

POST-DOCTORAL POSITION – 24 months - starting Fall 2011

Lab: IMS, CNRS UMR 5218, University of Bordeaux www.ims-bordeaux.fr

Team: ELIBIO-BIOELECTRONICS (Dir N. LEWIS) www.ims-bordeaux.fr/ELIBIO

Supervisor : Sylvie RENAUD , Pr Institut Polytechnique de Bordeaux

Grant: BIODIA project (Funding FEDER (EU) and Région Aquitaine (FR))

Title: *On-chip signature extraction of pancreatic cells electrical recordings*

Key-words:

Diabetes, real-time spike processing, digital integrated circuits, microelectrode arrays, pancreatic islets modelling, insulin delivery

Project Description:

The BIODIA interdisciplinary research project funded by Région Aquitaine and Europe (FEDER grants) aims at the improvement of insulin delivery in the settings of diabetes. It takes advantage of the expertise present in diabetology, pharmaco-toxicology, nanochemistry, microelectronics and cell biology/physiology to address the issue in a multidisciplinary approach exploiting recent advances in the corresponding research areas. The unifying topic is given by novel approaches to glucose recognition using nanochemistry or hybrid bio-electronic sensors. The project objective related to the proposed position is the development of a bio-electronic hybrid sensor using islets/beta-cells grown on microelectrode arrays (MEAs) and integrated electronics for on-line signal processing. This set-up will serve screening purposes drug actions, pre-transplantation quality control, monitoring differentiation of stem cells. In fine, and beyond the granting period, this setup will be implantable and sense the demand of insulin on-line and in real time to drive a commercial pump for the delivery of the hormone.

The post-doc researcher will be in charge of the development and on-chip (digital hardware) implementation of spike processing algorithms for extracting a signature parameter of the insulin need of pancreatic islets. He will base his investigations on the study of biophysical models for beta- and alpha-pancreatic cells and on experimental data provided by CBMN. The designed device will be embedded on-chip together with analog ICs in charge of on-line conditioning and spike detection on MEA recordings.

The project partners are IMS (www.ims-bordeaux.fr) for silicon-based processing and instruments, CBMN (Pr J. Lang, <http://www.cbmn.u-bordeaux.fr>) and CHU Bordeaux (Pr B. Catargi, <http://www.chu-bordeaux.fr/>)

Desired skills and qualifications:

- Applicants should have an advanced degree in Electrical or Biomedical Engineering, Signal processing or Microelectronics, preferably with emphasis on on-line biosignal processing.
- Demonstrated background in digital IC synthesis techniques and real-time signal processing
- Knowledge of programming in VHDL, Matlab, Madonna/Neuron or equivalent
- Proficiency in written and spoken English
- Experience in multi-disciplinary projects in a team environment

Application :

Please send a resume and a list of references to : sylvie.renaud@ims-bordeaux.fr