

Vacancy • PhD Student in Soil Mechanics

A position for a PhD student-assistant is available in the Laboratory “Soil, Solid, Structure and Risks” (3SR) at the University Joseph Fourier, Grenoble (France). The proposed subject is related to unsaturated geomaterials behaviour and it is entitled “water retention and hydro-mechanical couplings associated with post-localisation behaviour of unsaturated sand”. PhD works will be especially of experimental nature however will contain modelling tasks in relation with the numerical tools already developed in our lab. The PhD student could have opportunities to work as a teaching assistant.

Our lab is equipped with a multi scale X-ray Computed Tomograph which allows to characterise locally sands structure at the grain scale, and its time evolution between different equilibrium states, with a spatial resolution of less than 8 microns. In addition our team develops techniques and numerical tools for quantitative and qualitative analyses and interpretation of 3D pictures. These leading edge research methods in geomaterials will be used in this project aiming to better understand and define the physical phenomena acting at the microscale in unsaturated sand which are responsible of the global response of the material. These experimental investigations will lead to define constitutive laws in the frame of enriched continuum mechanics, adapted to this kind of materials in such conditions (unsaturation) and taking into account in the mathematical formulation the observed local phenomena.

One can define two main research axes for the PhD which concern: water retention behaviour and hydro-mechanical couplings associated with post-localisation behaviour of unsaturated sand. This analyse will be done mainly on sand, used as an equivalent media presenting strong analogies with finer material and for which the physical phenomena responsible of the unsaturated behaviour are well identified.

This PhD thesis will be done in the framework of collaboration with Geomechanics Laboratory de Kyoto University (Japan).

Candidates should send electronic applications to the following email addresses: pierre.besuelle@hmg.inpg.fr and simon.salager@hmg.inpg.fr. The application file will include a cover letter describing interests and qualifications for the position and a complete curriculum vitae.