



## **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 Naser Ojaroudi Parchin (Email: [n.ojaroudiparchin@napier.ac.uk](mailto:n.ojaroudiparchin@napier.ac.uk))
- 2<sup>ND</sup> SUPERVISOR: tbc

**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.

## **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