



**Materials Science and Mechanical Engineering center
– Georges Friedel Laboratory –
Application for the post of Assistant Professor (*Maître Assistant*) in
“Architected materials and ceramics”**

The École Nationale Supérieure des Mines de Saint-Etienne (EMSE), École de l'Institut Mines Télécom, under the supervision of the Ministry of the Economy, Industry and Digital Technology, is assigned missions of education, research and innovation, transfer to industry and scientific, technical and industrial culture.

The EMSE consists of 1,800 engineering and research students, 420 staff members, a consolidated budget of €50M, three sites on locations within the Saint-Etienne campus (Loire Department), as well as another campus in Gardanne (Bouches-du-Rhône Department). Our institution has five educational training and research centres, seven research laboratories. In addition, we maintain a museum/centre (La Rotonde) dedicated to improving and disseminating public awareness of science, technology and industry. Our school conducts development projects in France and abroad.

The SMS Centre (Materials Science and Mechanical Engineering) conducts advanced research in materials, mechanics and advanced manufacturing processes. There are three principal areas of study: land and air transport. Our goal is reduce weight, optimize production infrastructure, transport and energy storage. All of our efforts are to increase the durability of in-service materials, ameliorate or create functionalized surfaces, and support new and creative uses of materials for industrial design. The SMS centre ensures the implementation and development of the manufacturing components for the "Mines Saint-Etienne-Tech" program. This initiative will strengthen industrial knowledge transfer and by consequence, the visibility of the existing role of our School in the field of cutting-edge materials for advanced manufacturing processes. Plus, pioneering material and mechanical engineering is one of the bases for the national project 'Alliance for the Industry of the Future'. Our SMS Center is further sub-divided into three research departments that direct teaching, research and transfer activities and four technology platforms, sharing common experimental and digital resources. Finally, it should be noted that the SMS Center composes half of the Joint Research Unit CNRS / EMSE UMR 5307 "Georges Friedel Laboratory".

The prospective candidate will enter the department MPE (Mechanics and Processes of Direct Elaboration) which structures its research activities around the development of ceramic and multi-material materials. Of particular interest is the microwave sintering process, and organic matrix composite materials via particular infusion processes. The development of mechanistic-based models and high-performance numerical methods is a central element of to MPE's activities. These endeavours coupled with the experience actual experimentation makes it possible to accurately control processes of direct elaboration which will optimize performance of the structures in service.

The general theme of the position offered exists at the frontier between the development of ceramic and multi-material materials by advanced manufacturing processes such as additive manufacturing and consolidation by heating under electromagnetic field. An experimental approach coupled with a modelling of the physical phenomena is essential to understand the relations between among the elaborated architectural structures and their behaviour during the microwave heating to control their

progression the microstructures induced their history and, in fine, to predict the properties depending on the process parameters and the materials used.

Candidate profile and assessment criteria

The candidate should hold a doctorate in physics and materials sciences (sections 33 and/or 28 du CNU). Significant experience of in teaching in the aforementioned fields (teaching instructor, contracted teacher and/or ATER status (temporary teaching and research assistant status) at undergraduate or post-graduate cycle levels are appreciated.

The successful candidate will contribute to the research titled «Advanced ceramic processes and multi-material». Thanks to our in-house training, he/she will master the general concepts of for powders metallurgy for ceramics and the production processes associated with composites and multi-materials and should be keen to develop an advanced experimental approach. An experience in the field of multi-physics modelling of processes, guaranteeing an 'Advanced User' level of numerical modelling, will enable it to ensure a balance between this experimental approach and modelling. The stakes for our institution are not insignificant; successfully accomplishing these tasks will further position Mines Saint-Etienne as a natural partner for additional research at regional, national, and worldwide levels.

Command of the English language is essential. Given the School's international development projects, extensive international experience abroad is strongly recommended. Failing this, international mobility with a foreign partner institution should be arranged by management during in the three years following recruitment to improve the transnational collaboration aptitude of the candidate.

1) Missions

Teaching

The instructional aspects for the candidate mission consists of in undertaking both supervised and practical courses, along with the tutoring of projects and internships/work experiences.

