

Institute of Microelectronics of Barcelona IMB-CNM CSIC

PhD Position: Development of radiation hard timing silicon detectors - University of Glasgow (Particle Physics Group) and IMB-CNM (Radiation Detectors Group)

The **IMB-CNM** is the largest institute in Spain dedicated to the research and development of Micro and Nano Technologies and Microsystems and with unique capabilities in silicon technology. It belongs to CSIC since its foundation in 1985 and is distinguished as a María de Maeztu Unit of Excellence.

IMB-CNM aims to contribute to the advancement of knowledge and to the economic and social development of society, as well as to the training of researchers and engineers and to the advice to public and private entities.

The research activities of IMB-CNM are dedicated to Micro/Nano Integrated Systems: miniaturized electronic systems which include sensing and/or actuating capabilities in addition to electronic information processing, power management and external interfaces.

The IMB-CNM is located on the Autonomous University of Barcelona (UAB) Campus and contains the largest clean room facilities in Spain with full capability to process its own CMOS technologies and laboratories.

Job Summary:

This PhD project is framed within the CERN [DRD3](#) and [ATLAS](#) Inner Detector Collaborations, the student will be register in the University of Glasgow PhD Program and will develop his/her work between the IMB-CNM (first and second year) and The University of Glasgow (18 following months). The program will also require traveling to CERN and other international facilities to perform experiments.

The PhD student will join the Radiation Detectors Group (RDG) at IMB-CNM and the Glasgow experimental particle physics, (PPE), detector development sub-group.

The [Radiation Detectors Group \(RDG\)](#) at IMB-CNM is a leading research group in the development of innovative radiation detection technologies. Its work, spanning from the design and fabrication of silicon sensors to the implementation of complete detection systems, has a high scientific and technological impact, contributing to advances in high-energy physics, radiation safety, space exploration, and medical imaging, and positioning IMB-CNM as a key player in international science.

The [Particle Physics Experiment \(PPE\) Group](#) at the University of Glasgow is a leading centre in particle physics instrumentation, with a strong team of scientists. The group plays a key role in major CERN experiments, including the development and construction of the ATLAS Inner Tracker (ITk). Recognised internationally for its leadership in silicon detector technologies, the group has been instrumental in the CERN RD50 collaboration on 3D detectors, initiated the Medipix collaboration (now part of Medipix4), and co-developed LGAD detectors in partnership with the IMB-CNM and UK industry.

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The PhD Project:

Future particle physics experiments will demand tracking detectors with precise timing resolution and extreme radiation tolerance. Consequentially, sensors which combine the two features are required. 3D detectors have been shown to be more radiation hard than LGAD devices, however, the timing resolution of a 3D detector varies depending upon hit position.

This project will develop small pixel thin 3D devices at IBM-CNM on 6-inch wafers and characterise them at IMB-CNM, Glasgow and at beam tests at CERN to obtain optimised timing and radiation hard detectors. IMB-CNM has an established 4-inch wafer technology for 3D detectors used in the current ATLAS IBL. The present 3D design achieves excellent radiation hardness. The PhD project will extend the design to reach the maximum potential timing resolution of this technology. Design and fabrication of devices will take place at IMB-CNM for the first two years, and characterisation will be developed at UoG, during the second period of the PhD Program.

Who we are looking for:

- ✓ Background in Physics, Nanoscience and Nanotechnology, Materials Science or related Engineering fields.
- ✓ Capacity to perform experiments independently, with the support and scientific guidance of the project's supervisors and technical team.
- ✓ Ability to collaborate effectively with group members, cleanroom staff, and technical personnel, as well as intercultural and professional finesse.
- ✓ Strong motivation for science, with a genuine interest in problem-solving, a commitment to contributing to society, and a willingness to continuously learn and develop new skills.

What will you do:

- The selected student will actively contribute to the achievement of the main objectives of the project.
- A specific work plan will be established and will be periodically reviewed to ensure progress and alignment with the project goals.
- Wide inter-disciplinary research and technical training and support will be provided to equip the student for a successful PhD research.
- The planned activities include, among others:
 - Design and simulation of 3D detectors for optimised timing resolution
 - Design the fabrication process based on the IMB-CNM technology
 - Develop the 6-inch wafer process of 3D silicon detectors at IMB-CNM
 - Characterise the devices in the lab (in Glasgow) and at test beams (e.g. CERN)

What we offer:

- ✓ A dynamic international research environment with access to a broad top-tier scientific network.
- ✓ Access to Spain's largest clean room facilities for micro/nano fabrication.
- ✓ Work hand in hand with experienced researchers and multidisciplinary teams.
- ✓ PhD Training Contract and a tailored Career Development Plan designed to support your growth in this specific position, along with access to a wide range of professional development resources and career advancement opportunities.

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Desirable Skills:

- ❖ Understanding of semiconductor physics, radiation detection, and microelectronics.
- ❖ Some experience with simulation tools.
- ❖ Understanding of microfabrication processes.
- ❖ Familiarity with cleanroom environments and equipment operation.
- ❖ Some experience with electrical measurements and laboratory instrumentation.
- ❖ Skills in data analysis and processing.
- ❖ Analytical and problem-solving ability, scientific rigour and critical thinking, teamwork, rigor, autonomy, and responsibility, adaptability and proactivity, willingness to learn new tools, adapt to evolving research environments, and propose technological improvements.

Language Requirements:

- English, Full working competence.

Interested in joining us?

Complete this [form](#) and send your CV*, Motivation Letter and Academic Transcripts** to Talent@imb-cnm.csic.es, with the subject: "Development of radiation hard timing silicon detectors"

Incomplete or non-eligible applications will be automatically rejected.

*Applicants are kindly advised to ensure that their CVs clearly demonstrates compliance with the requirements of the position. CVs should include precise dates, relevant skills, and notable achievements that evidence the candidate's suitability and distinction in the selection process.

**Provisional academic transcripts can be obtained at <https://sede.educacion.gob.es/sede/login/inicio.ijsp?idConvocatoria=818>

Deadline: November 23rd, 2025

Shortlisted candidates will be contacted by **November 28th, 2025** to be informed of next steps.

Check our website for more information about the IMB-CNM and our research activities

<https://www.imb-cnm.csic.es/en>

Take the next step in your research career with us!

- ★ By applying, you accept our [data protection policy](#).
- ★ IMB-CNM (CSIC) adheres to the [European Charter and Code of Conduct for Researchers](#), ensuring full alignment with their principles and requirements, including equal opportunity, transparency, merit and ability, caring for an open, fair, and excellence-based hiring processes.
- ★ IMB-CNM holds the [HR Excellence in Research award](#), which acknowledges CSIC's commitment to continuous improvement in HR strategies for researchers.