean.sulem@enpc.fr).

The successful applicant will start on September 1st, 2021.