

JOB TITLE: Research Fellow: Offshore Renewable Energy and the Environment

SECTION: Environmental Research Institute (ERI), North Highland College-UHI

SCALE POINT RANGE: £30,066 - £32,641 (Post-doctoral Researcher) or £35,467 - £38,420 (Research Fellow)

TERM: Open-ended (subject to probationary period)

START DATE: Negotiable

RESPONSIBLE TO: Dr Benjamin Williamson

CLOSING DATE: 22nd November 2021

This is an exciting opportunity to join a multidisciplinary research group working with Ørsted, the world's largest offshore-windfarm developer. The successful candidate will lead the design of novel environmental monitoring technologies, platforms and analysis techniques to inform ecological understanding and future management priorities, as offshore wind fulfils increasing global demand for clean energy.

Seasonal distributions of seabirds and marine mammals are linked to annual migrations of their prey (fish). Those migrations, in turn, relate to predictable seasonal changes in feeding and spawning grounds which are driven by environmental factors. A detailed understanding of top-predator distributions is required to inform and de-risk future offshore windfarm development. However, existing large-scale environmental survey techniques often rely on seabird or marine mammal tagging studies or aerial / vessel-based snapshot surveys. These techniques result in high variance in animal locations, including between individuals, seasons, years and development sites.

This research fellowship, part of the PREDICT project, offers a unique opportunity for a talented researcher with a strong technical or analytical background and an **interest in marine ecosystems and offshore renewable energy**. This multi-disciplinary position would suit candidates from an **engineering, ecology or oceanography background** with interest in measurement techniques for understanding mobile marine species and oceanographic variation in habitats.

The researcher will work directly with a world-renowned multi-disciplinary research group based at the Environmental Research Institute (ERI) to review sensor platforms and design surveys to understand environmental drivers of animal behaviour, including

analysis methods. The post will build upon and validate ecological modelling being performed by colleagues at the University of Aberdeen and directly inform Ørsted's future and next-generation environmental monitoring.

The Research Fellow will investigate the optimal combinations of innovative technologies and novel sensor platforms to simultaneously collect data on environmental drivers, as well as prey (fish), which will be used to reduce variance and uncertainty in assessment of seabird and marine mammal distributions. In addition to fisheries acoustics (hydroacoustic) mobile and stationary platforms/moorings, this project will investigate next-generation platforms for coordinated measurement including underwater AUVs/gliders, USV/ASVs to bridge the air-water interface, and coordinated networks of distributed low-cost sensor platforms, together with analysis techniques required for in-situ empirical hydroacoustic measurement. This will enable investigation of temporal and spatial relationships between fish distributions at predicted top-predator foraging locations, in relation to relevant environmental factors.

PREDICT will support and accelerate the development of strategic methods that will allow identification of areas with high likelihood of overlap with important feeding areas for seabirds and marine mammals, which can then be considered during future rounds of offshore windfarm development. This is an exciting and career-boosting opportunity for a Research Fellow to work across disciplines and contribute to research that has directly applicable industry and policy outputs.

Informal enquires can be made to [Dr Benjamin Williamson](mailto:benjamin.williamson@uhi.ac.uk), Lead Scientist for the ERI's 'Renewable Energy and the Environment' research theme, at: benjamin.williamson@uhi.ac.uk

Job Description

We are seeking a dynamic researcher to:

- Review instruments, platforms and analysis methods for biophysical environmental monitoring.
- Design surveys and data-collection methodologies for multi-instrument platforms to answer defined biological questions. Support sensor integration and design of novel next-generation monitoring platforms.
- Analyse multifrequency and multibeam echosounder data to investigate animal behaviour in relation to environmental drivers.
- Produce >4 planned first-authored publications and reports for industry and policy use from this research.
- Collaborate, with the PREDICT team at the University of Aberdeen carrying out ecological modelling of fish migrations, and with colleagues at Ørsted.

Applicants should have a PhD or equivalent research experience, a strong technical or analytical background, and interest in marine ecosystems and offshore renewable energy. Desirable skills and experience include:

- Hydroacoustics / fisheries acoustics.
- Oceanography, hydrodynamics.
- Marine sensing (echosounder, multibeam etc.).
- Knowledge of marine ecosystems and ORE.
- Novel sensor platforms (USV/ASV/AUVs).

