

About ICN2

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 values are Commitment, Collaboration and Transformation.

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.

Job Title: PhD Student

Research area or group: Nanomedicine Lab

Description of Group/Project:

The Nanomedicine Lab [www.nanomedicinelab.com] focuses on the design, development and implementation of nanomaterials as vector systems (e. g. liposomes, carbon nanotubes, graphene oxide) for a range of biomedical applications, from cancer therapeutics to neurogenerative diseases. Over the past 15 years, the Nanomedicine Lab has made significant contributions to uncover the unique properties of two-dimensional (2D) materials and their applications in biomedicine. We have contributed to new knowledge in the properties and versatility of different graphene-based materials, pioneering work in the medical translation of carbon nanomaterials, as well as in bioelectronic and neural interface devices.

This research project is highly multidisciplinary and will focus on 2D materials engineering to develop advanced strategies for the modulation of host tissue after surgical removal of tumors. The PhD project will encompass the synthesis and fabrication of 2D materials, surface loading of therapeutic agents, surface modification of the complexes, and innovative *ex vivo* and *in vivo* administration approaches. To investigate 2D material complex structure – biophysical and biological function relationships, the project will include systematic studies at both the cellular (mammalian cell cultures) and whole tissue level (preclinical cancer models).

Main Tasks and responsibilities:

The PhD candidate researcher will focus primarily on laboratory-based experimental work in the engineering of 2D-based materials and on application strategies to ensure homogeneous interaction with target (mock or living) tissue.

The PhD candidate will receive comprehensive, hands-on training in all techniques and protocols relevant to the project. In addition, they will be supported in developing new skills and methodologies as the research evolves, ensuring continuous professional growth.

Principal responsibilities:

- Synthesis and fabrication of 2D nanomaterial (e.g. graphene, graphene oxide, molybdenum disulfide) and their complexes with therapeutic molecules

- Use an array of physicochemical and materials characterization techniques (e.g. Raman, AFM, SEM, TGA, dynamic light scattering, spectrophotometry, electron microscopy, XPS, HPLC)
- Conduct biophysical studies to evaluate the diffusion, adhesion and interaction of the 2D nanomaterials and their complexes using *ex vivo*, *in vitro* and *in vivo* tissue models
- Execution of experiments using different core facilities across Univeritat Autònoma de Barcelona and ALBA campuses and collaborating institutions (e.g. University of Manchester, UK and University of Marseille, France)
- Consistent evaluation of the bibliography in the areas relevant to the research
- Regular communication with the PIs and other members of the Nanomedicine Lab to assist in the development, progression and execution of the research project
- Development of communication and scientific writing skills
- Contribution to team work and activities (e.g. lab meetings, group presentations) of the Nanomedicine Lab

Requirements:

- **Education:**

Undergraduate or Master's Degree in chemistry, chemical engineering, materials science, bioengineering, pharmaceutical science, nanoscience and nanotechnology or equivalent.

- **Knowledge and Professional Experience:**

Essential skills and considerations:

- Demonstrable previous basic use of some physicochemical and materials characterization tools (e.g. Raman, AFM, Dynamic light scattering, spectrophotometry, XPS, HPLC)
- Methodological skills relevant to the research theme such as 2D materials synthesis, surface modification or chemical functionalization of carbon nanomaterials, *in vitro* biocompatibility studies.
- Applicants must show motivation, excellent disposition towards challenging research problems
- Ability to work under pressure and maintain a high degree of accuracy
- Ability to work effectively in a multi-disciplinary team and with all levels of staff and students

Desirable:

- Experience in the chemical synthesis and modification of 2D nanomaterials, including graphene and other carbon nanostructures
- Experience in experimental research using electron microscopy techniques (TEM, cryo-EM, tomography)
- Previous hands-on research experience in handling and studying the biological investigation of nanomaterials with biological matter (proteins, cells, tissues)

- **Personal Competences:**

Fluent in English, good communication and writing skills

Excellent organizational and time-management skills, including the ability to deliver timely and high-quality outputs

Enthusiasm to learn new skills outside own discipline

Summary of conditions:

- Full time work (37,5h/week)
- Contract Length: Temporary (4 years)
- Location: Bellaterra (Barcelona)
- Salary will depend on qualifications and demonstrated experience.
- Support to the relocation issues.
- Life Insurance.
- Work-Life Balance and Flexibility with flexible work schedules
- 28 holidays per year
- Flexible compensation plan: tax advantages contracting some products (health insurance, childcare, training, among others.)
- Training activities: languages, mentoring programme, wellbeing programme.
- International environment

Estimated Incorporation date: **January 2026**

How to apply:

All applications must be made via the ICN2 website <https://jobs.icn2.cat/job-openings/779/phd-student-nanomedicine-lab> 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: **10th November 2025**

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.