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 Naser Ojaroudi Parchin (Email n.parchin@napier.ac.uk)
- 2ND SUPERVISOR: Dr Chan Hwang See

Subject Group: Cyber Security & Systems Engineering

Funding status: Self funded

Project Title: Biomedical Imaging Using Intelligent Sensors

Project description:

Traditional imaging systems suffer from drawbacks such as moderate spatial resolution and limited imaging depth, which can result in missed early-stage malignancies and deeper tissue abnormalities. Moreover, their lack of adaptability to diverse clinical needs restricts their broader application. To surmount these challenges, there is a pressing need for next-generation microwave imaging systems characterised by enhanced resolution, greater penetration depth, and adaptable capabilities. These advancements promise to revolutionise early detection and diagnosis in biomedical imaging, addressing critical gaps in current medical diagnostics.

This research proposal introduces a novel approach to Biomedical Imaging through Intelligent Sensor Technology. The project aims to utilize advanced system-level simulation and modelling tools like CST and ADS for comprehensive characterization of Intelligent Antenna Sensors. These sensors will be engineered to possess

enhanced radiation properties, thereby improving detection and imaging quality for more accurate cancer diagnosis. The research will also focus on advanced techniques in image reconstruction and signal processing to further refine diagnostic capabilities. Moreover, prototyping and rigorous laboratory testing will be conducted to validate the functionality and effectiveness of the developed system.

Candidate characteristics

Education:

A first degree (at least a 2.1) ideally in B.Sc. degree with distinction in Electrical engineering, Biomedical engineering, Software Engineering, Mechanical Engineering, Materials Science or Physics with a good fundamental knowledge of Antennas.

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 with CAD tools
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills
- Good time management and a willingness to learn new subjects

Desirable attributes:

- Experience of fundamental on Microwave Engineering and Antennas
- Knowledge of Microwave Imaging
- Competent in Signal Processing

Application checklist:

- Statement no longer than 1 page describing your motivations and fit with the project
- Recent and complete curriculum vitae. The curriculum must include a declaration regarding the English language qualifications of the candidate.
- Supporting documents will have to be submitted by successful candidates.
- 2 academic references, using the Postgraduate Educational Reference Form (download)