



RECRUITMENT OF TWO TENURE TRACK ASSISTANT PROFESSORS IN GEOMECHANIC, HYDROGEOLOGY, GEOLOGY

Institution: **MINES ParisTech (École Nationale Supérieure des Mines de Paris)**

Laboratory : **Centre for Geosciences**

Location: **35, rue Saint Honoré
77300 Fontainebleau, France**

Developing its research and teaching activities in the field of Geosciences, MINES ParisTech opens two assistant professor positions in Geomechanics, Hydrogeology and Geology.

The chosen candidates will take part in the partnership research work of their teams and contribute to industrial and economic innovation. During their first year in the Centre for Geosciences, they will also have the opportunity to define PhD subjects they will supervise together with a senior member of the team who is officially accredited for such a task.

These two positions are to evolve into positions of permanent lecturer and researcher within 3 years in the framework of a Tenure Track procedure. A description of the process is available on MINES ParisTech website : <http://www.minesparistech.fr/Ecole/Recrutement/Travailler-a-MINES-ParisTech/>

1. THE CENTRE FOR GEOSCIENCES

The Centre for Geosciences of MINES ParisTech focuses on research and teaching activities in the field of applied Earth Sciences. It is located in Fontainebleau, 65 km South of Paris. Research and training activities cover various fields in relation to the understanding of mining and management of underground resources (mineral raw material, oil & gas, groundwater, deep underground waste storages, tunnelling and underground space management) in the context of a sustainable development.

The Centre for Geosciences is divided into six research teams in applied Earth Sciences fields (geology, geophysics, geostatistics, hydrogeology, hydrochemistry, engineering geology and geomechanics). Research activities are generally multidisciplinary and involve several teams of the Centre with topics spanning from original and fundamental developments to innovative industrial solutions. The Department employs about 40 tenured researchers, 35 technicians and administrative staff members and 40 PhD students.

The two positions concern the Geomechanics, Hydrogeology and Geology research teams, briefly described below:

The Engineering Geology and **Geomechanics** team (GIG) develops research activities related to two major fields : management and exploitation of underground resources and spaces; control of geotechnical hazards and risks. The research programme deals with experimental and theoretical modelling of i) thermo-hydro-mechanical coupled phenomena in porous and fractured rocks, ii) evolution, stability and failure of geomaterials, ii) stability of underground structures, iii) dynamic response of structures.

The **Hydrologic Systems and Reservoirs** team (SHR), is mainly constituted of hydrologists and hydrogeologists, and its research activities are related to i) transfer of fluids, chemicals or heat in porous or fractured media, and ii) the modelling of hydrosystems and their interaction with human activities. The team develops numerical tools applied to the management of underground or surface water resources, exploitation of geothermal energy, underground storage of waste material, or impact on water resources of former mining activities.

The **Geology** research team focuses on research projects seeking to improve the comprehension of surface and sub-surface geological systems, based on both field analysis and modelling. The activities of the team are mainly related to i) the response of sedimentary systems to allocyclic controls and ii) the fluid-rock interactions. The team is involved in fundamental as well as applied research projects, from reservoir to basin scale. The team develops activities in the field of clastic sedimentary process modelling, starting with the fluvial systems. Several current projects are conducted in close scientific cooperation with the other teams of the Centre for Geosciences.

2. DESCRIPTION OF THE VACANCIES

2.1 Position in GEOMECHANICS

Research-related aspects of the position

The candidate is expected to conduct research in the field of structural analysis and its applications in the design of civil engineering underground works, geological storage of energy or waste, as well as in the simulation of dynamic behaviour of structures. He/she will contribute to the improvement of the structural analysis software which is developed by the team.

The candidate is expected to contribute actively to theoretical and methodological studies of thermo-hydro-mechanical coupled processes in rocks, as well as to their application, to understand and simulate the behaviour of some hydrocarbons and geothermal reservoirs.

Most of these research activities need a multidisciplinary approach, and as a result the candidate will have to work closely with other teams of the Centre for Geosciences (Hydrogeology, Geophysics, Geology).

