Centre Nacional de Microelectrònica IMB

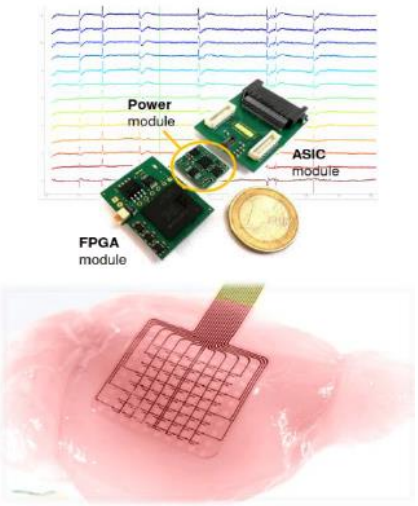
CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Research Electronic Engineer / PhD paid position

at the Integrated Circuits and Systems group (ICAS) and Biomedical Application Group (GAB) of IMB-CNM(CSIC)

Multiplexed Read-Out Integrated Circuits for High-Density Neural Interfaces Based on Graphene Micro-Transistors

Description



The mission of ICAS and GAB groups are to take advantage of the technological capacities available at the Clean Room of the IMB-CNM to provide novel solutions for different biomedical applications.

Graphene micro-transistors has demonstrated unique capabilities for recording brain signals, including infra slow activity (<0.1 Hz) that are of special interest for understanding neural disorders such as epilepsy, stroke or migraine. These flexible devices also enable the implementation of addressable sensors arrays, which are required for overcoming the connectivity bottleneck in the push for high density neural interfaces.

Now we are recruiting a PhD position to join in our team and work in a founded project "*Graphene based neurotechnology for advanced clinical brain monitoring*". The aim of this position is to develop novel electronics for recording brain signals using high-density arrays of graphene micro-transistors. This research is required to exploit the full potential of this technology in the neuroscience field and enable its translation to the clinical practice with humans.

Background and skills

- Electronic engineering or any similar curriculum covering the following topics: CMOS technology basics, analog and mixed-signal CMOS circuit design, FPGA-based platforms, instrumentation and data processing.
- Knowledge of EDA tools and HDLs for full-custom IC design.
- Motivation to gain multidisciplinary knowledge (mainly in electrochemistry, clean-room sensors technology and electrophysiology)

Tasks

- To develop a custom electronic system around an existing application-specific integrated circuit (ASIC) for the in-vivo recording of brain neurophysiological signals at large scale (1024 channels).

- To develop a new generation of the Read-Out ASIC with improved signal processing capabilities for reducing the communication bandwidth while preserving signal integrity.

- To validate the developed acquisition system at neurophysiological laboratories by means of different European collaborations.

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