DC Research Projects @ NOVA FCT | Marie Curie Doctoral Researchers – FERNS project

Contract: Full time/Fixed Term

Are you creative, self-motivated and collaborative with a passion for research?

If so, we have an exciting opportunity for you to join us and advance your career by developing methodologies for the sustainable fabrication of nanoscale sensing and electrode materials from natural precursors. We are seeking 2 outstanding Researchers (DRs) candidates for fully-funded studentships.

The studentships have a duration of 3 years.

The successful candidates will be expected to begin the programme before April 2026.

About the Project

Two funded PhD studentships are offered as part of the H2024 Marie Skłodowska-Curie Doctoral Network funded by the Europen Commission “Holistic integration of eco-Friendly design tools and materals, fabrication technologies for the responsible co-creation of future Sustainable integrated electronic systems” ‘FERNS’ coordinated by the Tyndall National Institute (grant agreement number 101226611). The network brings together 20 universities, research institutes and industrial partners from eight countries. Our aim is to train the next generation of researchers in the implementation of eco-design approaches for the realisation of sustainable electronics.

Positions @ NOVA FCT

- **DC7 Development of wearable green electronics for electrophysiological sensing (NOVA FCT)**

Objectives: Development of high resolution and long-term stability of electrophysiological sensors based on pressure sensors, able to monitor pulse waveforms and ECG signal acquisition, using a new technology based on laser-induced graphene (LIG), using polymers and cellulose based materials as precursors. Development of simple transfer methodologies for application of LIG-sensors on textiles. 1. Selection of new cellulosic based materials and membranes 2. Optimization of DLW on selected materials using alternative CO2 laser sources like UV 3. Development of simple transfer methodology based on a water-induced peel-off process that efficiently separates patterned LIG structures from paper/cellulose substrates to conformable, flexible substrates, harnessing the multifunctional capabilities of LIG toward applications in wearable electronics. 4. Sensors fabrication and characterisation.

Expected Results: production of strain gauge sensors for electrophysiological signals (case study 2); development of methodologies for the integration of LIG sensors on textiles for wearable applications.

- **DC8: Development of wearable green electronics for non-invasive electrochemical sensing (NOVA FCT)**

Objectives: Development of high resolution non-invasive for non-enzymatic glucose electrochemical sensors, using a new technology based on laser-induced graphene (LIG), using as precursor materials, different kinds of flexible substrates, like polymers and cellulose based materials. The sweat stimulation will be based on iontophoresis, also-LIG-based. 1.Development of an iontophoresis with electrodes produced by green LIG process, for sweat stimulation 2. Integration of glucose sensor and wearable sweat sensing demonstration 3. Assessment of sustainability and benchmarking against commercial wearable solution (not sustainable).

Expected Results: Development of a fully integrated and autonomous platform that enables continuous and non-invasive monitoring of glucose: a) optimization of sweat-stimulating using iontophoresis LIG electrodes and b) wearable electrochemical sweat sensing system for precise measurement of biomarkers in sweat.