

Master 2 Position

at Centre Microélectronique de Provence, Gardanne, France

Title: Improving neural interfaces with organic electronic materials

A Master position is open at the Bioelectronics Department of the Ecole des Mines de Saint-Etienne, Gardanne, France. The Ecole Nationale Supérieure des Mines de Saint-Étienne (Mines Saint-Etienne), Ecole de l'Institut Mines Télécom, belongs to the French Ministère de l'Économie et des Finances. Mines Saint-Etienne host two campuses ; one in Saint-Étienne (Loire) with three sites, and the Centre Microélectronique de Provence (CMP) in Gardanne (Bouches-du-Rhône). The main mission of the CMP campus is to develop new microelectronic technologies in various fields of application of IoT (materials, health, cybersecurity and industrial engineering). Each area is managed by specific research departments, including several research laboratories and a microfabrication clean room facility. (<https://www.mines-stetienne.fr/recherche/5-centres-de-formation-et-de-recherche/>).

The research activities in the bioelectronics department focus on the coupling of electronics and biology. Prof. Ismailova's team works in the designing of new generation of electronic implants toward diagnosis and therapy of neurodegenerative diseases. The advertised project consists on the development of fiber-like microelectrodes that are able to record/stimulate neural signals. Such state-of-the-art electrodes face several challenges: high impedance, low spatial resolution, low signal to noise ratio, mechanical mismatches of electrodes with the brain tissue. To address these challenges, the main objective of the project is to tune microelectrode's impedance by applying a thin coating of conductive organic materials. Different materials synthesis strategies will be envisioned to alter electrochemical characteristics of the electrodes targeting the recording of specific neural activities.

At the end of this project it is anticipated that the participants of the project will get familiar with the following subjects:

1. Specifics of implanted neural microelectrodes for recording and stimulation
2. Challenges of neural electrodes in interfacing the brain tissue
3. Surface functionalization methods
4. Impedance spectroscopy
5. Electron Microscopy

Duration: 6 months

Candidate's Profile: Master specialization in electronic engineering, materials science, chemistry or biomedical devices

Location: Campus Georges CHARPAK Provence, 880, route de Mimet 13541 Gardanne Cedex, France

Context: This position is part of a collaborative project funded by the Agence National de la Recherche (ANR) NeuroSense.

How to apply: Please send your CV and a motivation letter to Dr. Esma Ismailova ismailova@emse.fr by **February 20, 2020**.