Postdoctoral Researcher – Exploratory Development of Innovative Beyond State-of-the-Art Spintronic Devices

Job Reference: Ref.45.25.433
Employer: International Iberian Nanotechnology Laboratory (INL)
Location: Braga, Portugal
Group/Unit: R. Ferreira Research Group
Number of Vacancies: 1
Employment Type: Full time
Contract Duration: 48 months

Open Date for Applications: August 13th, 2025
Closing Date for Applications: September 7th, 2025, 23h00m (Lisbon Time)

Key words: #micro&nanofabrication #magnetictunneljunctions #TMRsensors #biomedicalapplications

Overview

The R. Ferreira Research Group is focused on deploying Spintronics enabled solutions in industrial products and society at large, while keeping scientific excellence and continuously pushing promising technologies from low TRL to high TRL. To this end, the research group develops its activities along two research lines concerning magnetic field sensors and spin dynamics. This position concerns the research line on magnetic field sensors.

We are looking for a qualified Postdoctoral Researcher to join the team focused on the microfabrication of MTJ devices with the goal of developing novel TMR sensor solutions for biomedical applications. This activity is carried out within a private research contract and requires the development of innovative solutions beyond the current-state-of-the-art and targeting specific applications.

Job Duties

The job duties will be the following:

- Optimise stacks and processes towards the production of new sensing devices beyond current state-of-the-art;
- Micro-fabricate and nano-fabricate TMR sensor wafers that can be used to qualify solutions and products;
- Characterise electrically the sensors produced;
- Develop and automatize new characterisation setups that might be required to explore the devices produced;
- Engage with a team made of researchers and engineers working at INL to integrate such devices at system level, either by combining them with discrete electronic circuits or by homogeneously/heterogeneously integrate the devices developed with CMOS and/or other technologies;
- Collect and analyse data to characterise single sensors and the full solution at system level;
- Elaborate documentation, reports and presentations;
- Participate in the writing of scientific publications or patent submissions concerning the achievements of the project.

Mandatory Qualifications

Education

- PhD in Physics, Material Sciences or related field.

Experience and Technical Skills

- Strong background in magnetism and spintronic devices;
- Capacity to design and automate data acquisition setups, including the development of software required to gather and analyse data (using e.g., .Net, Python, LabView);
- Experience in the operation of common clean room tools used in the nanofabrication of magnetic tunnel junctions, including PVD deposition systems, Ion Milling, Direct Write Laser Lithography, Mask Aligners, E-beam systems, CVD deposition tools, RIE tools, SEM inspection tools and metrology instruments (e.g., contact profilometers, sheet resistance mapping);
- Hands on experience in the micro and nanofabrication of devices exploring Magnetic Tunnel Junctions;
- Hands on experience in the micro and nanofabrication of other types of Beyond-CMOS devices that can be combined with spintronics, such as those exploring MEMS and 2D materials;
- Capacity to follow and design a run-sheet for the nanofabrication of specific devices;
- Experience in the bulk characterisation of magnetic materials and stacks using techniques such as VSM and CIPT;
- Capacity to simulate magnetic fields generated by magnets, electromagnets and other types of magnetic components using appropriated software tools (e.g., COMSOL, FEMM);
- Experience in the electrical characterisation of devices and ability to analyse and present data gathered using usual scripting and analysis tools (e.g., Python, Mathematica, Matlab).

Other Valued Skills

- First hand direct experience in the micro/nanofabrication of magnetic tunnel junction nanodevices is highly valued;
- Knowledge and first hand experience in the measurement and characterisation of noise of spintronic devices is valued.

Personal Skills

- Commitment and result driven work ethics;
- Capacity to organise the workload in a flexible way;
- Capacity to work in multidisciplinary teams;
- Pro-active spirit;
- Good understanding of state-of-the-art research in the field;
- "Hands-on" approach together with a high commitment in respecting working deadlines;
- Good communication skills.

Our Benefits

- Competitive salary;
- Tax benefits and other Diplomatic privileges;
- Private health insurance;
- Family allowances (according to family situation);
- Free nursery service at INL premises (subject to availability);
- Support for education fees of dependent children;
- Relocation support;
- 30 working days of annual leave.

How to Apply

The application **must be in English** and include the following **mandatory documents**:

a) Cover letter;
b) Curriculum Vitae;

c) Academic and/or Professional diplomas;

Online application instructions:

1. The application is made online by clicking the "Apply" button;
2. The candidate must complete all required sections of the online application form;
3. The candidate must submit the mandatory documents mentioned above in pdf format by including them in the "Additional files" section using the "Add portfolio" button.

Important note:
Incomplete applications including the failure to provide mandatory documents or providing inaccurate information will result in the application not being considered.

How the Selection Process works

A. Applications eligibility check

This stage will be carried out on the basis of the mandatory requirements, education, experience and technical skills defined for the job, as well as the validation of the mandatory documents. Only candidates who meet the eligibility criteria will move forward to the next stage.

B. CV Assessment
The Selection Committee will evaluate the eligible applications based on their CV and other submitted documents and the suitability for the position. The best ranked candidates will be shortlisted for the interview stage(s).

C. Interview(s)
The interview(s) may be done in different formats: video recording, online or onsite.
The question based interview will evaluate the match between the candidate's profile and the requirements for the position, including the technical and personal skills. To better support this stage, the candidate may be requested to prepare a short presentation.

D. Nomination
The selected candidate will be nominated and formally offered the position, including the disclosure of the contractual conditions.

Additional Information

Application feedback
We highly value your interest in becoming part of the INL experience and it is important for us to maintain good communications with all candidates. No matter the outcome of your application, we will always provide you with feedback.

Equal Opportunity and Non-Discrimination Principle
INL follows a non-discrimination and equal access principle, wherefore no candidate can be privileged, benefited, impaired or deprived of any rights whatsoever, or be exempt of and duties based on any possible discriminatory issues.

The advertisement deadline may be extended at any time without previous notice in order to improve the suitability and effectiveness of the recruitment process.

About INL

The International Iberian Nanotechnology Laboratory – INL (http://www.inl.int), is the first and only Intergovernmental Organisation in the world entirely focused on Nanoscience and Nanotechnology.

It was founded under an international legal framework to perform interdisciplinary research, deploy and communicate nanotechnology for the benefit of society. INL aims to be a recognised leading global nanotechnology innovation hub.