



**RECRUITMENT TENURE TRACK IN ENERGETICS
(SYSTEMS FOR THE HYDROGEN ENERGY SECTOR)**

Establishment : MINES ParisTech (Ecole Nationale Supérieure des Mines de Paris)
Affectation : Centre Procédés, énergies renouvelables et systèmes énergétiques (PERSEE)
Processes, renewable energies and energy systems

As part of the development of its research and teaching activities in the field of systems for the hydrogen energy sector, MINES ParisTech is opening a Tenure Track position in Energetics.

Opened in the form of a three-year fixed-term contract, this position is intended for a young researcher (M/F, PhD + 0-5 years) keen on multidisciplinary work at the interface of the basic research and the industrial world. The selected candidate will have the opportunity to work in close connexion with the business community and will participate in the research contracts of his team. He/she will also have the opportunity to supervise PhD works and to participate in the lectures taught in the different education programs of the School. **This position is intended to evolve into a permanent position of teacher-researcher** after a period of 3 years as part of a Tenure Track procedure that assesses the successful integration of the candidate in the research team and its ability to adopt the research model of the MINES ParisTech research Centers.

Candidates can find a description of this procedure on the MINES ParisTech website, at : <http://www.mines-paristech.fr/Ecole/Recrutement/Travailler-a-MINES-ParisTech/>

1. RESEARCH AT MINES ParisTech

In coherence with its education activity, MINES ParisTech develops a research activity that covers a very broad field of scientific disciplines. The eighteen research centers are organized into five departments: Earth and Environmental Sciences, Energy and Processes, Mechanics and Materials, Mathematics and Systems and finally Economics, Management and Society.

Research at MINES ParisTech is aimed at both academic excellence and socio-economic impact. This model of oriented research is developed in close interaction with the socio-economic world: private and public sector companies, as well as institutions and public administrations. MINES ParisTech is the first school in France for its volume of research contracts, supported by Armines, the Mines ParisTech Foundation or MINES ParisTech. This original positioning has allowed the School to expand its teams (by recruiting permanent teachers-researchers on its own resources through Armines), and allows it to maintain on the long-term unique experimental and digital platforms whose quality is recognized by its partners.

This ability of MINES ParisTech and companies to work together on ambitious scientific and industrial topics is recognized at the national and international level: let us mention, for 2016, the CNRS silver medal awarded to Madeleine Akrich, two ANR industrial chairs, the renewal of the Carnot label (MESR), MINES ParisTech ranked 23rd in the QS World University Rankings by subject, in the top 100, 150 and 300 of Shanghai thematic rankings in engineering or ranked 72nd with PSL in the THE classification.

2. PERSEE RESEARCH CENTER

The position is opened in the research Center PERSEE (<http://www.persee.mines-paristech.fr/>), located in the Sophia Antipolis science park.

The Center's staff is currently composed of 22 permanent people (including 15 scientists), 18 doctoral students and 2 post-docs. Its field of expertise concerns new energy technologies (NTE) and renewable energies (RE). Its research strategy is based on a multiscale approach ranging from (nano)materials to energy systems. It is built around three structuring themes: i) materials and components for energy, ii) sustainable processes and technologies for energy conversion and storage and iii) renewable energies and intelligent electrical systems. The associated research is conducted within two groups: MATPRO ("Materials and Processes for Energy") and ERSEI ("Renewable Energies and Intelligent Electrical Systems").

The PERSEE Center is also very active in education and training. In particular, it is in charge of the minor "Machines and Energy" of MINES ParisTech's Ingénieur-Civil program, of the PESTO "Energie" of the *Corps Technique de l'Etat* (State Technical Corps), and will be involved in the specialties of the future Graduate School of Systems Engineering, Materials, Mechanics, Energetics (ISMME). It is also in charge of the ENR and ALEF International Specialized Masters Courses (post master programs), respectively created in 2002 and 2007 by the Center, and participates in the coordination of the Sino-European CARE Masters Course (Clean and renewable energy).

The group MATPRO is essentially active on the first two themes: "Materials and components for energy" and "Sustainable processes and technologies for energy conversion and storage". The research is developed around the close links between processes and associated materials in the context of: i) thermal insulation and innovative envelopes (especially for the building industry), ii) the hydrogen-energy sector and low temperature fuel cells and (iii) plasma technologies (hydrogen and carbon black co-production, CO₂ retro-conversion) and energy storage.

The group also conducts research in the field of renewable energies: conversion of wind energy, hybrid multi-energy systems in the hydrogen-energy sector (for example coupling PV generator, electrolyser and fuel cell), direct conversion of solar energy in hydrogen (photo(electro)lysis or water splitting) and passive solar components of building envelopes.

The (nano)materials developed and studied by MATPRO mainly concern metal oxides (SiO₂, TiO₂, SnO₂ matrices), crosslinked polymer matrices (resorcinol-formaldehyde, polyurethane, cellulose derivatives, ...) and nanostructured carbons. They come from sol-gel (aerogels) and plasma processes (carbon blacks, fullerenes, nanotubes).

