PhD-Direct writing of functional materials for milk quality point-of-care tests

Contract: Full Time/Fixed Term

Fast and inexpensive patterning of functional biomaterials is desirable for point-of –care (POC) applications in animal health. Standard laboratory patterning techniques based on lithographic methods are too cumbersome for POC applications. For example micro-contact printing and capillary micro-molding require hard vacuum, high temperature and strong solvents not suitable for POC. On the other hand, direct writing of plasmonic materials has been achieved by our group and others, leading to the fabrication of pen-on-paper Surface-Enhanced-Raman Scattering (SERS) sensors.

In this project commercial pens (BIC pens or fountain pens) will be used to “write” plasmonic test domains on nitrocellulose membranes in order to develop lateral flow paper test strips for detection of residual antibiotic in milk (β-lactams, sulfonamides, tetracyclines). Metal nanoparticles (including nanostars, nanorods and nanocubes) will be functionalised with antibodies for targeted applications. The read out will be colorimetric, based on the coloration of the test strip caused by selective adsorption of plasmonic nanoparticles to the test line. Alternative platforms will also be fabricated whereby Raman Enhanced Scattering (SERS) will be used to detect targeted pathogens on paper test strips.

Tyndall National Institute at University College Cork invites applications for a PhD opportunity as part of the Science Foundation Ireland funded SFI centre VistaMilk. The Nanotechnology Group - Tyndall National Institute at University College Cork, is focusing its research in Nano- design and -fabrication with the aim of making smart sensors for multiple applications. We now wish to recruit a PhD fellow to develop the generation of novel sensors for milk quality applications. Key research themes will include development, fabrication and characterisation of novel lateral flow sensors.

Key Responsibilities

This is a PhD position of 48-month duration. The responsibilities will include:

- The synthesis, characterization and bio-functionalisation of plasmonic inks.
- Development of plasmonic and biological direct writing techniques.
- Development of lateral flow test strips with colorimetric and optical read outs.
- Demonstration of antibiotic residue and pathogen detection in milk substances.

Essential Criteria

- The successful candidate for this position will have a BSc or an MSc in a relevant field e.g. materials science, nanotechnology, nanoscience or chemistry.
- The candidate should be able to work independently, and have excellent theoretical and experimental skills.
- Fluent command of English is required.
- Knowledge or experience in nanofabrication and nano-synthesis is considered as a key advantage.
Moreover, knowledge of electrochemistry and electrochemical characterisation techniques is also greatly appreciated. Most importantly, the Nanotechnology group in general, and this project in particular are very challenging multidisciplinary environments. It is therefore essential to show willingness to look beyond disciplinary boundaries, to learn new techniques and skills required for this project.

**Desirable Criteria**

- Ability to work in a team environment.
- High motivation with excellent organizational and communications skills.
- Experience with materials science characterization tools (e.g., optical and electron microscopy, infrared/Raman spectroscopy)
- Willingness to work on a variety of projects and learn new techniques.
- Demonstrated fundamental verbal and written communication skills necessary to work in a multidisciplinary team environment, author technical and scientific reports and publications, and deliver scientific presentations.

An annual student stipend of €18,500 applies for this successful candidate for this position. Yearly University academic fees will paid by the Tyndall National Institute.

**Application Instructions**

**Step 1** - click [here](#) to download the Application form and indicate the Job reference DI-7

**Step 2** - return the completed Application form, together with your CV and motivation letter to careers@tyndall.ie.

Please note that Garda vetting and/or an international police clearance check may form part of the selection process.

The University, at its discretion, may undertake to make an additional appointment(s) from this competition following the conclusion of the process.

At this time, Tyndall National Institute does not require the assistance of recruitment agencies.

Tyndall National Institute at University College, Cork is an Equal Opportunities Employer.