Call reference number	(2026-27)
Call name	Pre-doctoral researcher to characterise perovskite neuromorphic devices and assemble spiking neural networks
Application Deadline	2026/12/15

Introduction and main description

BCMaterials, Basque Center for Materials, Applications and Nanostructures, is an autonomous research center launched in June 2012 by Ikerbasque, the Basque Foundation for Science and the University of the Basque Country (UPV/EHU) as a research center for Materials, Applications and Nanostructures. The center is included in the BERC's (Basque Excellence Research Centers) network and its mission is to generate knowledge on the new generation of materials, turning this knowledge into (multi)functional solutions and devices for the benefit of society.

BCMaterials is looking for a pre-doctoral researcher to contribute to the development of perovskite spiking neural networks (SNNs) within SHIFT (Shape-shifting robots with Hybrid Intelligence for Flexible acTuation), a Horizon Europe Research and Innovation Action (Grant Agreement No. 101343611). SHIFT is developing modular, shape-changing robots in which local SNNs process tactile signals and trigger fast reflexes, with BCMaterials leading the perovskite work in close collaboration with the neuromorphic team at the Istituto Italiano di Tecnologia (IIT). The perovskite route is based on controlling ion migration within the perovskite family of semiconductors and exploiting its influence on charge recombination processes at the devices' interfaces to achieve neuron- and synapse-like behaviour and self-learning in the network.

The selected researcher will work closely with a postdoctoral researcher who leads device development, and will participate in the necessary steps to fabricate the devices, from substrate-patterning to thin film crystal growth and contact deposition. The main focus of the position will be on device characterisation and on establishing the network. In addition to performing standard electronic characterization, it is anticipated that the researcher will develop novel characterisation protocols to both quantify the spiking and learning behaviour of the devices and understand the fundamental charge transfer processes at the interface, and will integrate the devices into perovskite SNNs. The success of this technology promises to deliver a sustainable and recyclable computing platform that can be printed, potentially revolutionising the way we approach electronics design.

We offer a one-year contract. After an evaluation of the candidate's performance, if the results are positive, the researcher will be hired for two more years. It is estimated that three years are enough to develop a PhD thesis.

Skills and Requirements

We are seeking highly motivated candidates with:
- MSc degree in Physics, Electrical or Chemical Engineering, Chemistry, Materials Science or similar.
- Background in materials science, semiconductors or electronic devices.

Skills and Requirements

- Experience in thin film deposition, device fabrication or electronic characterisation will be valued; experience with perovskites is a plus but not essential.
- Strong interest in understanding fundamental charge transport processes, instrument automation, and preferably with some programming aptitude.
- Interest in neuromorphic computing and electronic circuits is an advantage.
- Proficiency in English, and able to work in an international and interdisciplinary environment is critical.

Work Program / Duties / Responsibilities

The main duties will include:
- Extensive structural, optoelectronic and electrical characterization of perovskite neuron and synapse devices.
- Development of characterisation protocols and automated measurement set-ups to quantify spiking behaviour, synaptic plasticity, retention and endurance.
- Determination of ion-mediated charge transfer processes.
- Analysis of the mechanisms underlying the operation of the novel devices.
- Integration of the devices into perovskite SNNs and testing of the networks with tactile sensor inputs.
- Participation in the development and fabrication of perovskite neuron and synapse devices.

Additional responsibilities:
- Working closely with the postdoctoral researcher leading device development, feeding characterisation results back into device design
- Contributing to the common spike encoding/decoding framework with the neuromorphic engineering team at IIT
- Taking part in SHIFT project meetings and contributing to project reporting
- Writing of manuscripts
- Presenting research at national/international conferences
- Maintaining equipment
- Maintaining a positive and collaborative group atmosphere

Application Procedure

Apply by submitting a CV, a motivation letter and reference letters if possible (in English) using the "Contact" button at the corresponding offer, at the "Join Us" area on BCMaterials' portal (https://www.bcmaterials.net/join-us).
Your name and email address will be required for furher contact too.

Other Relevant Information

We provide a highly stimulating environment with state-of-the-art infrastructures, and unique professional career development opportunities. We offer and promote a diverse and inclusive environment and welcomes applicants regardless of age, disability, gender, nationality, ethnicity, religion, sexual orientation or gender identity.