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8 schools + 39 laboratories

8300 students

1 300 teaching, research, administrative and technical staff

Grenoble INP - UGA is a renowned public institution of higher education and research, and a major player in the Grenoble ecosystem. It is the engineering and management institute of Grenoble Alpes University, and plays a leading role in the scientific and industrial community.

## Researcher on the development of memristive devices based on topotactic phase transitions

Job reference number	2024-RESDEVMEMDEVICES-LMGP
Research field	Materials Engineering/Materials Technology/Chemistry/Physics
Host laboratory	LMGP (UMR 5628 Grenoble-INP, UGA and CNRS) / Website : <a href="http://www.lmgp.grenoble-inp.fr">www.lmgp.grenoble-inp.fr</a>
Researcher profile	First stage researcher (R1)
Location	Grenoble, France
Date of recruitment / contract term	As soon as possible (13 months)
Contacts	Mónica Burriel <a href="mailto:monica.burriel@grenoble-inp.fr">monica.burriel@grenoble-inp.fr</a>

Grenoble INP - UGA is a leading public institution accredited with the French label "Initiative d'excellence". It offers innovative engineering and management programs, with an increasing internationalization of its course offers. The courses are grounded in sound scientific knowledge and linked to digital, industrial, organizational, environmental and energy transitions. The Engineering and Management Institute of Grenoble Alpes brings together more than 1300 staff members (teacher-researchers, lecturers, administrative and technical staff) and 8300 students, located on 8 sites (Grenoble INP - Ense3, Grenoble INP - Ensimag, Grenoble INP - Eisar, Grenoble INP - Génie industriel GI, Grenoble INP - Pagora, Grenoble INP - Phelma, Polytech Grenoble, Grenoble IAE and the INP Prepa). Grenoble INP is also a highly-ranked institution of higher education and research, leading the way in the fields of engineering and management on an international scale. It is a member of a large number of international academic and research networks. It is part of the European University UNITE!.

As part of Grenoble Alpes University, Grenoble INP has associated guardianship of 39 national and international research laboratories and of technological platforms. The research conducted there benefits both its socio-economic partners and its students. Grenoble INP is at the heart of the following scientific fields: physics, energy, mechanics and materials; digital; micronanoelectronics, embedded systems; industry of the future, production systems, environment; management and business sciences.

Grenoble INP - UGA is an equal opportunity employer committed to sustainability. Grenoble INP-UGA celebrates diversity and equity and is committed to creating an inclusive environment for all employees. All qualified applications will be considered without discrimination of any kind.

# Research

The postdoctoral researcher will work within the LMGP, Materials and Physical Engineering Laboratory in Grenoble, in the Nanomaterials and advanced nanostructures (NanoMAT) team. Located in the heart of an exceptional scientific environment, the LMGP offers the applicant a rewarding place to work.

LMGP Web Site: <http://www.lmgp.grenoble-inp.fr/en>

The postdoc will be carried out in the framework of on the “Memtop” ANR-DFJ joint project, and will involve collaboration, interaction and short visits to the 2 partners in Germany: Prof. Dr. Roger A. De Souza’s group at RWTH Aachen and Prof. Regina Dittmann’s group at FZ-Jülich.

## **Position description:**

We are looking for a highly-motivated postdoctoral researcher to lead the research activity on the development and advanced characterization of redox-based memristive devices as candidates for future non-volatile memories and for artificial synapses in neuromorphic circuits. He/she will be part of the “Oxides for nanoionic devices” group and will work under the supervision of Dr Mónica Burriel within the framework of the ANR-DFJ joint project “Memtop”, which aims to study the switching kinetics of memristive devices employing topotactic brownmillerite-perovskite phase transitions.

He/she will be mainly focused on the tuning of the materials structural and functional properties using chemical deposition techniques (mainly MOCVD) and in the development of advanced functional characterization techniques. For understanding and optimizing the memristive device’s performance in terms of switching speed, retention and plasticity of artificial synapses, it is mandatory to relate the structural, micro-structural and chemical parameters of the oxide to the oxygen-ion transport kinetics. The LMGP houses state-of-the-art experimental equipment for investigating such properties. Atomic force microscopy, electron microscopy (SEM, TEM), several electrical characterization and in situ X-ray diffraction and Raman spectroscopy will be routinely used and will be combined with electrical measurements. For this the postdoc will mainly in charge of the:

- Deposition, characterization and tuning of brownmillerite thin films
- Development and implementation of in situ characterization techniques
- Advanced electrical and operando characterisation of memristive devices
- Project management: organization of meetings, presentations and report writing

## Specific requirements or conditions

### Requirements:

- PhD degree in materials science, physics, chemistry or related field.
- A very good knowledge of English language, both spoken and written.
- Good writing skills, ability to publish and promote your research
- Excellent communication, organizational skills and managerial ability for the project
- Proactive, creative, independent and highly-motivated candidate
- Interpersonal skills, problem-solving, initiative, rigor and teamwork abilities

## Research profile & skills:

### **Required**

- Knowledge in materials science, especially in resistive switching
- Experience in characterization of functional oxide thin films, including diffraction techniques (XRD, XRR, RSM), electron microscopy (SEM, EDX and TEM), Atomic Force Microscopy (AFM), X-ray photoelectron spectroscopy (XPS), Ellipsometry and Raman spectroscopy
- Experience in electrical and electrochemical measurements of materials and devices
- Computing and programming skills (Python, Matlab and/or Labview)

### **Highly desirable**

- Experience in oxide thin film deposition
- Numerical simulation skills (e.g. COMSOL)
- Experience in Synchrotron characterizations techniques (eg. XAS, HAXPES, XRD)
- Experience in clean room microfabrication

### **Position assigned to a restricted area: NO**

(Device for the protection of the scientific and technical potential of the nation, conditioning the appointment of the researcher to the authorization of the Defense Security Officer).

## How to apply

Please send **ASAP** your motivation letter, CV, list of publications and contact details of two referees to:

[monica.burriel@grenoble-inp.fr](mailto:monica.burriel@grenoble-inp.fr)

Application deadline: 21/05/2024