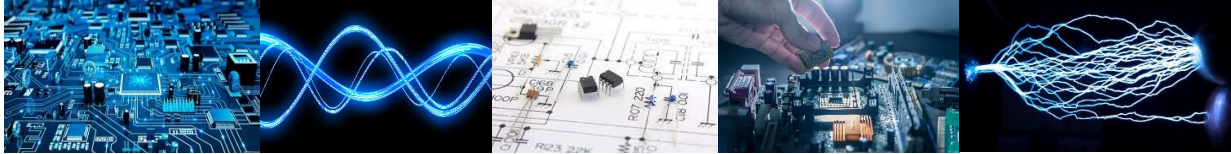


## **ASSISTANT PROFESSOR (TENURE TRACK) IN ELECTRICAL / ELECTRONIC ENGINEERING FOR PROCESS ELECTRIFICATION**



Mines Paris - PSL University opens an Assistant Professor position (tenure track) in the field of electrical / electronic engineering for process electrification, first under the form of a fixed-term contract, then able to evolve into a permanent position after a period of 2 years. Any person having a Ph.D. in Electrical / Electronic Engineering with a pronounced experimental profile and wishing to contribute to the energy and industry transitions to prepare a greener but no less technologically efficient world can apply.

### **Research at Mines Paris - PSL**

Mines Paris - PSL is a French public establishment with a scientific, cultural and professional vocation that comes under the Ministry for Industry, and a founding member of the University of Paris Sciences and Letters (PSL). Since the School's creation in 1783, it has trained high-level engineers capable of solving complex problems in a wide variety of fields. Along with its training activity, Mines Paris - PSL develops research covering a very broad field of scientific disciplines. The 18 Research Centers are organized into 5 departments: Earth and Environmental Sciences, Energy and Processes, Mechanics and Materials, Mathematics and Systems and, Economics, Management and Society.

The research undertaken at Mines Paris - PSL aims both at academic excellence and socio-economic impact. This targeted research model is developed in close interaction with the socio-economic sphere: private and public sector companies, public institutions and administrations. Mines Paris - PSL is the first school in France in terms of volume of contractual research, supported by ARMINES, the Mines Paris Foundation or Mines Paris - PSL. This original positioning has enabled the School to expand its teams (by recruiting researchers on permanent contracts using its own resources via the contractual research association ARMINES) and allows it to maintain unique experimental and digital platforms whose quality is recognized by its partners. Located in the heart of Paris, Mines Paris - PSL brings together all areas of knowledge, innovation and creation. Ranked among the top 50 universities in the world, PSL University trains researchers, artists, engineers, entrepreneurs and managers while fostering awareness of their social, individual and collective responsibility.

### **PERSEE Research Center**

PERSEE Center is one of the 4 Research Centers at the Energy and Processes Department (DEP) of Mines Paris - PSL. Its field of expertise concerns new energy technologies (NTE) and renewable energies (EnR). PERSEE's research strategy is based on a "micro/macro" approach ranging from (nano)materials to energy systems. It is built around three structuring themes: i) materials and components for energy, ii) sustainable energy conversion and storage processes and technologies, and iii) renewable energies and smart electrical systems. The associated research is conducted by the groups MATPRO ("Materials and Processes for Energy"), TeP ("Thermochemistry and Plasmas") and ERSEI ("Renewable Energies and Intelligent Electrical Systems"). The PERSEE Center is also very active in education and training. It actively participates in the civil engineering program at Mines Paris - PSL and in the Energy Master's degree program at PSL. The Center is also in charge of the international Specialized Masters, ENR and ALEF, which it created in respectively 2002 and 2007. The PERSEE Center is located in the science and technology park of Sophia Antipolis, in the south of France near the cities of Nice, Cannes and Antibes. Around 50 people work at PERSEE, which currently has 22 permanent staff, including 10 teacher-researchers. The position to be filled concerns the TeP group. The location is Sophia-Antipolis.

