

Open Post-Doctoral Fellow Position “ Exploring 1D/2D Nanomaterials for Wearable Biosensors”

Duration: 18 months (with possible extension)

Location : Institut d'Electronique et des Systemes, CNRS Université de Montpellier, Montpellier, France

Start Date : January 2019

Funded by : EU H2020-ICT-SmartVista

Description & Project Context: Cardiovascular diseases (CVD) remain the leading cause of mortality and a major cause of morbidity in Europe. Every year there are more than 6 million new cases of CVD in the EU and more than 11 million in Europe as a whole. With almost 49 million people living with the disease in the EU, the cost to the EU economies is €210 billion a year. There is a growing demand for a reliable cardiac monitoring system to catch the intermittent abnormalities and detect critical cardiac behaviors which, in extreme cases, can lead to sudden death. The objective of the Smart Autonomous Multi Modal Sensors for Vital Signs Monitoring (SmartVista) project is to develop and demonstrate a next generation, cost-effective, smart multimodal sensing platform to reduce incidences of sudden death caused by CVD, and will contribute to the EU vision of an Internet of Things for healthcare. The key innovation in SmartVista is to integrate 1D/2D nanomaterials based sensors to monitor the heart, thermoelectric energy harvesters to extract energy from the body to power the system and printable battery systems to store this energy. Together these will result in a self-powered device that will autonomously monitor the electrocardiograph, respiratory flow, oxygen flow and temperature of the patient. This information will then be transmitted wirelessly for online health processing. This real-time self-powered monitoring of a patient's health is currently not available. Thus, the technology that will be developed in SmartVista will position us at the forefront of digital health and wearable biosensor technology for wireless monitoring in hospitals and of remote patients, both of which are necessary in this era of an aging population.

Position Summary: The research work entails development of piezoresistive sensors based on both 1D (i.e., carbon nanotubes) and 2D (i.e., molybdenum disulphide) nanomaterials for strain sensors to capture heart rate, blood pressure, respiratory flow and muscle activity. Additionally, the goal is to develop chemical sensors based on 2D materials for measurement of arterial oxygen saturation. The work will be conducted in close collaborations with project partners Tyndall (IE), AnalogDevices (IE), Fraunhofer (DE) and Novosense (SE).

Qualifications: By the starting date, the applicant should have a PhD degree in Engineering Physics, Applied Physics, Nanosciences, Material Sciences, Electrical Engineering or equivalent. Solid knowledge in the areas on device physics, nanomaterials, and semiconductors is necessary. Any experience from material processing and characterization, device/circuit analysis, and/or theoretical modeling is a merit. You should have good analytical and experimental skills and good ability to work independently towards the goals expressed in the project plans.

Language: Fluency in English is mandatory. French language is not required.

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Application : Please send the following documents

- CV and publication list
- Motivation letter
- Candidate should arrange up to three reference letters to be sent to us.