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

PHD STUDENT PROJECT

Funding and application details

Funding status: Self-funded students only

Application instructions:
Detailed instructions are available at https://www.napier.ac.uk/research-and-innovation/research-degrees/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: Naser Ojaroudi Parchin (Email: N.OjaroudiParchin@napier.ac.uk)
- 2ND SUPERVISOR:

Subject Group: Cyber-security and system engineering

Research Areas: Engineering & Computer Science

Project Title: Reconfigurable Surfaces for High-Efficiency RF Energy Harvesting

Project description:

The objective of energy harvesting is to convert electromagnetic waves into usable direct currents that can be stored. A promising innovation in this field is the use of two-dimensional artificially engineered reconfigurable surfaces. These surfaces offer spatial energy signal processing without the need for active phase shifters or amplifiers, making them an alternative to conventional systems. Reconfigurable surfaces can enable efficient RF power transfer between points at a minimal cost. However, for long-distance energy transmission, it is crucial to have a high-efficiency and high-gain harvesting system with beam-steering and reconfigurability capabilities.

This PhD project aims to design and create an innovative energy harvesting system with high efficiency and low loss, incorporating reconfigurable surfaces. The proposed design will be thoroughly characterized using system-level simulations and modeling. Additionally, the project will involve the crucial phases of prototyping and laboratory testing to validate the proposed system.

References:

Candidate characteristics

Education:

A second class honour degree or equivalent qualification in Electrical and Electronic Engineering, or Computer Engineering

Subject knowledge:

- RF/Antenna systems
- Reconfigurable Structures
- CAD tools (CST/HFSS, MATLAB)

Essential attributes:

- Knowledge of Microwave Engineering
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills
- Good time management

Desirable attributes: