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: TFM

Project Title: End-to-end development of an indoor gas sensing system

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

Project Description:

- The Internet of Things (IoT) is an ever-growing field, with gas sensing being a key area of interest. We propose the development of a comprehensive IoT device tailored for gas detection applications. This project encompasses the end-to-end development of the system, including hardware and firmware design, frontend and backend development, as well as some product design elements. The specific objectives and scope of system development will be adjusted to align with the requirements of either a TFG or a TFM degree.

Work Plan:

The work will be carried out across four levels:

1. Hardware design: the system will be designed and built using off the shelf components, for the MCU, sensors, storage, and communication module. Prototyping will begin with evaluation boards and existing test systems; the final goal will be to design, manufacture, and assemble a PCB to include an indoor gas sensor. The TFM will include additional sensors such as humidity and temperature.
2. Software design: it will encapsulate the firmware that will drive all the sensors, storage of data collected, and any communication implemented e.g. Bluetooth or WiFi. Further work for the TFM will be to implement the backend to receive data and the frontend to display the data in a user-friendly way.
3. Implementation: the prototype will be packaged and installed in lab conditions to collect data in real time to validate its functionality. the TFM will include real indoor examples such as an office space.
4. Data evaluation: storage of data, evaluate the data i.e. data pre-processing, correlation analysis (e.g. measured variable, measurements vs calibration curves). Compare measures and condition (e.g. office size, number of people etc).

Carrer dels Til·lers s.n., Campus UAB | 08193, Cerdanyola del Vallès
https://www.imb-cnm.csic.es | talent@imb-cnm.csic.es
+34 93 594 7700

Institute of Microelectronics of Barcelona IMB-CNM CSIC

Candidate desired studies:

- ✓ MSc in Research and Innovation in Computer-Based Science and Engineering
- ✓ MSc in Telecommunications Engineering
- ✓ 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.

Carrer dels Til·lers s.n., Campus UAB | 08193, Cerdanyola del Vallès
https://www.imb-cnm.csic.es | talent@imb-cnm.csic.es
+34 93 594 7700