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

MRes 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 & Systems Engineering

Funding status: Self funded

Project Title: Transparent advanced energy storage device development

Project description:

Transparent electronic devices represent a cutting-edge technological frontier where functionality and transparency converge, enabling the creation of innovative electronic components and systems. These devices are characterized by their ability to perform electronic functions while maintaining optical transparency, allowing light to pass through them. This emerging field has gained significant attention due to its potential to revolutionize diverse industries, offering a wide array of applications across consumer electronics, healthcare, renewable energy, architecture, and more. The development of transparent electronic devices has paved the way for the creation of see-through or semi-transparent components such as transistors, displays, sensors, and even entire electronic systems. Electrochromic technology in many transparent electronic devices stands out for its unique capability to dynamically alter their optical properties in response to charge storing and discharging processes. These devices utilize electrochromic materials that undergo reversible colour changes or modifications in light transmission when subjected to an electrical potential or charge.

The integration of electrochromic technology into fashionable electronics allows for the creation of stylish, adaptable, and interactive products that not only serve practical purposes but also contribute to aesthetics and personal expression. electrochromic technology has made notable strides in various applications, including wearable devices, smart glasses, and electrochromic windows, where transparent displays can dynamically change appearance or visibility based on their charge storage condition

In this project the student will be focussed on the development of a large area flexible and transparent energy storage devices. The student will be part of the Sustainable Materials Research & Technologies (SMART) Group@Napier (https://smartnapier24.wixsite.com/napier). The student will prepare new metal oxide or conductive polymer based transparent electrode and will investigate its optical, electrical and electrochemical properties.
If you undertake this research project you will work for 12 months full-time or 20 months part-time and will spend the early weeks refining the project to fit your interests and aspirations.

Candidate characteristics

Education:
A first degree (at least a 2.2) ideally in materials engineering, physics, chemistry, electrical and electronics engineering with a good fundamental knowledge of electronics and materials.

English language requirement
IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. Full details of the University's policy are available online.

Essential attributes:

- Experience of fundamental materials, electronics, sensors and its characterisation
- Competent in literature review, report writing and statistical and/or qualitative analysis
- Knowledge of wearable sensors
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Application checklist:

- Completed application form
- CV
- 2 academic references, using the Postgraduate Educational Reference Form (download)
- A personal research statement (This should include (a) a brief description of your relevant experience and skills, (b) an indication of
- What you would uniquely bring to the project and (c) a statement of how this project fits with your future direction.)

- Evidence of proficiency in English (if appropriate)