### **Position Description**

The position is for a young researcher (M/F) wishing to work for energy transition at the interface of fundamental research and industrial development within a world-renowned research group. The position is offered by TeP "Thermochemistry and Plasmas" research group of PERSEE center to strengthen its expertise in the field of electrical

/ electronic engineering. TeP group has been working for almost 30 years with international industrial partners on industry electrification and decarbonization with several big successful technological transfers. Plasma assisted thermochemistry is the historical specialty of the group. In this frame, the young researcher will integrate the team currently composed of gas and plasma physicists and thermochemists in order to study and develop special electrical generators / converters for the tailor-made production of a wide range of plasmas, thermal type (free arc plasmas or magnetically confined plasmas) and non-thermal type ones (non-equilibrium discharge plasmas). The young researcher will work both on the fundamental and technological aspects of electrical generation / conversion by focusing on the classes, architectures and modes of generation as well as the dynamic control of the most suitable waveforms for each plasma source. The research will cover several technologies of generation / conversion, ranging from the electrotechnical type generators (based on transformers, multi-capacitors, etc.) to electronical type ones (based on field-effect transistors, bipolar junction transistors, insulated-gate bipolar transistors, etc.), and several waveform types going from one-phase alternating current to pulsed current with variable shape and polarity, by way of three-phase alternating current with controlled phase change. Frequency modulation will also be an important aspect in the research work. The power range will extend from W to MW depending on the target process applications so the candidate must have a good knowledge on the technological choice criteria and the scaling effects for producing and stabilizing similar excitation signals at different scales.

Given the research objectives of the position, the general knowledge of the candidate must be quite extensive in the field of electrical / electronic engineering (power generation principles, electrical / electronic architectures of converters, energy optimization, modulation and dynamic control of waveforms, component design, resonance, electromagnetism, coupling in complex systems with highly non-linear reactive multipoles, etc.). Additional knowledges in signal processing (analog / digital) and automation (intelligent automatic control, event-driven programming, etc.) would be a plus.

The recruited researcher will participate with the rest of the group to the development of robust, efficient plasma sources with high degree of energy control in various physical conditions for integration into new thermochemical processes in the frame of heavy industry electrification and decarbonization supporting the energy transition. He/She will have the possibility to define a thesis subject from the first year and to participate in its co-supervision. In addition to the proposed research activity, he/she will take part in the teaching at Mines Paris and more generally at PSL University in engineering sciences.

### **Required profile**

The candidate must have a Ph.D. in Electrical / Electronic Engineering with a pronounced experimental profile. A post-doc in the field would be a real plus. Any experience in this field applied to the generation of: (i) plasmas, (ii) high power lasers (gas lasers), (iii) microwaves, or (iv) X-rays, will be a great asset.

A post-doctoral period or a stay at a research center or institution other than that in which he/she pursued his/her doctorate, and preferably in a different country, will be highly appreciated. The candidate must demonstrate his/her ability to work in a team, his/her potential to develop research activities in his/her field in collaboration with the other researchers of PERSEE Center and other French and foreign research teams, and sufficient autonomy to develop his/her research activity in connection with the themes described above. The successful candidate will be required to seek external resources through partnerships with various players in the industrial and academic worlds and to actively collaborate in setting up and participating to projects at national and international levels.

Fluency in spoken and written French and English is essential.

### **Application**

The standard application must include the following items (if possible in a single pdf file):

- a detailed résumé (CV)
- a cover letter
- a list of studies and publications
- the research project proposed, based on the candidate's experience and in relation to the priorities of the TeP group described above and his/her project for involvement in the teaching activities of the School
- PhD thesis (link to pdf) and the reports of the rapporteurs/assessors and other reports related to the defense (if available)

- if possible, three letters of recommendation should be sent to us directly by referees chosen by the candidate. Failing this, the file should 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 must be sent, no later than April 16, 2023, to the following address:

**Centre PERSEE – Mines Paris-PSL**  
**1 rue Claude Daunesse**  
**CS 10207**  
**06904 SOPHIA ANTIPOLIS CEDEX**  
**To the attention of Prof. Vandad J. Rohani**

And/Or by email to: [vandad-julien.rohani@minesparis.psl.eu](mailto:vandad-julien.rohani@minesparis.psl.eu)  
with a copy to: [sophie.pierini@minesparis.psl.eu](mailto:sophie.pierini@minesparis.psl.eu)

Applications will be examined by a jury comprising representatives of the School and external eminent scientists. The candidates chosen during the pre-selection process will be invited to present their background, their work and their scientific project in front of this jury.

For more information, candidates may contact Prof. Vandad J. Rohani, Head of the TeP group at PERSEE and/or the Human Resources Department at Mines Paris.