



Predoctoral Researcher

The role

We are looking for a **highly motivated PhD student** to join our Lab at IQAC-CSIC and work within the project “BubblyBots4BC: Laser-induced nanobubbles from enzyme-powered nanobots for bladder cancer immunotherapy” (funded by AEI).

Cancer vaccines train the immune system to prevent tumor recurrence. These vaccines are made from patients’ own tumor cells, either processed into sterile formulations or used to activate immune cells prior to reinjection. However, these treatments are often expensive due to the complexity of manufacturing processes. Our project focuses on photoporation, a cutting-edge technique that employs nanoparticles to generate microscopic bubbles when irradiated. The collapse of these bubbles can stimulate anti-tumor immune responses. We aim to use photoporation as a versatile, scalable approach to simplify the production of cancer vaccines. The developed vaccines will be evaluated *ex vivo*, by using dying tumor cells directly or to activate immune cells outside the body, and *in vivo*, by combining the technique with self-propelled nanomotors for targeted, *in situ* vaccination.

The candidate will explore this concept at multiple levels:

In vitro: optimization of nanomaterials and photothermal conditions for ICD induction.

Ex vivo: development of tumor-cell derived vaccines based on VNB-mediated immunogenic modulation.

In vivo: evaluation of *in situ* vaccination in bladder cancer models, including nanomotor-mediated delivery and localized irradiation inside the bladder.

This project combines nanotechnology, bioengineering, immunology and oncology, offering a unique opportunity to work at the intersection of frontier technologies and clinical translation. This is an exciting opportunity to work in cancer immunotherapy, combining nanotechnology, photonics, and immunology.

What do we look for?

- **Qualifications**

MSc in immunology, pharmacy, biotechnology, biomedical engineering, biomedicine, or nanotechnology.

- **Professional experience**

- Experience with nanoparticle synthesis, functionalization, and characterization (dynamic light scattering and zeta potential).
- Previous experience with cell cultures (cell lines and primary cells).
- Basic knowledge of fluorescence microscopy and flow cytometry.
- Previous experience working with qPCR.
- To be accredited with A (Animal care), B (Euthanasia), C (Experimental procedure) Functions according to RD 53/2013 within the first year.

ADVANTAGEOUS: Accredited with A (Animal care), B (Euthanasia), C (Experimental procedure) Functions according to RD 53/2013.

- **Competences**

- Communication, Teamwork, Proactivity, Commitment, Collegiality, Integrity, Critical and Analytical thinking.
- High motivation for translational and multidisciplinary research.
- High level of English

Working conditions

- **Contract duration: four-year full-time contract**
- Estimated annual gross salary: Competitive salary according to national PhD fellowship schemes (FPI/AEI).
- Target start date: February-March 2026

The group

The PhD candidate will join the **Gene and Light NanoTherapies Lab** (GLNT Lab), a newly established laboratory at IQAC-CSIC led by Dr. Juan Carlos Fraire (Ramón y Cajal Principal Investigator). The lab focuses on the development of nanostructures and nanocarriers, photothermal/photomechanical effects, and immunoengineering for advanced therapies.

The GLNT Lab is part of the **Nanomedicine for Therapeutic Applications group** (NM4T group), led by Dr. Ibane Abasolo. The NM4T group is internationally recognized for its contributions to nanomedicine, by developing new therapeutic strategies based on nanotechnology. Together, we offer a dynamic and interdisciplinary training environment at the interface of nanotechnology, immunotherapy, and oncology.

🔗 Lab link: [Gene and Light NanoTherapies Lab](#)

🔗 Group link: [Nanomedicine for Therapeutic Applications Group](#)

The institute

The **Institute for Advanced Chemistry of Catalonia** (IQAC) is one of the research centers of the Spanish National Research Council (CSIC). The Institute is located in Barcelona and it was created in 2007 with the mission to perform research of excellence in Chemical Sciences with the broad goal of improving the quality of life. The general strategy to achieve this mission involves the application of chemical approaches to address and solve societal challenges, mainly those related to human health, the sustainability of chemical processes and products, and the needs for novel materials for different applications. Since its establishment, IQAC has been in a permanent attitude to transfer its knowledge and technology results to the industrial sector.

The research developed at IQAC is organized around two main nodes: **Biological Chemistry** and **Nanobiotechnology** and it is facilitated by a number of Key Enabling Technologies. Considering the objectives pursued, many of the investigations carried out by the Research Groups at IQAC lie at the intersection between nodes.

In addition, our Institute holds a set of scientific and technical facilities run by highly qualified scientists and technical personnel with a solid background and long lasting expertise. These facilities are available not only to IQAC research groups, but also to potential users from both academia and private institutions. In any case, the technical services from IQAC are always wide open to attend any inquiry and to offer their best efforts to find adequate responses to specific needs.

How to apply?

Those interested may email their **CV**, **motivation letter** and **academic qualifications** to **Dr. Juan Fraire** at juan.fraire@iqac.csic.es, adding **PhD_GLNT** to the email subject. Contact details for at least one reference would be also valued.

Deadline: 01/11/2025