# 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:** Characterization of CrSi2-based micro-thermoelectric generators

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

**Project Description:**

- Understand the fabrication flow of a micro-thermoelectric generator (µTEG) to identify critical steps and parameters that affect device quality and performance.
- Measure key thermoelectric parameters, including electrical conductivity, Seebeck coefficient, and thermal conductivity, to assess the efficiency of the $CrSi_2$-based microgenerators.
- Test the performance of fabricated µTEGs under different temperature gradients to determine output power and conversion efficiency.
- Analyze how microstructure and uTEG geometry influence thermoelectric properties and device performance to suggest improvements.

**Work Plan:**

- Study the fundamentals of thermoelectric materials, $CrSi_2$ properties, and micro-thermoelectric generator (µTEG) fabrication techniques to establish a solid theoretical background.
- Understand the fabrication flow of $CrSi_2$-based µTEGs by reviewing existing protocols or collaborating with the lab responsible for device manufacturing.
- Measure electrical conductivity, Seebeck coefficient, and thermal conductivity using appropriate setups to evaluate the thermoelectric performance of the devices.
- Test the µTEGs under controlled temperature gradients to measure output voltage, power, and conversion efficiency.
- Analyze the results to correlate fabrication parameters and microstructure with device performance. Identify areas for improvement..
- Final report, including methodology, results, discussion, 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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