Université Lille Nord de France
Pôle de Recherche et d'Enseignement Supérieur

Ecole doctorale régionale Sciences Pour l'Ingénieur
Lille Nord-de-France - 072

Titre Thèse	Characterization of new neuro-biohybrid systems enabling bidirectional communications between artificial and biological neurons: applications for neurodegenerative disorders.	
(Co)-Directeur	Pr Virginie Hoel	E-mail : virginie.hoel@iemn.fr
(Co)-Directeur	Dr Christel Vanbesien, HDR	E-mail : christel.vanbesien-mailliot@iemn.fr
(Co)-Encadrant	Dr Alexis Vlandas	E-mail : alexis.vlandas@iemn.fr
Laboratoire	IEMN	Web : http://www.iemn.fr
Equipe		Web :
Financement prévu	Contrat Doctoral Etablissement	ULille ☒ UPHF ☐ Centrale Lille ☐ Yncrea ☐
	Région – Autre ☐	Contrat de recherche ☐ Préciser :
Financement acquis ? ☐	Contrats de Recherche ☐ Préciser	Autre ☐ Préciser

Résumé du sujet :

Neuromorphic engineering is an emerging interdisciplinary field that aspires to the development of artificial systems employing some physical properties of the information representations found in biological neural systems. In parallel, neurosystem engineering which aims at studying neural systems, enhancing or replacing neuronal function with engineered devices such as biosensors, multielectrode arrays or even neural prostheses, has also considerably progressed in the past years. The junction between both fields and the specificity of artificial neurons, displaying the same electric signature as biological neurons, opens large perspectives for the development of biomimetic material solutions for therapy. Our main objective is to study the communication between living neuronal cells and artificial neurons. For more information on artificial neurons created in the laboratory, see Sourikopoulos et al (2017). In this context, the proposed Ph.D. project aims at characterizing and improving the communication between biological neurons and ultra-low power artificial devices, in order to develop new therapeutic approaches in the context of neurodegenerative disorders such as Parkinson's disease. The long term target is to build autonomous new networks embedded in human body as bio sensors, neural prostheses and brain interfaces.

PhD requirements:

For the proposed Ph.D. work in a multidisciplinary growing team (electronic, neurosciences and Bio-MEMS), talented and enthusiastic candidates with excellent analytical and communication skills are encouraged to apply. A strong background in electronic devices and/or in neuroscience with previous experience in cell culture or electrophysiological measurements would be an advantage; full training in other aspects will be provided to the successful candidate within the multidisciplinary environment available at the University of Lille / IEMN.

For more information on this Ph.D. position and for application, please contact:

Pr. V. Hoel (virginie.hoel@iemn.fr)
Dr C. Vanbesien (christel.vanbesien-mailliot@iemn.fr)
Dr A. Vlandas (alexis.vlandas@iemn.fr)