



## Recruitment Associate/full professors School year 2014-2015

**Short profile:** Environmental geotechnics and geomechanics

**Category:** Professor

**Job number:** 0567

**Field of expertise:** **Section 1:** 60

**Section 2:**

**School to which the position is attached :** Grenoble-Ense3

**Associate Research lab:** 3SR

**Location:** Grenoble

**Date de recrutement :** 01/09/2014

**Contact (*email...*) :**

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Grenoble INP, Grenoble Institute of Technology has been training engineers, and PhDs, and developing outstanding international research for the past hundred years. As a public Higher Education Institution and a leader in innovation, it is one of the preferred partners of the industrial world. As a cofounder of MINATEC, and an active member of Grenoble Innovation University, it is involved in international projects. Grenoble INP, Grenoble Institute of Technology is made up of approximately 1100 staff (administrative and academic), 6 engineering schools, 5400 students and 32 Research labs.

*Site internet :* <http://www.grenoble-inp.fr/>

### **School to which the position is attached**

Ense3 - National School of Energy, Water and Environment - is an engineering school of the Grenoble INP group. It trains engineers in industries to meet the challenges of tomorrow and respond to the major societal challenges of the 21st century. Over 1000 students (engineers and masters) for a total of 100 faculty members - 350 temporary teachers - 50 administrative staff.

The school offers a comprehensive and multidisciplinary training based on a strong interaction with industry and research, particularly through the technological platforms PREDIS and IEE. The number of partnerships with large groups provide a good fit with the training needs of industry. The strong link with the research

laboratories of Grenoble internationally recognized allows teaching to be brought in line with the latest technological developments. Ense3 also works towards opening itself to the world and its issues, including the promotion of international mobility of students and by diversifying the public (foreign students, learning).

Ense<sup>3</sup> website : <http://ense3.grenoble-inp.fr/index.jsp>

### **Teaching experience:**

The candidate will participate in the teaching of the civil engineering curriculum of the “Hydraulic Structures and Environment” (HOE) masters specialty of Ense3, developing transverse lessons covering geotechnical and environmental engineering. Specifically he/she will develop and teach lessons on the interaction between geotechnical structures and groundwater managed by different types of coupling: pollutant transfer in porous media, alteration of the behavior of unsaturated soils through hydro-mechanical, physico-chemical or microbiological processes. The analysis of geo-environmental interactions and impacts of structures, and more specifically bioremediation of soils for reinforcement or site remediation are currently a field of expansion in engineering.

The candidate should have a good knowledge of the behavior of geomaterials (soils , rocks ... ), constitutive laws, transfer phenomena in porous media and associated numerical methods (finite elements , discrete elements . ..). Knowledge of advanced industrial codes is appreciated.

It is also highly appreciated that the applicant has industry experience and links with industry and downstream sectors as well as an international experience. The candidate should demonstrate abilities in spoken and written English in order to be able to take part in lessons taught in English.

He or she will obviously have to take over the teaching of core and elective modules for the masters specialties of the all school.

He or she will immediately have the responsibility of the Geo-environmental module taught in the 3<sup>rd</sup> year. The candidate will have to take responsibility, in the medium-term, of the masters specialty and / or facilitation and management of education in the wider context of Ense3 .

### **Associate Research lab:**

**3SR** – Domaine Universitaire – BP 53 – 38041 GRENOBLE cedex 9

The laboratory Soils, Solids, Structures - Risks comprises all the geomechanics manpower of Grenoble, civil engineering and associated risks as well as mechanics and multiphysics couplings in complex solid media. This is a mixed research unit (UMR 5521) between CNRS, the University Joseph Fourier and the Institut Polytechnique de Grenoble.

### **Objectives**

The objectives are the analysis of the behavior, durability and vulnerability of structures and systems, their modeling and the development of tools for their optimization, possibly the verification of their security in service and their repair when damaged:

- In the field of environmental and technological risks,
  - \* for underground and surface storage
  - \* for gravity and seismic risks
  - \* for underground collapses (structure-environment interaction)
  - \* regarding the safety of sensitive structures
- In the field of mechanical behavior and conduct in-service
  - \* structures and geo-structures
  - \* systems and complex solid media (granular, porous, woven, reinforced...) whether natural or artificial (including biological media)

In all these areas (the list is not exhaustive), research based on work where experiments are conducted to understand, analyze and provide data for the development of advanced models which take into account physico-mechanical coupling as well as multi-scale analysis. 3SR is equipped with innovative experimental tools relevant in mechanics of materials, geomaterials (soils, rocks, concrete) and structures. The numerical modeling is a goal for all research based on advanced numerical technologies (finite elements, discrete elements, multi-scale techniques, couplings...) leading to powerful tools as well as simplified methods for engineering.

**Website Laboratoire 3SR:** <http://www.3sr-grenoble.fr/>

#### **Research experience:**

Laboratoire 3SR has recognized expertise in modeling and numerical simulation of geomaterials by continuous and discrete approaches and models.

A central goal of this professorial position is the production of constitutive laws incorporating knowledge from direct calculations performed on microstructures as practiced in the laboratory for bi- and tri-phasic geomaterials and chemo-thermo-mechanical couplings.

The candidate will provide expertise in the field of advanced constitutive laws and multi-physics coupling in the framework of the theories of continuous media and/or discrete media. His/her developments will be linked to existing geo-environmental issues, such as methods of storage and retrieval in the deep rocks or methods of bio / chemical treatment of soils.

Research teams involved in this theme are the GDR, GEO, Medina and RVO teams.

#### **Details of the position, specific requirements and responsibilities**

None

#### **Languages**

Ability to teach in French and English  
Fluent French and English required.

#### **Skills**

<b>General knowledge</b>	Modeling and numerical simulation of geomaterials with continuous or discrete approaches
<b>Technical knowledge</b>	Creation, steering and management of national and international multi-partners research projects in association with the industrial sector
<b>Character traits</b>	Leadership

**Keywords :**

geomechanics, geotechnics, non linear mechanics, rheology, natural hazards, constitutive laws, multi-scale, multiphysical couplings