RECRUITMENT OF A TENURE TRACK ASSISTANT PROFESSOR

IN ENERGETICS (SMART GRIDS)

Institution: **MINES ParisTech (Ecole Nationale Supérieure des Mines de Paris)**
Laboratory : **Center for Processes, renewable energies and energy systems (PERSEE)**
1 rue Claude Daunesse, 06904 Sophia Antipolis, France.

To develop its research and teaching activities in the field of Smart Grids, MINES ParisTech is opening an assistant professor position in Energetics.

Initially on a short-term contract, this position is suitable for a young male or female researcher who is motivated by multidisciplinary work connecting fundamental research with industrial applications. The successful candidate will have the opportunity to work closely with economic and academic spheres and will take part in the team's contractual research. In this capacity, he/she will have the opportunity to develop collaborative research projects, publish in top journals and take part in international conferences. He/she will also have the opportunity to define a PhD subject during his/her first year at PERSEE to be supervised together with a senior member of the Center officially accredited for such a task. In addition, he/she will take part in supervising other PhD students on the team.

The position should evolve into a permanent lecturer and researcher after three years in line with the tenure-track process. A description of the process is available on the MINES ParisTech website: http: http://www.mines-paristech.fr/Ecole/Recrutement/Travailler-a-MINES-ParisTech/

1. RESEARCH AT MINES ParisTech

In line with its educational activity, MINES ParisTech develops research covering a very broad range of scientific disciplines. Its 18 research centers are organized into 5 departments: earth sciences and environment, energy and process engineering, mechanical engineering and materials, mathematics and systems, economics, and management and society.
Research at MINES ParisTech aims at both academic excellence and socio-economic impact. This targeted research model is developed in close interaction with the socio-economic sphere, i.e. private and public companies, institutions and state administrations. MINES ParisTech is the leading university in France in terms of contracted research, driven by ARMINES, the MINES ParisTech Foundation and MINES ParisTech. This original positioning has seen the university expand its teams (by recruiting lecturer-researchers on permanent contracts funded by its own resources via the contractual research association ARMINES), and enables it to sustain unique experimental and numerical platforms whose quality is acknowledged by its partners.
This capacity of MINES ParisTech and companies to work together on ambitious scientific and industrial issues is recognized nationally and internationally. As an illustration, 2016 featured a CNRS silver medal awarded to Madeleine Akrich, two ANR industrial chairs, the renewal of the Carnot label (MESR), and saw MINES ParisTech ranked 23rd in the *QS World University Rankings by subject* and in the top 100, 150 and 300 in the Shanghai engineering rankings.

2. Center for Processes, Renewable Energies and Energy Systems (PERSEE)

PERSEE is one of 18 research Centers at MINES ParisTech. Its field of expertise is new energy technologies and renewable energies. Its research strategy is based on a "micro/macro" approach that goes from (nano) materials to energy systems. It is developed around three structuring axes: i) materials and components for energy, ii) sustainable processes and technologies for energy conversion and storage, and iii) renewable energy sources and smart grids. The corresponding research activities are carried out by two groups at the Center: MATPRO ("Materials and Processes for Energy") and ERSEI ("Renewable Energies and Smart Grids").
PERSEE is also actively involved in education and training. It is responsible for the MINES ParisTech "Machines and Energy" undergraduate Engineer program, the School's doctoral specialty, "Energy and Processes", and the International Chinese-European Master's, CARE. It offers MOOCs in the energy field and runs the international Specialized Masters ENR and ALEF created by the Center in 2002 and 2007 respectively.

The ERSEI group works on developing methods and tools for the optimal integration of distributed generation, including renewable energies and storage, into power systems and electricity markets. The group's research activity is divided into **three themes**. 1) The first is based on developing advanced **short-term forecasting methods** for various applications in power systems (i.e. forecasting renewables production, consumption, dynamic line rating, etc.). 2) The second focuses on **modeling, managing and planning smart grids**. This involves devising innovative approaches for the predictive management and planning of power systems in order to optimize the integration of renewables, which involves taking into account inherent uncertainties in renewable generation, storage options, demand flexibility, the integration of electric vehicles, and the deregulated market environment. These issues are at the heart of smart grid research. 3) The third and last theme concerns modeling **multi-energy hybrid systems**. These are small systems that employ renewable energies to electrify remote sites (commonly known as "offgrid").

