



Career positions Announcement Postdoctoral fellowships at the Institute of Advanced Materials at Universitat Jaume I, Spain

2023 05 19

Postdoctoral fellowships in the formation of neural networks with halide perovskites (ERC AdG project)

Area of Research: Our research focusses on building neurons, synapses and operating neural networks with halide perovskites and organic materials. The goal is to build an operational artificial retina for visual recognition of objects fully constructed with these materials. The research involves the investigation of device physics for the functional properties of neurons and synapses, and the fabrication of the material elements with the required properties.

Our approach is to unite basic and applied science in order to pursue this goal. Our team gathers and relies upon experts in chemistry (synthesis, device making, sub microscale fabrication), physics (device properties, impedance spectroscopy, time transient response) and engineering (especially materials synthesis/properties/processing, electrical engineering, chemical engineering).

The specific program we lead is related to the ERC Advanced Grant “Perovskite Spiking Neurons for Intelligent Networks” led by Juan Bisquert. The Project aims to develop compact miniature material elements that will emulate closely the complex dynamic behaviour of neurons and synapses, to form Spiking Neural Networks with substantial reduction in footprint, complexity and energy cost for perception, learning and computation. This method will produce the hardware that we need for a preferred spiking computational model, incorporating time, analog physical elements and dynamical complexity as computational tools. We will show visual object recognition from spiking data provided by a spiking retina by advanced neuristors and dynamic synapses.

Description of Duties: Successful candidates will place their major focus on achieving original first-authored publications in interdisciplinary academic journals. They will work effectively in a team environment and will value the chance to reach across disciplines. Post-doctoral fellows will take advantage of the opportunity to increase their mentoring skills, helping doctoral students to develop as scientist-engineers.

2 × Postdoctoral Positions

Applicants must have received, or be close to receiving, a PhD degree in an area of science or engineering. Applicants are sought to have backgrounds in a field of engineering or science relevant to halide perovskite and organic materials synthesis and

characterization. Applicants with doctoral or postdoctoral experience in major scientific European groups will be highlighted.

Post-doc 1: We seek for one candidate with expertise in fundamental methods for preparation of solar cells and memristors. The candidate will be in-charge of fabrication of cross-bar arrays, miniaturization of the contacts to size of 1×1 micron² design using lithography methods, formulation of lead-free perovskite and organic semiconducting inks and selection of buffer and contact layers. Experience in formulation of halide perovskite or inks and a good understanding on the effect of the electronic contacts will be highly desired. Experience in photolithography and proven track record in design and fabrication of cross-bar arrays for investigation of neural networks and neuromorphic systems will be highly advantageous.

Post-doc 2: We seek for one expert on device physics specialized in advanced electrical characterization methods like impedance spectroscopy or time transient response with experience in electrical modelling and simulation. The candidate will be in-charge of programming the optical and electrical measurements of neural networks and neuromorphic systems. Experience designing the set-up for opto/electrical measurements and programming the measurements (Laview, Python,...) and completing the simulations (Matlab) will be highly advantageous. Expertise from relevant allied fields, such those that study transport phenomena, transistors, electrochemistry are highly desired. Proven track record in design and fabrication of cross-bar arrays for investigation of neural networks and neuromorphic systems will be highly advantageous.

Salary: 45,000 €/year

Expected Start Date: between September 2023, to January 2024, as soon as possible.

Appointment: Term – (12 months) with a possible renewal up to five years

How to apply:

Please include in your application package a cover letter; your full academic CV; your two most relevant publications, information on 2 referees that are prepared to be consulted; and a motivation letter of why you want to be part of this project. Please send **as a single combined PDF whose file name includes your first and last names** to Juan Bisquert (bisquert@uji.es) with the subject line **Perovspiker application Postdoc** by June 20, 2023. Evaluation of candidates will begin immediately and continue until filled.

Posting Date: May 19, 2023

Closing Date: June 20, 2023

