



Geoscience and Geoengineering Research Department

Open position for a Research Assistant in the field of *Geostatistics*, or *Hydrogeology*, or *Geotechnics*

MINES ParisTech, one of the major French higher education and research institutions, has an opening for a gifted young scientist at Research Assistant level in the field of *Geosciences*. The appointment will be for an initial period of three years maximum; subject to good performance, this position will be extended to a permanent associate professor position.

The position offers opportunities for strong collaborations with other industrial and academic R&D groups at European and international level. The successful candidate will also have the opportunity to co-supervise Master and Ph. D. students.

Starting annual gross salary range will be 35 to 40 k€, depending upon previous experience. This salary will evolve according to results.

1. The Geoscience and Geoengineering research department

The Geoscience and Geoengineering research department 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 the various fields in relation to the understanding of mining and management of underground resources (mineral raw material, oil&gaz, groundwater, deep underground waste storages, tunnelling and underground space management) in the context of a sustainable development.

The Geoscience and Geoengineering department is divided into six research teams which cover most of the applied Earth Sciences fields (geology, geophysics, geostatistics, hydrogeology, hydrochemistry, engineering geology and geomechanics). Research activities are generally multidisciplinary and involve several teams of the department, topics spanning from original and fundamental developments to innovative industrial solutions. The department employs about 50 tenured researchers, 35 technicians and administrative staff, and 70 PhD students.

The department also benefits from experimental facilities dedicated to rock and water characterization (ionic microprobe, SEM, XRD, water chemistry analysis...), to soil and rock mechanical testing, and finally to simulate rock cutting and oil&gaz drilling processes.

The Geoscience and Geoengineering research department takes also part in the MINES ParisTech graduate school and PhD programs in association with several Paris Universities. Besides, the department offers several professional trainings (6 to 9 months; about 50 trainees per year) in the fields of public administration of mining activities, geostatistics, open-pit mining, and economic evaluation of mining projects.

(see <http://www.geosciences.mines-paristech.fr> for more information)

2. To apply

At the time of the appointment, the candidates must have a doctoral degree in Earth sciences or related subject.

As the position implies cooperation with international partners, strong social skills as well as good knowledge of English language are required. A first experience in academic or industrial research would be appreciated.

Applications must be submitted by November 30th, 2012.

All applications must include:

- a detailed curriculum vitae;
- a list of publications and recent projects;
- a cover letter indicating the profile on which the person candidates, and presenting the **research project** of the candidate;
- if possible, three recommendation letters. In any case at least the names and contact information of three references.

Applications should be sent via E-mail or by post to:

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3. Description of the different profiles

3.1 Position in *Geostatistics*

Description of the research team

The *Geostatistics* team gathers twelve teachers-researchers and about fifteen PhD students and trainees. Geostatistics is dealing with models and probability methods devoted to the characterization and the prediction of phenomena showing a spatial variability. It was created by Georges Matheron at the beginning of the 1960s and got developed from the creation of the Geostatistics research department of MINES ParisTech in 1967. As its applications largely concern Earth Sciences (mine, oil, environment), the Geostatistics research department has integrated the Geoscience and Geoengineering research department in 2006. Nevertheless, the team keeps on developing works in other fields as fisheries sciences or epidemiology.

The team develops theoretical tools, new methodologies and applications for new questions or problems, as well as its own computer tools. Beside its research tasks, the team is in charge of teaching and training in Geostatistics: Geostatistics classes in MINES ParisTech and associated universities Master programs, specialised training in Geostatistics (CFSG), and finally continuous formation training (*Automnales*).

Research

The candidate will manage and lead research works in spatial statistics. He will have to be able to contribute to theoretical and methodological works as well as to their application to concrete problems. According to the needs of the department but also to his tastes and abilities, he will for example contribute to works dealing with modelling of compositional data, spatiotemporal modelling, stochastic inverse modelling, assimilation of data, or extreme values in a spatial context.

In the frame of his activities, he will take part in the preparation of research actions, often by making partnerships with other research institutions, in France and abroad, by looking for co-financings from companies, national agencies or European funds.