The applicant should be capable of covering a relatively large spectrum within the teaching of materials science and/or physics and/or chemistry. The teaching assignments could also involve other training programmes: Masters of Science, doctoral studies, professional and vocational training.

The successful candidate will be actively involved with the teaching teams in charge of the training courses cited above. The design of new activities and the development of innovative teaching methods, in particular related to digital technology, will be an integral component of the teaching mission.

The candidate should be able to carry out the teaching assignments and possibly MOOCs in English. A minimum number of hours must be completed. Activity design, supervision and course management are included in the expected teaching activities.

Research

In relation to the research theme "Advanced ceramic processes and multi-material" the following tasks will be allocated to the candidate: in the research laboratory LGF research laboratory (Georges Friedel Laboratory):

- Develop a research activity on the architected materials manufacturing and ceramic materials. The candidate may propose a project falling under one or more of the following research areas:

"Ceramic, multi-material and composite materials", "Ceramic and / or organic radiation-matter interaction", "Experimental modeling and simulation of processes", "Characterization of microstructural evolutions", "Mechanisms of constrained transport".

These research topics in 'Physics and Mechanics of Materials' will be developed in collaboration and in coherence with the research activities of our main academic and industrial partners. The recruited

person will have to integrate a modelling approach to, on the one hand, design and validate his experimental developments, and on the other hand to reinforce the position of the team in this field.

- Ensure long-term collaborations with industrial partners and develop in parallel a fundamental approach,
- Participate in regional and / or national and / or international structuring actions.

These assignments will be carried out on the G. Charpak Provence/Saint-Etienne (42).

2) **Candidate assessment criteria:**

The main candidate assessment criteria are as follows (non-exhaustive list):

- Significant teaching experience (development of digital courses, reference works...) in the previously mentioned fields, at under-graduate or post-graduate level, will be appreciated, along with development of new teaching methods.
- Capacity to reinforce the research theme “Architected materials and ceramics”
- Capacity to successfully integrate the team project, the centre and the research laboratory
- Production of scientific articles: quality and number of publications in A-ranked scientific journals according to HCERES (Council for Evaluation of Research and Higher Education) criteria.
- Partnership-based research: direct industrial partnerships, collaborative research, support to start-ups ...
- International partnerships
- Good command of the English language, significant international experience
- Other skills or aptitudes (to be completed): aptitude for team work, management, piloting projects, English,
- Capacity to obtain the Accreditation to Supervise Research qualification (Habilitation à Diriger des Recherches) in the five to seven years following the candidate’s recruitment

3) **Recruitment Conditions**

By application of the specific status of teaching staff of the Mines Telecom institute (modified decree n° 2007-468 of the 28th March 2007), candidates should hold a doctorate diploma or a similar recognized qualification level, equivalent to the required national diplomas.

In addition, candidates should have European Union citizen status as of the day of the application submission (law 83-634 of the 13th July 1983 referring to the rights and obligations of public employees; Art. 5 and 5 bis).

Required date for taking up the position: **1st October 2018**

4) **Application procedures**

The application file should include:

- An application cover letter
- A curriculum vitae outlining teaching activities, research work and where appropriate, relations with economic and industrial sectors (maximum 10 pages)
- Recommendation letters, at the discretion of the candidate,
- A copy of the Doctorate diploma (or PhD),
- A copy of an identity document

These documents should be addressed for the attention of the Director of the École Nationale Supérieure des Mines de Saint-Étienne, at the latest by the **30th April 2018**, date as per postmark, and sent to:

École nationale supérieure des Mines de Saint-Étienne
For the attention of Madame Elodie EXBRAYAT

Department of Personnel and Human Resources
158, Cours Fauriel
42023 Saint-Étienne cedex 2
France

Candidates selected for an interview will be informed rapidly. Part of the interview will be held in English. Cover letters, CVs and application files written in English will be accepted, but applicants will have to demonstrate in their application file their ability to efficiently communicate in French with students, fellow faculty members and the school administration. For those invited to be interviewed, the same will be expected in oral form and tested by the selection committee.

5) Further information

For further information concerning the post, contact:

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