

# Aquatera - SUPER DTP PhD ideas

These project ideas have emerged from several of Aquatera's projects, ranging from the ORJIP Ocean Energy programme (<http://www.orjip.org.uk/oceanenergy/about>) to our international work on blue economy development, policy, and road-mapping. We are generally interested in projects in the following areas:

- Offshore renewable energy
- Environmental impact assessment
- Integrated energy systems
- Blue economy development
- Gender equality and social inclusion in the maritime sector
- Capacity building and skills development
- Carbon accounting / footprinting

A general contact for all of the projects below will be Dr. Raeanne Miller: [Raeanne.Miller@aquatera.co.uk](mailto:Raeanne.Miller@aquatera.co.uk).

## Project Ideas

### **Are marine ecological baseline surveys fit for purpose in an era of large-scale offshore development?**

Many authors have identified that the traditional site-specific 2-year baseline survey for offshore developments is no longer fit for purpose, yet within the offshore industry this approach remains the gold standard for gaining environmental approvals. However, as ecosystem approaches to environmental impact assessment and cumulative impact assessment gain traction, data is needed not only at project scales, but also at regional and larger scales in order to address some of the key questions now facing developers and regulators of the offshore space.

- This project would use statistical and modelling approaches to identify the ideal geographical scales, time periods, and resolution for ecological data collection.
- Through engagement of regulators, developers, and the research community, it will also seek to develop an integrated framework for data collection and analysis that can be accessed and contributed to by all stakeholders, addressing perceived barriers to such a framework.
- The integrated framework should ultimately address the increasingly pressing challenge of cumulative impact assessment for developments around the UK coastline.

### **Understanding the impacts of changes to the physical environment from offshore renewable energy development on ecosystem services**

This project would aim understand the linkages between changes to the physical environment resulting from offshore renewable energy development and any implications for ecosystem services provision. The ultimate aim of this project would be to enable the real-world implications (e.g. for habitats, species, and ultimately, humans) of effects on to the physical environment to be translated in relevant and impactful ways. This topic is listed as a critical evidence need by ORJIP Ocean Energy, and has been highlighted by the ScotMER programme's benthic ecology working group.

- The project could use a variety of approaches, from ecosystem modelling to physical modelling
- An ecosystem services approach would enable the project to identify the human outcomes of changes to the physical environment.

### **Developing standardised tools to assess the social and economic impacts of offshore renewable energy development.**

The ORJIP Ocean Energy Critical Evidence Need 8 identifies the need for development of tools and frameworks for assessing social and economic impacts of wave and tidal stream developments, including impacts on other sectors and

activities. This critical evidence need is also highly applicable to the large-scale development of offshore wind energy around Scotland's coasts. This project might include impacts on commercial fisheries, recreational users, shipping and navigation, tourism, and/ or the health and wellbeing of local communities, and could seek to identify key indicators for social and economic impacts, develop methods for validating social impact predictions within EIA, and/or understand the cumulative social impacts of ORE development.

### **Assessing the climate change impacts of wave and tidal energy devices**

This project would seek to understand the carbon reduction benefits of wave and tidal energy developments and their contributions to net zero targets (including at a local scale), for example through diesel displacement, electrifying micro-grids, or other applications. This has been identified as a critical evidence need by ORJIP Ocean Energy. This project will seek to:

- Inform the assessment of climate change benefits of large- and small-scale wave and tidal stream developments
- Develop tools for assessing the climate change benefits and disbenefits of wave and tidal stream energy developments, which might include guidance and protocols for assessing climate change benefits and the development of good practice in the assessment of climate change impacts.

### **Optimising environmental enhancement opportunities for offshore renewable energy**

As the offshore wind energy industry develops apace, discussion of ecological enhancement and its role as an ecological compensation measure for development has become an important discussion. Good environmental enhancement and/or compensation measures must be carefully planned according to the desired outcomes, species/habitats in question, and local environmental conditions. This project will seek to develop a framework for decision-making around ecological enhancement options. This project could incorporate a variety of methods, from GIS modelling to data visualisation and end-user engagement.

### **Exploring the cultural, organisational, and individual factors influencing decision-making in ORE**

A large number of factors can influence the outcomes of environmental decision-making for offshore renewable energy, including (but not limited to) perceptions of risk, social norms, organisational culture, and political influences. This project would seek to develop a conceptual model for ORE decision-making at various scales, from individual, to organisational, to societal, in order to understand how different factors can influence each scale of decision-making. Ultimately, better understanding of the factors that influence decision-making in the ORE sector can enable the science community to present information in such away that it addresses these factors, and so an additional aim for the project would be to develop a framework for presenting evidence to facilitate evidence-based decision-making.

### **Opportunities for Gender equality and the Scottish Blue Economy**

The Scottish Government released its Blue Economy Vision in March 2022, which outlines Scotland's ambition to become a world leading Blue Economy. It identifies six outcomes acting as focal points to ensure the marine environment supports ecosystem health, improved livelihoods, economic prosperity, social inclusion, and wellbeing. Globally, the development of the Blue Economy presents an opportunity for improved gender equality and social inclusion, are important in order to address the UN SDGs on Gender Equality (SDG 5) and Reduced Inequalities (SDG 10), amongst others. This project will seek to understand how the Blue Economy sector is moving towards addressing these targets, and could include a variety of approaches from policy analysis to stakeholder engagement, and could focus on the wider blue economy, or could take a comparative approach to investigating gender equality and social inclusion within specific sectors.