Teaching-related aspects of the position

The candidate will contribute to teaching general and specialized courses within the different programs of the Earth Sciences Department (MINES ParisTech and associated universities Master programs, continuing education, supervision of trainees and PhD students). Depending on the background of the candidate, teaching topics can address geomechanics, structural analysis, continuum mechanics, finite elements ... The candidate will also be involved in the general organisation of courses and will supervise student internships that are generally chosen in close collaboration with industry.

Specificities of the profile

He/she should prove a significant experience in modelling of the equations which govern mechanical or thermal phenomena, as well as flow in porous media; he/she will show references in terms of software development (or significant contribution to the evolution of existing software, mainly FEM codes). Finally, he/she will have the necessary skills to develop and monitor lab or in situ experimental programs.

2.2 Position in HYDROGEOLOGY

Research-related aspects of the position

Candidates are expected to work in the field of modelling of water, solute and energy fluxes in aquifers. He/she is expected to contribute to the three research activities of the SHR team indicated hereinabove.

The candidate is expected to contribute mainly to the numerical modelling of the long-term hydro-geo-chemical evolution of polluted natural systems. To develop this work, in situ data acquisition is a basic step to feed quantitative models. Lab experiments can of course also help provide new data.

Most of these research activities need a multidisciplinary approach, and as a result the candidate will have to work closely with other teams of the Geosciences Centre, especially the geochemistry team.

Teaching-related aspects of the position

The candidate will contribute to the teaching of general and specialized courses within the different programs of the Earth Sciences Department (MINES ParisTech and associated universities Master programs, continuing education, supervision of trainees and PhD students). Depending on the background of the candidate, teaching topics can address hydrogeology, hydrology, Geochemistry ... The candidate will also be involved in the general organisation of the courses and will supervise student internships that are generally chosen in close collaboration with industry.

Specificities of the profile

The candidate will have strong skills in Earth Sciences (geology, hydrology, geochemistry, biology) and a taste for modelling. He/she will have the necessary skills to develop and implement new models, in flow and hydrogeochemistry, but also to collect information in the field or in the lab.

2.3 Position in GEOLOGY

Research-related aspects of the position

The team is seeking applications in the field of sedimentary processes modelling. The candidate will participate in the development of modelling tools, based on existing and new field observations.

The goal is to develop new methods, based on original research and data resulting from collaboration with partners involved in the exploitation of natural resources or in underground storage wastes. The candidate will contribute to the research activities of the team in the understanding and the simulation of heterogeneous reservoirs in order to improve their evaluation and exploitation. He/she will also contribute to the simulation of long-term evolution of storage sites integrating the local climatic and geomorphological conditions, as well as their evolution in the context of the global climate change.

Teaching-related aspects of the position

The candidate will contribute to the teaching of the general and specialized courses within the different programs of the Earth Sciences department (MINES ParisTech and associated universities Master programs, continuing education, supervision of trainees and PhD students). The candidate will also be involved in the general organisation of courses and will supervise student internships that are generally chosen in close collaboration with industry.

Specificities of the profile

The candidate should have a very good knowledge in sedimentology and physics. He/she will have the necessary skills to develop and implement new models but also to collect information in the field or in the lab. The position is an exciting challenge for a researcher with a taste for multidisciplinary works and a strong involvement in applied research.

3 APPLICATION FILE

At the time of the appointment, the applicants must have a doctoral degree in Earth Sciences or a related subject. As the positions imply cooperation with international partners, strong social skills as well as good knowledge of English language are required. Post-doctoral experience in a foreign laboratory would be an asset for this position.

The applicants will have to show their capacity to conduct research work in a multidisciplinary context, together with an aptitude for teamwork. A first experience in academic or industrial research would be appreciated.

The application file will include :

- a detailed CV;
- a list of recent research work and publications;
- a covering letter presenting the candidate's research project;
- possibly three reference letters, directly sent to the Geosciences department, from specialists selected by the candidates. If not, the file will include at least the names and contact details of three scientific leading figures who can be contacted to give their opinion about the candidate's work and abilities.

The file should be sent **no later than May 15th 2015** at the following address:

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