



School of Computing, Engineering, and the Built Environment Edinburgh Napier University

PHD STUDENT PROJECT

Application instructions:

Detailed instructions are available at :

<https://www.napier.ac.uk/research-and-innovation/doctoral-college/how-to-apply>

Prospective candidates are encouraged to contact the Director of Studies (see details below) to discuss the project and their suitability for it.

Project details

Supervisory Team:

- DIRECTOR OF STUDY: Dr Libu Manjakkal (Email: l.manjakkal@napier.ac.uk)
- 2ND SUPERVISOR: tbc

Subject Group: Cyber Security and System Engineering

Research Areas: Physical Chemistry, Electrical Engineering, Electronic Engineering, Manufacturing Engineering, Nanotechnology, Ceramics, Polymers

Project Title: Flexible Electrochemical Multi sensors For online Water Quality Monitoring

Project description:

Solid-state electrochemical sensor technologies with IoT systems have significant importance in many fields such as medical, biological, agricultural, and environmental pollution monitoring systems. In environmental pollution, and water pollution have serious consequences for human health, animal, fish, and plant life. Water quality monitoring demands the determination of parameters like pH, dissolved oxygen (DO), conductivity, turbidity, Cl⁻ ion, temperature, content of ammonia, metal ions, etc. This Ph.D. project will develop a new flexible electrochemical multisensor patch (pH, DO, dissolved ions) on the flexible substrate. Such sensor patches will have potential implementation in underwater vehicles for online water quality monitoring. The sensors will be fabricated by screen printing technology.

The expected major activities are

1. Preparation of new biocompatible sensitive electrode paste and fabrication of flexible electrodes.
2. Structural, morphological, and elemental analysis of the sensitive electrodes
3. Fabrication of the sensors by printing technology and investigation the sensing mechanism using electrochemical characterisations.

Candidate characteristics

Education:

A second class honour degree or equivalent qualification in material science, chemistry, physics and electronics engineering

Subject knowledge:

- Fundamental knowledge of electrochemistry and advanced functional materials.

Essential attributes:

- Experience of fundamental sensors fabrication, electrochemistry and advanced functional materials
- Competent in collaborative research work
- Knowledge of sensing technology
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Desirable attributes:

- Knowledge in wireless communication