Institute of Microelectronics of Barcelona IMB-CNM CSIC

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.

Project Type: TFG/TFM

Project Title: Development of Electrospun Fibers for Piezoelectric and Triboelectric Energy Harvesting Devices

Research Group: MicroEnergy Sources and Sensor Integration Group (MESSI)

Project Description:

- ❖ This work aims to fabricate and characterize piezoelectric and/or triboelectric fibers using the electrospinning technique, for the development of energy harvesting devices. These fibers, with nanometric or micrometric dimensions, enable the efficient, lightweight, and flexible conversion of mechanical stimuli into electricity.

- ❖ The project will include the micro- and nanofabrication of the fibers, as well as the optimization of parameters such as morphology, orientation, and polarization to enhance their functional response.

- ❖ Finite element simulations will also be conducted to predict the electromechanical behaviour of the devices.

- ❖ Structural characterization will be performed using techniques such as SEM, TEM, AFM, PFM, and XRD, complemented by electrical analysis to validate their energy generation capabilities.

- ❖ The ultimate goal is to optimize the performance of these nanogenerators for future applications in autonomous or portable devices.

Work Plan:

- ➢ Micro- and nanofabrication of fibers by electrospinning for the fabrication of energy harvesting devices.

- ➢ Finite element simulation of the electromechanical behavior of the devices.

- ➢ Structural characterization using techniques such as SEM, TEM, AFM, PFM, and XRD.

➢ Electrical characterization of the nanogenerators to verify their operation and generated power.

Candidate desired studies:

✓ MSc in Semiconductor Engineering and Microelectronic Design
✓ MSc in Nanoscience and Nanotechnology
✓ MSc in Telecommunications Engineering
✓ BSc in Nanoscience and Nanotechnology
✓ BSc in Electronic Telecommunications Engineering

Application Process:

Before applying, please **check with your TFG/TFM program supervisor,** as he/she may already be coordinating with us to assign the project.

If there is no such coordination**, complete this [form](#) and send your CV and a motivation letter** to **Talent@imb-cnm.csic.es**, with the **subject: "TFG/TFM at IMB-CNM"**

Your CV will be forwarded to the Researcher leading the project who will contact you directly if interested.

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.