



## **Announcement for post-doc position for 2016 (12 months)**

### **Numerical modelling of internal erosion within a poro-elastic soil and its consequences on soil mechanical behaviour.**

Location: GeM Laboratory (UMR CNRS 6183, IEG research team), University of Nantes, Saint-Nazaire, France.

Job description: This research project is financed and co-supervised by the EDF-CIH company. The salary will be based on the contract grid of the employer, *Capacités society* (a subsidiary of the University of Nantes) with gross income estimated around 40,000 € for 12 months.

Objectives and Scientific Strategy: The project is designed to start a new numerical FEM approach complementary to the experimental approach developed by the team. The main objective is to contribute to the design and the implementation of a new constitutive model representing the poro-elastic behaviour of a soil sample with suffusion (internal erosion). The scientific strategy comprise the following steps: (1) understanding the comprehensive poro-elastic model adapted to suffusion, (2) implementation of the model within a domestic Fortran code, (3) testing this model against closed-form solutions, (4) model triaxial and suffusion tests realized by other members of the team and (5) contribute to the interpretation of those tests both on the internal erosion susceptibility and on the influence of the erosion on the mechanical behaviour. Publications in international peer-reviewed journals and conferences are expected within the project

#### Prerequisites:

- PhD in geomechanics, civil engineering or environmental engineering
- Proficiency in English and French communications, both written and spoken English
- Good skills in programming, preferably in FORTRAN and/or C++, matlab or python
- Ability to work in a team and motivation to publish internationally
- Applicants with one or several of the following research experiences are preferred: mixture theory, finite elements, computational methods, and soil mechanics.

#### Applications:

Interested applicants may contact Dr. Rachel Gelet and Pr. Didier Marot, through both emails: [rachel.gelet@univ-nantes.fr](mailto:rachel.gelet@univ-nantes.fr) and [didier.marot@univ-nantes.fr](mailto:didier.marot@univ-nantes.fr). The application should include a CV and

a cover letter. In the cover letter, the applicant should include a short research statement explaining how he/she understands the issues related to the project.

Closing date: 15th June 2016

Starting date: September 2016

Employer presentation: Capacités SAS (<http://www.capacites.fr/>)

*Capacités SAS* is a French subsidiary of Nantes University, it was founded in 2005 and is located in Nantes. It counts more than 50 employees. *Capacités SAS* optimizes the link between Nantes University, companies and research partners throughout expertise, advice, assessment, engineering, R&D, sales and marketing services with the aims to optimize results of the latest research developments and to widen its portfolio.

Contact: Laurence Guihéneuf, [laurence.guiheneuf@capacites.fr](mailto:laurence.guiheneuf@capacites.fr)

Partner 1 - GeM laboratory presentation (<http://gem.ec-nantes.fr/>)

The GeM is an UMR of the CNRS linked to two establishments, on one hand the *École Centrale of Nantes* and on the other hand the *University of Nantes* represented by the *Faculty of Science and Techniques of Nantes* and the Technological college *I.U.T. of Saint-Nazaire*. The IEG research team of GeM Laboratory is recognized for its knowledge, experience and skills on soil behaviour under hydraulic load linked to internal erosion processes in hydraulic earth structures.

Contacts: Didier Marot, [didier.marot@univ-nantes.fr](mailto:didier.marot@univ-nantes.fr), Rachel Gelet, [rachel.gelet@univ-nantes.fr](mailto:rachel.gelet@univ-nantes.fr)

Partner 2 - EDF-CIH presentation (<https://www.edf.fr/groupe-edf/producteur-industriel/hydraulique>)

Present for more than 25 years on *Savoie Technolac*, the *Center of Engineering Hydraulics (CIH)* of EDF designs and realizes hydraulic arrangements in France and abroad, rehabilitates and modernizes the existing structures and contributes to assure the maintenance of the current French hydraulic park. CIH employs 942 people.