PERSEE is located at the scientific technology park of Sophia Antipolis, near the cities of Nice, Cannes and Antibes. It employs a staff of 50 (on 31/10/2017) including 25 permanent positions, of whom 14 are lecturer-researchers.

3. DESCRIPTION OF THE VACANCY

Research activities
The successful candidate is expected to have a proven ability to elaborate academic research in the field of smart-grids. Depending on his/her competencies, the candidate will contribute to developing the first and/or second theme dealt with by PERSEE's ERSEI group as described above, considering various fundamental aspects, in particular in the following areas:

- **Forecasting**: Development of short-term probabilistic forecasting approaches (from a few minutes to a few days) of different processes considered in the management of power systems including e.g. renewable generation (wind, photovoltaic), local electricity consumption, dynamic line rating (DLR), and electricity prices. The development of methods capable of intelligently and cost-effectively exploiting very large quantities of data (i.e. big data) available at different spatial and temporal scales will also be considered.
- **Modeling/Management/Planning**: Development of stochastic optimization approaches to manage different system typologies (e.g. smart-homes, virtual power plants, renewable/storage combined plants, micro-grids, electric vehicle fleets, etc.) for different purposes (e.g. participation in electricity markets, supply of flexibilities and system services, etc.). Potential synergies between different energy vectors (electricity, gas, heat networks, etc.) will also be considered. Research activity may focus on planning problems of transmission and distribution grids considering, for example, different technological developments expected in the smart grid field. The associated objective in this area is to integrate in the different decision processes and in the best way possible the different uncertainties inherent to renewable energy production and demand, which will be a major challenge for networks in the future.

The corresponding research activity could potentially include an experimental component related to the research projects developed and the teaching activities to be carried out.

Teaching activities
The chosen candidate will act as assistant to the manager of the Specialized Master ALEF ("International Energy Management"). Depending on opportunities, he/she will participate in teaching activities on the basis of his/her research themes and competencies, as part of the programs the PERSEE Center is involved in. He/she will also be encouraged to set up new courses within MINES ParisTech's teaching programs.

Specific candidate requirements
The position is suitable for a researcher with a doctoral degree in areas like **applied mathematics or electric engineering** from a university or engineering school. Significant experience would be strongly appreciated in one or several application domains, such as time-series forecasting, predictive analytics, optimization methods (stochastic, combinatorial, etc.), high dimensional systems modeling, renewable energies and smart grids. A good standard of spoken and written English is required.

A post-doctoral experience in a research laboratory different from the one in which the candidate undertook his/her PhD, and preferably in an international institution or laboratory, would be highly appreciated.

The candidate should demonstrate a strong capacity to work in a team in order to be able to develop his/her research activities alongside teams from the PERSEE center and other French and foreign laboratories. In addition, the candidate should be sufficiently autonomous to develop his/her own research activity connected to the themes described above.

The candidate will be required to look for outside resources through partnerships with different stakeholders from industrial and academic spheres and to actively take part in setting up and coordinating national and international projects, linking together theoretical research and numerical simulations or even experimental approaches.

4. APPLICATION

The application should include:

- **Detailed CV**
- **Covering letter**
- List of recent research work and publications
- The proposed scientific project, connected with the candidate's research work, along with a project to participate in the School's teaching activities
- Assessment reports of the candidate's PhD (if available)
- If possible, three reference letters sent directly to PERSEE from specialists selected by the candidate. If not, the application should at least include the names and contact details of three leading scientific figures who could be contacted to give their opinion on the candidate's work and abilities.

The application should be sent by email, **by 31 December 2017 at the latest**, to Mr. Georges Kariniotakis (georges.kariniotakis@mines-paristech.fr) with a copy to Ms. Sophie Pierini (sophie.pierini@mines-paristech.fr).

Please also fill in the online form: **https://goo.gl/sDhqXZ**

Applications will be evaluated by a jury comprising researchers from MINES ParisTech and external scientists. Preselected candidates will be invited to present their background, work and scientific project to this jury.

For further information, please contact Mr. Georges Kariniotakis, Head of PERSEE's ERSEI group, and/or Mr. Bruno Dehen, director of the human resources department at MINES ParisTech (bruno.dehen@mines-paristech.fr).