The position to be filled is proposed by the group MATPRO to reinforce its activities in the field of systems for the hydrogen-energy sector, within the framework of the second theme of the Center ("Processes and technologies sustainable of conversion and storage of energy"). The recruited person will be under the hierarchical authority of the person in charge of this group.

3. PROFILE DESCRIPTION

The person sought is a candidate who has demonstrated abilities to develop academic works, project partnerships and industrial collaborations in the field of the hydrogen-energy sector (systems activities). The candidate should have a good autonomy allowing him to generate, manage and promote innovative collaborative projects and to find external resources through partnerships with different actors of both the industrial and academic worlds.

Research

The PERSEE Center wishes to strengthen its team in the field of processes for electrochemical conversion and energy storage. In the medium term, the selected candidate will take responsibility for the relevant "processes / systems" activities.

The research mission will focus on the systemic aspects of the MATPRO group's activities related to the hydrogen-energy sector. This mainly includes studies on low temperature fuel cell systems (PEMFC), stacks and auxiliaries, for all types of applications (transport, stationary, ...) or developments concerning electrochemical compression / purification. In line with the foreseen projections, the activities will have to quickly integrate the systems of hydrogen production by electrolysis (or plasma technologies) as well as the coupling with the renewable energies. On top of setting up and monitoring the laboratory tests, the

candidate must be able to develop models adapted to the problem studied.

It is expected that the recruited person is strongly involved in the establishment of new direct collaborations with industry players in the field, both locally and nationally and internationally. The recruited person will have to actively contribute to the extension of the PERSEE Center's academic partnership networks. He/she will also participate in working groups already active in the field of hydrogen and fuel cells in structures such as the Joint Technology Initiative FCH (Hydrogen Europe Research), the European Alliance Joint Program Hydrogen and Fuel Cells energy research (EERA) or the French Association of Hydrogen and Fuel Cells (AFHYFAC).

The successful candidate will have to develop his/her own creative research program around these themes, to participate in various courses for both students and engineers, to co-supervise doctoral students and to communicate in the best international journals and conferences.

Teaching

The candidate will contribute to the various courses and trainings of the School; he/she will be encouraged to take small classes or set up new courses in energy that will enrich the educational offer of MINES ParisTech, including its site of Sophia Antipolis. In particular, from the beginning, he/she will participate to courses on hydrogen and fuel cells provided in the education programs of the University Paris Sciences and Letters (PSL University) recently created (eg master research " Energy ") and specialized ENR and ALEF masters. He/she will also participate in the MINES ParisTech Civil Engineer options ("Machines and Energy" and "Processes and Energy") and in the MIG (generalist engineer modules) which evolve every year. He/she will also be involved in specialized courses in the hydrogen-energy sector, tutoring IC students, masters and specialized masters as well as research training for PhD students.

He/she will participate in the selection and graduation of students in the cycles that will involve him/her. He/she will co-supervise PhD students, master or post-master students and engineering students. If necessary, he/she will contribute to the institution's e-learning offer or to replications abroad of the School's courses at its international partners, in both French and English. He/she will have to prove an educational experience in the field of the position. He/she will assume his share of the administrative work of organization of the lessons and the industrial visits.

The ability to deliver courses or MOOCs in english is required. An experience of digital education will be appreciated.

Specificities of the candidate's profile

The position is for a young researcher graduated from a major school or university, with a PhD in energy, a strong interest in the hydrogen-energy sector and experience in systems and electrochemical processes. Proven skills in electrical engineering, thermics, fluidics and electrochemistry as well as systems modeling are expected. A significant experience in a research laboratory different from the one in which he/she will have completed his/her PhD, and preferably in a foreign institution or laboratory, will be highly appreciated. The candidate must have demonstrated a good capacity to work in a team, in order to be able to develop his/her research activities in collaboration with the PERSEE Center teams and other French and foreign laboratories, both academic and industrial. The candidate will have to collaborate in project proposals writing, project management and/or coordination, linking theoretical and experimental research, modeling and numerical simulations. He/she must have demonstrated proven scientific and/or educational responsibilities as well as organizational.

Fluency in spoken and written English is imperative.

4. APPLICATION FILE

The application will contain the following elements:

- a cover letter,
- the personal development project, in coordination with the activities of the PERSEE Center,
- a detailed CV,
- a list of works and publications,
- thesis dissertation and defense reports
- if possible, three letters of recommendation addressed to us directly by personalities chosen by the candidate. (Failing this, the file will include at least the names and contact details of three scientific personalities who may be asked to give an opinion on the candidate's work and skills.)

The file should be sent, no later than 2019 March 31, to the attention of the Director of the Center, Mr. Arnaud RIGACCI, and the MATPRO group Leader, Mr. Christian BEAUGER, by e-mail to arnaud.rigacci@mines-paristech.fr and christian.beauger@mines-paristech.fr or by post to the following address:

Centre PERSEE - MINES ParisTech,
1 rue Claude Daunesse - CS 10207,
F – 06 904, Sophia Antipolis cedex, France

For more information, the candidates can contact, for the scientific aspects, Mr. Christian BEAUGER and, for the administrative aspects, the direction of the human resources of the School.