Programming experience, especially with large datasets, (e.g., MATLAB, Python, C++, R) is an advantage.

Key Duties

Research:

- Make an effective and innovative contribution to the development of multi- and inter-disciplinary environmental research, exploiting knowledge exchange and commercial opportunities.
- Generate internationally recognised outputs of originality and scientific insight.
- Contribute to income generation at the ERI through grant capture, commercial activity or knowledge exchange activity in line with strategic objectives.

Management:

- Provide effective and expert supervision of research students, and line management of staff (where required).
- Contribute to development and implementation of ERI, NHC and UHI policies & strategies.

- Provide effective budget management for specific projects or areas of research.

Networking and outreach:

- Develop an effective and responsive network of academic and research organisations and where applicable, commercial, stakeholder, business or public services organisations.
- Build new collaborations and partnerships in response to emerging challenges or opportunities.
- Take on an ambassadorial role using available opportunities and contribute to public engagement and outreach activities.

Teaching:

- Contribute to curriculum development and teaching / training as opportunity permits.

Other duties temporarily or on a continuing basis, as may reasonably be required, commensurate with the grade.

Person Specification

Candidates should be able to demonstrate:

Academic experience and achievements exemplified by some of the following:

- Research outputs (papers, presentations, etc.).
- Research grants and/or knowledge exchange.
- Contributing to postgraduate supervision.
- Peer recognition (e.g., refereeing, reviewing, invited lectures and conference presentations).

Communication (level 3):

- Communicate clearly, concisely and professionally ensuring understanding by a wide audience.
- Produce effective written communications in a variety of media for diverse situations/audiences.
- Communicate persuasively to influence change.

Resource management (level 2):

- Plan, monitor and review time and resource allocation and discuss with other colleagues to ensure efficient delivery of project objectives and use of resources.
- Manage budgets and engage effectively with Finance experts when required.

Teambuilding (level 2):

- Build wide networks and work with team members to support research and organisational goals.
- Take steps to become an effective team member.
- Draw on the diversity and experiences of others.

Leadership (level 1):

- Build effective relationships with staff, colleagues, peers and external partners to achieve objectives.
- Demonstrate pride and professionalism in activities and actively promote these qualities in others.
- Motivate and inspire people to achieve, delegating effectively to provide development opportunities.

The University of the Highlands and Islands (UHI)

UHI is based in the Highlands and Islands of Scotland, providing access to undergraduate and postgraduate study and research opportunities through a distinctive partnership of 13 colleges and research institutions with 40,000 students. Each partner has its own character and contributes to the wider UHI partnership. Some are relatively large colleges in the urban centres of the region such as Perth, Elgin and Inverness. Others are smaller institutions, including some whose primary focus is on research – all enriched by the people, natural environment, economy, culture and heritage of the Highlands and Islands and its communities.

Partners have their own micro-strategies and employ most research staff, make their own investments and exploit local autonomy in creating research activity within the wider university strategy. This breadth and diversity of the UHI partnership adds strength and impact to the main UHI research themes at the local level, often based on our unique regional characteristics. It permits a growing cross-disciplinary approach which enriches our research and allows UHI to collaborate at the highest level. Particular research strengths, as measured through the Research Excellence Framework (REF), include environmental, marine and health sciences.

The Environmental Research Institute (ERI)

The ERI is part of North Highland College, Thurso, one of the academic partners of UHI. The ERI seeks to address and advance understanding of environmental issues through high-calibre research (including knowledge exchange), enterprise (including commercial and consultancy), learning and teaching, and outreach.

We use our proximity to outstanding natural resources combined with state-of-the-art facilities to build internationally recognised research capability. Our approach is underpinned by strong, strategic partnerships and collaborations with academic,

commercial and stakeholder organisations at regional, national and international levels.

We aim to ensure that our work is highly significant to the advancement of scientific understanding and of tangible socio-economic worth. We address new societal and policy demands related to improving understanding of the natural environment, particularly in relation to offshore renewable energy, and to decarbonising modern society.

