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: Growth and Characterization of Thermoelectric Nanostructures by Electrospinning

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

Project Description:

- Develop and optimize the electrospinning process to produce uniform and high-quality thermoelectric nanostructures.
- Analyze the structural, morphological, and compositional properties of the nanostructures using techniques such as scanning electron microscopy (SEM), X-ray diffraction (XRD), and/or Transmission Electron microscopy (TEM).
- Evaluate the thermoelectric properties, including electrical conductivity, Seebeck coefficient, and thermal conductivity, to assess the potential efficiency of the fabricated nanostructures.
- Investigate how variations in electrospinning parameters affect the growth and thermoelectric performance of the nanostructures.

Work Plan:

- Formulate precursor solutions with the appropriate thermoelectric materials and solvents to ensure good spinnability and uniform fiber formation.
- Set up and optimize electrospinning parameters such as voltage, flow rate, and collector distance to fabricate nanostructured fibers with controlled morphology and size.
- Use microscopy (SEM, TEM) and spectroscopy (XRD, EDS) techniques to analyze morphology, structure, and composition. Measure thermoelectric properties (electrical conductivity, Seebeck coefficient, thermal conductivity) to evaluate performance.
- Analyze the collected data to correlate electrospinning parameters with structural and thermoelectric properties, and optimize the process accordingly.
- Compile results, prepare documentation, and write the final report detailing findings and conclusions.

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Candidate desired studies:

- ✓ MSc Semiconductor Engineering and Microelectronic Design
- ✓ MSc Nanoscience and Nanotechnology
- ✓ MSc Telecomunications Engineering
- ✓ BSc Physics
- ✓ Doble Bsc in Physics and Chenistry
- ✓ Bsc Nanoscience and Nanotechnology
- ✓ BSc in Electronic Engineering for Telecommunications
- ✓ BSc in Industrial Electronics and Automation 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.

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