Position Offered: UNIVERSITY GRADUATE

Project: *Advanced Digitization for Nanoscopy: High-Speed Image Acquisition and Machine Learning Implementation*

Technological and scientific fields: Electronic Digitization. Machine Learning, Nanotechnology

Location: Tres Cantos, Madrid, IMN-CSIC, https://imn.csic.es/

Research Group/PI: MBE: Nanoestructuras cuánticas para optoelectrónica, M. Mónica Luna, http://www.imm-cnm.csic.es/mbe/

PROJECT SUMMARY

The atomic force microscope (AFM) is an exceptional nanotechnology instrument for characterizing the structural, electrical, thermal, and mechanical properties of a wide range of materials at the nanoscale. The fundamental objective of this project is to achieve significant advancements in nanotechnology through the implementation of advanced digital techniques and machine learning (ML). Firstly, a digital control electronics for AFM will be developed based on a proprietary card that will use digital synchronous amplifiers adapted for various applications. Secondly, ML techniques will be implemented, making it one of the first AFMs with incorporated artificial intelligence. Both the project PI and the co-PI (Prof. Julio Gómez, UAM, H-index = 55, over 22,000 citations) have an outstanding track record in instrumental developments as well as in patent generation.

PROFESSIONAL PROFILE

Minimum requirements:

Bachelors degree in Electronic, Telecommunications, Computer Engineering or the like

Merits to be considered:

Interest in learning and working in a team

WHAT IS OFFERED

Over the course of 4 years, the hired individual will receive training, guidance, and mentorship from both the host group (120 ECTS) and the co-PI's group, where they will complete 3 training stays of 3 months each (60 ECTS). Additionally, they will receive advice and support from I. Horcas (UAM), an electronic and computer engineer and one of the authors of recent control electronics patents. Furthermore, the hired individual will receive external training in ML, primarily through a paid university master's program (62 ECTS), thus becoming an expert in digital techniques for data acquisition and in the application of ML techniques. Their high level of specialization will make him/her an excellent candidate for competitive job positions that require knowledge in electronic digitization and/or artificial intelligence, both in the research field and in industry. Additionally, he/she will learn to work in a multidisciplinary and international context and will be able to attend international conferences to present the project results. Similarly, the hired person will receive training that will contribute to the improvement and promotion of transversal skills (20 ECTS): he/she will be able to choose from a variety of courses (CSIC Training Plan), such as English, communication skills, etc. During the 4-year contract, all activities (including external learning activities) will be carried out within a 37.5-hour workweek.

Contract conditions:

Indefinite contract for a University Graduate associated with the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (37.000 € - 41.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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