ERI Thematic Priorities

The ERI is focussed on the thematic priorities of:

- Renewable Energy and the Environment
- Carbon, Water and Climate
- Environmental Contamination and Ecological Health

And the cross-cutting of:

- Environment, Economy and Society

Renewable Energy and the Environment (REE)

The ERI is located close to many of Scotland's outstanding wind, wave and tidal energy resources, notably the Pentland Firth, the foremost tidal resource in the UK, and the Moray Firth, containing multiple offshore windfarms and many future ScotWind lease areas. Sustainable use of these resources will play a key role in achieving the Scottish Government's renewable energy and carbon emission targets.

The REE theme seeks to capitalise on our multi-disciplinary expertise to address environmental uncertainties and issues underpinning development of the renewable energy sector. We do so by actively seeking and developing effective collaborations and partnerships, including with our UHI partners, and within regional, national and international settings.

Our team exploits distinctive blends of in-situ measurement, environmental survey, experimental, modelling and remote-sensing approaches. These provide new insights that are relevant not only to renewable energy, but also to ecosystem functioning and anthropogenic impacts more generally within the fields of marine biology, behavioural ecology and oceanography.

As well as developing and disseminating environmental knowledge, we also aim to promote understanding of closely coupled social and economic issues. These relate to development of the region, including the relationship with other key sectors. This will assist in establishing

sustainable industries that can have a transformational impact on prospects of this region, its economy, its people and its communities.

The REE theme comprises around 20 PhD students and researchers working across engineering, ecology, oceanography, marine sensing, modelling, robotics and socioeconomics. It is led by Dr Benjamin Williamson.

Renewable Energy and the Environment Activities

Innovative sensors and platforms – development and application of novel cross-cutting approaches and technologies to gaining new environmental insights including hydroacoustics, sensor fusion, computer vision, machine learning and big data.

Bio-physical and environmental interactions – understanding biological and ecological responses to changes in the marine (wind, wave, tidal) and terrestrial (wind, hydro) environments, together with oceanographic and hydrodynamic drivers of biodiversity, and environmental interactions around renewable energy devices.

Renewable energy resource assessment – field, modelling and remote sensing approaches to advance understanding of tidal stream, wave, hydro and wind energy resources (temporally and spatially).

Movement ecology – understanding the behavioural ecology of key species using techniques such as telemetry, remote sensing and observation.

Energy vectors, storage, smart grids / micro grids – supporting optimal use of intermittent renewables into grid and off-grid applications, including remote communities and developing countries.

Economically and ecologically-sustainable energy transition and decommissioning – supporting the move to renewable sources, informing decommissioning and environmental / habitat considerations with pre- and post-decommissioning monitoring and pre- and post-consent monitoring.

REE is housed within the Centre for Energy and Environment, a state-of-the art facility with a dedicated research boat 'Aurora', modern offices, instrumentation and electronics laboratories, and workshops. Cutting-edge instrumentation includes hydroacoustics (multi-frequency echosounders, multibeam sonars), broadband ADCPs, AWACs, multi-frequency sidescan sonar, multi-sensor seabed observatories, ROVs, X-band radar, fish and seabird tracking tags and receivers, Waverider buoys, weather stations, and a large fleet of UAVs including RTK and high-payload water-landing hexacopters with multi-spectral imaging systems.

Key Terms and Conditions of Employment

Hours of Work	A full-time working week is one of 35 hours. This may include evening and weekend work, where required.
Holidays	A full year's holiday entitlement is 31 days. In addition, there are 14 days public holidays of which 10 are taken at Christmas and 2 at Easter, the remaining 2 are treated as floating.
Salary	To be negotiated within advertised range, i.e. £30,066 – £32,641 (Post-doctoral Researcher) or £35,467 – £38,420 (Research Fellow)
Location	The position is planned to be based at the ERI in Thurso although you may be required to work from other sites as appropriate to the duties.
Pension	You will be contractually enrolled into the Local Government Superannuation Scheme. Further details are available on joining.
References / PVG Scheme	For external candidates, appointment will be subject to references and admission to the PVG Scheme.