



Reference: 27/008

Category: R-1.3

Project: SELDON – Smart Edge and Low-power Neuromorphic Computing Devices for IoT Nodes (ASIMOV)

Research group: Nanoionics and Fuel Cells, IREC, Barcelona

Group leader: Prof. Albert Tarancón

Principal investigators: Prof. Albert Tarancón and Dr. Francesco Chiabrera

Publication date: 9/10/2026

Application deadline: 15/12/2025

Estimated starting date: during the first trimester, with flexibility depending on the candidate's availability.

R1 – PhD position in Neuromorphic Devices and Hardware Implementation

Position description

The Nanoionics and Fuel Cells group at the Catalonia Institute for Energy Research (IREC) is seeking a motivated MSc graduate in Physics, Electronic Engineering, Materials Science, Nanoscience or a related field to pursue a PhD within SELDON – Smart Edge and Low-power Neuromorphic Computing Devices for Internet of Things (IoT) Nodes. Led by Prof. Albert Tarancón and Dr. Francesco Chiabrera, SELDON is part of a coordinated project with the Institute of Microelectronics of Barcelona–National Microelectronics Centre (IMB-CNM) and the Universitat Oberta de Catalunya (UOC). The research will focus on developing oxide-ion synaptic transistors and integrating them into neuromorphic chips to implement neural networks directly in hardware.

The successful candidate will work at the interface of iontronic devices, microfabrication and neuromorphic electronics, progressing from individual artificial synapses to functional arrays and hardware demonstrations. These devices use controlled oxygen-ion motion to tune and store their electrical conductance, enabling analog in-memory computing. The research will combine device fabrication, electrical characterization and programming with the implementation and validation of neural networks for low-power edge computing. The position offers hands-on training in advanced fabrication and measurement techniques and close collaboration with partners working on microelectronics, algorithms and system integration.

Research activities:

- Fabricate and optimize oxide-ion synaptic transistors and arrays using thin-film deposition and microfabrication techniques.
- Characterize synaptic devices and arrays, assessing conductance modulation, programming speed, retention, endurance, variability and energy consumption.
- Develop automated electrical measurements and programming protocols to address devices and set synaptic weights, including thermally assisted programming with integrated micro-heaters.
- Implement and validate analog computing operations and neural-network functions in device arrays, linking measured device properties to computational accuracy and energy efficiency.



- Collaborate with IMB-CNM and UOC on circuit and system integration, contributing to hardware demonstrations for satellite navigation (GNSS) signal processing and intelligent IoT nodes. Share findings through scientific publications and international conferences.

Qualifications and experience

Essential:

- A completed master's degree in Physics, Electronic Engineering, Materials Science, Nanoscience or a closely related field by the appointment date.
- An interest in experimental device research, neuromorphic computing and hardware implementation, together with the ability to analyze quantitative data.
- Good written and spoken English and the ability to work independently and collaboratively.

Desirable:

- Experience with electronic devices, electrical characterization, microfabrication or thin-film deposition.
- Knowledge of, or interest in, neuromorphic computing, analog electronics, neural networks, electrochemistry or solid-state ionics.
- Programming and data-analysis skills, for example in Python or MATLAB, and an interest in measurement automation, device modelling or mapping neural networks onto hardware.

Employment and application

The successful candidate will join an international research environment at IREC in Barcelona, with doctoral training planned at the Universitat Autònoma de Barcelona (UAB). The position offers interdisciplinary training in device fabrication, electrical characterization and neuromorphic hardware, together with opportunities for collaborative research and international mobility. Contract duration, salary and employment conditions will follow IREC policy and the applicable predoctoral funding call.

Applicants must submit the following documents by email to irecjobs@irec.cat, fchiabrera@irec.cat and atarancon@irec.cat :

- Curriculum Vitae, specifying the completed degree and any relevant professional experience.
- BSc and MSc transcripts.
- Motivation letter.

Please quote reference **27/008** when applying.

El contrato es parte del proyecto PID2025-169739OB-C31 financiado por MICIU/AEI/10.13039/501100011033 y por el FSE+”,