He will contribute to the recognition of the team and to the promotion of the research undertaken by taking part in scientific events and by publishing works.

Teaching

The candidate will be in charge of courses dealing with his research topics in the frame of the teaching and training activities of the team.

Specificities of the candidate

The candidate will have strong skills in mathematics, probabilities and stochastic processes. He will have a taste for theoretical works as well as for applications. An international experience will be appreciated.

Contacts for further questions related to both profiles

For more information on scientific questions:

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For more information on administrative questions:

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3.2 Position in *Hydrogeology*

Description of the research team

Hydrologic systems and reservoirs is one of the six research teams of the *Geosciences and Geoengineering research department*. The team 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, in collaboration with its partners (Météo-France, INRA) its own numerical tools, which are applied on topics like 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.

Beside its research tasks, the team is also in charge of some teaching and training activities.

Research

Candidates are expected to work in the field of modelling of water, solute and energy fluxes in aquifers. Three main research axes will be explored, in continuity with the team activities:

- concept developments: recent developments include:
 - modelling of multiple permeability media (e.g., matrix and fracture permeability);
 - modelling of water and solute fluxes in the unsaturated zone, at local as well as regional scale;
 - multiphasic contaminants;
- integrating modelling tools: the team has developed along the years tools for several domains (water flux in large multilayered aquifer systems, solute flux in aquifers, biogeochemistry of rivers,...). These tools are presently being integrated in a unique simulation platform (Eau-Dyssée) which takes into account coupling between surface and underground flow, as well as problems of water quality due e.g. to agriculture, and climatic forcing.

The candidate is expected to contribute in a balanced way to these activities. He/she will participate to the elaboration of research actions in partnership with other French or foreign research institutions, and look for co-financings from companies, national agencies or European funds. He/she will actively contribute to the recognition of the team by promoting the research undertaken with the industrial world through participation to scientific events and publications

Teaching

The candidate will be in charge of courses dealing with his research topics in the frame of the teaching and training activities of the team.

Specificities of the candidate

The candidate will have strong skills in geology, and have a taste for modelling. He/she will have to develop activities to collect data as well on the field as in laboratories, but he/she will also to develop quantitative aspects by the way of modelling activities. An international experience will be appreciated.

Contacts for further questions related to both profiles

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3.3 Position in *Geotechnics*

Description of the research team

The *Engineering Geology and Geomechanics* team is made of fifteen permanent teachers-researchers and is thus the most important team of the Geoscience and Geoengineering research department. Its research works can be classified into two major fields: management and exploitation of soils, rocks, or underground space; control of geotechnical hazards and risks. The research topics of the team deal with theoretical and experimental modelling in the following topics:

- evolution, stability and failure of geomaterials (soils, rocks and cement materials);
- thermo-hydro-mechanical coupled phenomena in geotechnics;
- interaction between structure and geomaterials and mechanical behaviour of interfaces (reinforcement of soils and rocks, mechanical behaviour of drillstring assembly inside boreholes, wearing of cutting and drilling tools, ...).

Research

The candidate is expected to conduct research and teaching-training tasks, specifically in the field of structural analysis and its applications in the design of civil engineering underground works, geological storage of hydrocarbons or waste, as well as in mechanical simulation (static and dynamic) of oil&gaz drilling systems. He/she will contribute to the improvement of the structural analysis software which are developed by the team.

The candidate will take part in the preparation of research actions, including development of partnerships with other research institutions, in France and abroad, and looking for co-financings from companies, national agencies or European funds. He/she will actively contribute to the recognition of the team by promoting the research undertaken with the industrial world through participation to scientific events and publications.

Teaching

The candidate may be involved in teaching in the frame of the training activities of the team.

Specificities of the candidate

The candidate should have good skills to develop static and dynamic numerical modelling of the mechanical behaviour of structures. He/she has to be able to use numerical simulation tools (mainly FEM codes) and to contribute to their development. Finally, he/she will have the necessary skills to develop and monitor a lab or *in situ* experimental program.

Contacts for further questions related to both profiles

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