

The mission of the Catalan Institute of Nanoscience and Nanotechnology (ICN2) is to achieve the highest level of scientific and technological excellence in Nanoscience and Nanotechnology. Its 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 Centre of Excellence distinction for three consecutive periods (2014-2018, 2018-2022 and 2022-2026). ICN2 comprises 17 Research Groups, 7 Technical Development and Support Units and Facilities, and 2 Research Platforms, covering different areas of nanoscience and nanotechnology.

Job Title: Postdoctoral researcher in nanoscale thermal transport (3D-Bricks -PD1)

Research area or group: Phononic and Photonic Nanostructures Group

Description of Group/Project:

The Phononic and Photonic Nanostructure Group (<https://www.icn2-p2n.eu/>) carries out research in the general area of nanophononics, which includes nano-scale thermal transport, phononic crystals, thermoelectricity, acousto-metamaterials, topological bosonics and NEOMs.

The group is 14-strong and additionally involves several undergraduate project and visiting students. Silicon-based CMOS technology is approaching its performance limits, but the demand for more powerful computers remains. A newly funded HORIZON-EIC PATHFINDER project 3D-BRICKS will raise this concept of integrated self-assembly carbon nanotube (CNT) -nanocircuits to a completely new level by moving towards the third dimension. Computers based on CNT field-effect transistors (FETs) have been theoretically predicted to provide a power-performance improvement of ten times over computers based on Si-CMOS technology. A technological revolution would be a reliable approach to fabricate a new family of CNT-based devices that could enable aligned arrangement of the nanotubes avoiding the critical steps related to nanolithography. In particular, biofabrication using DNA-templated CNT arrays FETs has been demonstrated to further scale the alignment of CNTs within the FETs well beyond standard lithographic feasibility.

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Main Tasks and responsibilities:

The candidate will be involved in the European project HORIZON-EIC PATHFINDER 3D-BRICKS. The main tasks:

- To develop methods and tools for the hybrid DNA - 3D CNT nanostructures characterization (morphological, structural, thermal and acoustic) and deep physical mechanism comprehension
- To study nanoscale transport for local characterization and imaging of nanocircuits and logic gates.
- Measurements of hot spots in operando conditions.

Requirements:

We look for a highly motivated researcher who will have a PhD in solid state Physics and postgraduate level research experience in:

- **Education:** PhD in Physics
- **Knowledge and professional experience:** Knowledge of experimental techniques for thermal transport on nanoscale, such as FDTR/TDTR and Raman thermometry. Experience in structural characterization techniques for CNTs (Raman, TEM, SEM, AFM) and electrical measurements. Experience in modelling using COMSOL and data analysis with Matlab.
- **Personal Competences:** Excellent communication skills in English (spoken written, reading comprehension) are essential to establish strong synergies within our group and with the project consortium. The applicant will have demonstrated ability to marshal arguments and to develop research concepts and or methods, supervise master and or undergraduate students, and will have bespoke organisational skills.. Ability to work with highly qualified professionals with international backgrounds

Summary of conditions:

- Full time work (37,5h/week)
- Contract Length: Temporary (2years)
- Location: Bellaterra (Barcelona)
- Salary will depend on qualifications and demonstrated experience.
- Relocation expenses support.
- Life Insurance.

Estimated start date: 01/01/2024

How to apply:

All applications have to be made via the ICN2 website <https://jobs.icn2.cat/job-openings/471/postdoctoral-researcher-in-nanoscale-thermal-transport-3d-bricks-phononic-and-photonic-nanostructures-group> and include the following:

1. A cover letter.
2. A full CV including contact details.
3. Three reference letters or referees contact details.
4. Title and abstract of the applicant PhD thesis

Closing date: September 2023

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.