

# MaREI Funded PhD Opportunity in SDR in Offshore Marine & Renewable Energy

2020

## Project Title:

***Software Defined Radio (SDR) Platform for Inter-Device Communication in Offshore Marine Research and Renewable Energy Applications***

## Project Summary

Previous simulation and modelling studies suggest that global control of Wave Energy Converter (WEC) arrays performs better than independent control and allows for up to 10% increase in energy conversion. However, this approach is more computation intensive and also requires inter-device communication. An SDR platform could facilitate this by limiting power consumption in most devices compared to using a communication and computation hub. The SDR platform is also applicable for development as a flexible base station for networks of marine sensors formed into ad-hoc wireless networks for marine monitoring and wave forecasting, for modelling and simulation of these arrays and investigating the effects of bandwidth limitations and packet loss on the performance of global control and co-ordination.

The student will build a flexible SDR platform based on existing open source SDR tools such as GNUradio and will use this to model and simulate the WEC arrays implementing global control which will necessitate the development of bespoke software for new GNUradio blocks.

The student will be based at the University of Limerick in the existing Telecommunications Research laboratory, which is equipped with SDR equipment, and test equipment and will be working closely with RA3 (Observation and Operations) researchers located in nearby laboratories and facilities at UL as well as regular visits to RA1 (Offshore Renewable Energy) for interaction with the co-supervisor and the team in Maynooth for focus on control and optimisation.

## Collaborative Plan

The development of the SDR platform will require C++/Python programming skills combined with knowledge of digital wireless communications and signal processing and control theory (for application of the WEC array global control.) The former will be provided by co-supervisor Dr Jacqueline Walker and application in particular to WEC arrays will be provided by Prof John V. Ringwood and his team at Maynooth, NUI.

## Qualifications/areas of suitable applicants

Applicants should have at least a minimum 2.1 class undergraduate degree in either: Engineering/Physical Sciences discipline/Electronic/Electrical Engineering/Communications/Control Engineering, or a relevant Masters Degree in the mentioned areas.

## Scholarship

Candidates will be funded for up to **4 years** at SFI PhD scholarship rates: **€18,500 (€1,540 per month) tax free stipend + €5,500 fees, total value €24k per year.**

## How to apply?

To apply, please send CV and Cover Letter to [jacqueline.walker@ul.ie](mailto:jacqueline.walker@ul.ie), [john.ringwood@mu.ie](mailto:john.ringwood@mu.ie) and [cris@ul.ie](mailto:cris@ul.ie). Rolling deadline, applications will be reviewed each month from 30 April up till closing, **Friday 8th August, 2020**. For enquiries and further information, contact Dr J. Walker, ([jacqueline.walker@ul.ie](mailto:jacqueline.walker@ul.ie)), or Prof. John V. Ringwood, ([john.ringwood@mu.ie](mailto:john.ringwood@mu.ie)).

Proposed Start Date: 01/10/2020

Lead FI: J. Walker