PhD Scholarship Advertisement

Fully Funded PhD Scholarship in Flexible Polymer-Carbon Composites for Medical Sensors
College of Science and Engineering; School of Natural Sciences-Physics Unit

Applications are invited from suitably qualified candidates for one full-time funded PhD scholarship starting in September/October, 2023 affiliated to the College of Science and Engineering/School of Natural Sciences/Physics at the University of Galway.

University of Galway
Located in the vibrant cultural city of Galway in the west of Ireland, the University of Galway has a distinguished reputation for teaching and research excellence.

For information on moving to Ireland please see www.euraxess.ie

Detailed Project Description.

A Four Year PhD Scholarship in Flexible Polymer-Carbon Composites for Medical Sensing is available immediately. Funded by Science Foundation Ireland's Frontiers for the Future funding.

Closing date for applications: 31 August 2023 for a September/October start.

New carbons, such as graphene, create novel electronics at an ultra-compact scale, replacing metals, silicon and semiconductors, but are disadvantaged by complex and toxic manufacturing methods, requiring process liquids/gases, clean rooms and controlled atmospheres. In this project, a single step Direct Laser Writing (DLW) process will be used to structure the solid carbon material in 3D to tune the composite conductivity, functionalization and sensitivity to strain, temperature and moisture. This project will create flexible polymers, for sensing spatial variations in strain, temperature and moisture for smart polymer skins or smart dressings for wound healing, medical implants for monitoring physiological parameters, or contaminated or damaged surfaces in structural health monitoring.

This project is suitable for a student interested in Polymer Characterisation and Applications as Sensors, including material and electronic analysis and instrumentation/signal processing and laser processing. This project will suit candidates with interests/experience in: nanotechnology, carbon, graphene and polymer materials, optics and lasers, spectroscopy, microscopy techniques, electrical measurement and characterization, analytical science, and sensors.
Skills Acquired: The student will receive training on polymer material analysis and testing. They will perform chemical and electrical characterisation of DLW carbon structures, and evaluate the performance of structures and sensors. They will learn optical and chemical analytical techniques for chemical and electrical characterisation of materials and laser processing. This research work will equip a student with skills in the following research areas:

1. **Instrumentation**: Photonic materials for sensors and devices. Signal processing, internet of things and integrating sensing structures into medical and body sensing devices.
3. **Medical Devices**: The sensor/device structures inscribed inside flexible biologically compatible polymers, can create wearable or implantable integrated sensors/devices for medical and assistive technologies.
4. **Manufacturing and process analytics**: industrial/manufacturing processes using laser and photonic technologies for sensors and devices.
5. **Technology Transfer**: Basic science to enables fast, scalable, green and low energy laser based, roll to-roll manufacturing processing, and digital control of a laser manufacturing process for sensors/devices and as smart composite materials.

Structured PhD: The student’s research is supported and complemented through a range of taught modules and accredited activities aimed at ensuring the acquisition of high-level skills in research methods, analysis and communication. Every PhD student must complete 30 ECTS of such training during their PhD programme. Every PhD student, in addition to a supervisor, has their own Graduate Research Committee (GRC) of three academic staff members. The formal role of the GRC is to review the student’s progress annually and to make a recommendation to the College on progression into the next year of the programme.

**Living allowance (Stipend)**: €18,500 per annum, [tax-exempt scholarship award]

**University fees**: €5,500 (EU fees for EU residents).

**Start date**: September/October 2023.

**Academic Entry Requirements**: Applicants should demonstrate excellent performance at Undergraduate level and/or Masters level with interests/experience in material science or polymer chemistry, electrical characterization, sensors, instrumentation and laser material processing. They should have achieved a Degree in a Science or Engineering subject (Physics, Materials Science, Chemistry, Electrical or Mechanical Engineering) and be prepared to work in a multidisciplinary environment.
To Apply for the Scholarship: Submit an expression of interest comprising a covering letter, CV, a statement of personal research interests, evidence of performance (transcripts) at BSc and MSc or equivalent and the contact details of two referees.

Contact Name: Dr Patricia Scully

Contact Email: patricia.scully@universityofgalway.ie

Application Deadline: 31/08/2023 and time [23.59] (Irish time 24hr format)

Primary Supervisor name: Dr Patricia Scully