## PhD position in the Marie Sklodowska-Curie Doctoral Network (MSCA-DN)

## MENTOR

**Project title:**
DC12: Establishing equivalent ISOS protocols for Indoor PVs employing Pb-free Perovskite Solar Cells.

**Place of Employment and planned mobility:**
NMPE – Nanostructured Materials for Photovoltaic Energy (webpage under update)
Catalan Institute of Nanoscience and Nanotechnology (ICN2), Barcelona (Spain)

As a flagship research center in nanoscience and nanotechnology, our mission is to open and explore new frontiers of knowledge at the nanoscale, and bring value to society in the form of new understanding, capabilities and innovation, while inspiring and providing broad training to the next generations of researchers.

Our research lines focus on the newly-discovered physical and chemical properties that arise from the behaviour of matter at the nanoscale. ICN2 has been awarded with the Severo Ochoa Center of Excellence distinction for three consecutive periods (2014-2018 and 2018-2022 and 2023-2026). ICN2 comprises 19 Research Groups, 7 Technical Development and Support Units and Facilities, and 2 Research Platforms, covering different areas of nanoscience and nanotechnology.

**Secondments:**

- CeNTI – Centre for Nanotechnology and Advanced Materials is a Centre for Technology and Innovation (CTI), Portugal. 4 months, from M18. Purpose: Study of different encapsulation solutions.
- National Physical Laboratory (NPL) is the UK's National Metrology Institute (NMI), U.K. 3 months, from M30. Purpose: Co-development of stress conditions to identify premature failures in IPVs.

**Supervisor:** Prof. Monica Lira-Cantu

**Project Tasks and Objectives:**

General Objective: Fabrication, characterization and stability protocols development for Pb-free Halide Perovskite Solar Cells for Indoor Applications

Specific Objectives:
1) To fabricate Pb-free Halide Perovskite Solar Cells.
2) To develop testing protocols for indoor stability based on the IEC TS 62607-7-2 standard.
3) To study spectral invariant light sources for IPV considering variable illuminance levels. We will consider spectral coincidence, temporal stability, non-uniformity at sample plane, stable spectra profile and high uniformity of the illumination levels.
34) To examine the IPV performance at the maximum power point under constant illumination from hours to days, setting up accelerated indoor testing involving day-night cycles as established for lead PSK and OPV and complementing with in-situ optoelectronic characterization to unveil degradation mechanisms.
5) To upgrade our patented encapsulation methodology at room temperature (employed for outdoor stability analyses) to indoor conditions and apply it to fabricated Sn-PSK IPVs for stability assessment.

Tasks:

- Synthesis and functionalization of materials, especially Pb-free Metal Halide perovskites (MHPs), including all inorganic and 2D.
- Fabrication of functionalized Pb-free MHPs by solution processing methods.
- Fabrication of complete Pb-free MHPs solar cells
- Stability analysis of materials and devices following the recently upgraded ISOS protocols and in-situ characterization.
- Development of stability protocols for indoor photovoltaics.
- Process and analysis of data.
- Elaboration of periodic reports to keep track of the project progress.
- Preparation of scientific manuscripts and presentations in workshops or conferences to showcase your research results to the scientific community.
- Skills on proposal writing.

**Starting date:** March 2025

**Duration of the work contract: 36 months/ Full time commitment.**
**Trial period: 4 months**
**Target Degree: PhD degree from Polytechnic University of Barcelona (UPC)**
**Link to doctoral program**: Doctoral School — UPC. Universitat Politècnica de Catalunya
**Approximately Gross salary:** ~ 33,376.18 € including living and mobility allowance; and 37.836,31 € with family allowance.

**Eligibility:**

- Master's degree in physics, chemistry, materials science, nanotechnology, electronics or closely related discipline. No previous PhD awarded.
- The researcher must not have resided or carried out his/her main activity (work, studies, etc.) in Spain for more than 12 months in the 3 years immediately prior to his/her recruitment.
- Experience in thin film or/and solar cell fabrication by solution processing methods.
- Highly motivated and enthusiastic researcher.
- Strong analytical skills and a keen interest in the interpretation of complex data.
- Excellent organization skills, time management and ability to work to priorities.
- Excellent written and oral communication skills.

**English language requirements**: High english level is mandatory (written and spoken).

**How to apply:**
All applications must be made via the ICN2 website … and include the following:

1. A cover letter.
2. A full CV including contact details.
3. 2 Reference letters or referee contacts.

Deadline for applications: January 2025

Funded by the European Union

*This contract has received funding from the European Union's Horizon Europe research and innovation programme under Marie Skłodowska-Curie Actions, under grant agreement 101169056 - MENTOR.*

**Equal opportunities:**
ICN2 is an equal opportunity employer committed to diversity and inclusion of people with disabilities.

ICN2 is following the procedure for contract of people with disabilities according with article 59 of the Royal Decree 1/2015, of 30 of October.