THE UNIVERSITY OF WESTERN AUSTRALIA
Achieve International Excellence

Position Title:	Research Fellow/Associate
Position Classification:	Level B or Level A
Position Number:	314865
Faculty/Office:	Engineering, Computing and Mathematics
School/Division:	Centre for Offshore Foundation Systems (COFS)
Supervisor Title:	ARC Future Fellow
Supervisor Position Number:	101595

About the University

The University of Western Australia (UWA) has an international reputation for excellence and enterprise and has been rated as one of the best comprehensive universities in Australia. It is one of the country's leading research institutions, as demonstrated by our Nobel Laureate, and is the only Western Australian member of the prestigious Australian "Group of Eight" research universities.

Vision and Values

The University of Western Australia vision is achieving international excellence. Its core values underpinning our activities are a commitment to:

- A high performance culture designed to achieve international excellence
- Academic freedom to encourage staff and students to engage in the open exchange of ideas and thought
- Continuous improvement through self-examination and external review
- Fostering the values of openness, honesty, tolerance, fairness, trust and responsibility in social, moral and academic matters
- Transparency in decision making and accountability
- Equity and merit as the fundamental principles for the achievement of the full potential of all staff and students

All staff are expected to comply with the Code of Ethics and the University's Code of Conduct and demonstrate a commitment to its Equity and Diversity and Safety principles and the General Capabilities of personal effectiveness, working collaboratively and demonstrating a focus on results. Details of the University policies on these can be accessed at http://www.hr.uwa.edu.au/publications/code_of_ethics, http://www.equity.uwa.edu.au and http://www.safety.uwa.edu.au/policies. All Staff are to complete a Professional Development Review Annually. Details of the University policies on Professional Development Review can be accessed at http://www.hr.uwa.edu.au/policy/toc/performance_management_of_staff/professional_development_review
A Commencing Professional Development Review should be completed within six months of commencement please discuss with your supervisor who is responsible for undertaking the review.

About the work area

UWA and Carnegie Wave Energy are undertaking a four-year Australian Renewable Energy Agency (ARENA) Research and Development project, with multiple fundamental and applied research components that are collectively aimed at determining the cost-weighted optimal location for wave energy conversion (WEC) devices along coastlines. The ARENA project is led by a team of 6 academic staff (Chief Investigators: Professor Gaudin, Professor Lowe, Dr Hansen, Professor Cassidy, Dr O'Loughlin, Dr Tian) based at the UWA Oceans Institute in the Centre for Offshore Foundation Systems (COFS) and the School of Earth and Environment. UWA hosts more than 40 academics with interests in physical oceanography, offshore engineering and coastal dynamics. Applying this expertise to ocean renewable energy problems is a growing research area.

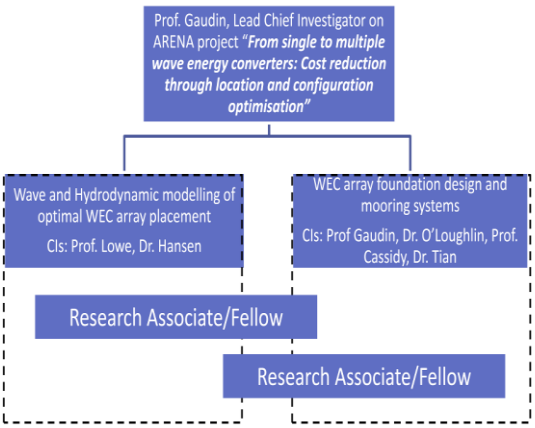
UWA has invested heavily in research infrastructure to support oceanography and ocean engineering. This includes the Indian Ocean Marine Research Centre which when completed in mid-2016 will be the largest building on the UWA campus and will house researchers from the UWA Oceans Institute, including all of the project investigators. Key research facilities include hydrodynamic laboratories, the National Geotechnical Centrifuge Facility and access to Pawsey Centre supercomputing facilities, which we use extensively for numerical simulations.

Carnegie Wave Energy (CWE) based locally in Perth is developing the CETO technology to harness wave energy into electricity generation and produce fresh water. The current and fifth generation of the technology, CETO 5, consists of a submerged buoy, known as the Buoyant Actuator (BA), driving a hydraulic cylinder which pressurises the working fluid in a pipeline back to shore. The pressurised fluid then drives a hydro-electric system, thereby producing power for the electricity network. A full scale test of three of these units has been undertaken as part of the Perth Wave Energy Project (PWEP) to demonstrate the feasibility and reliability of the concept. CWE is now moving towards the development of the CETO 6 unit both at Garden Island (WA) and in the UK, which will be the full size commercial unit.

The motivation for the ARENA project is develop a set of tools and guidelines to inform the optimal placement of WECs, including Carnegie's next generation CETO 6, considering not only optimal conditions for energy generation, but also subsea infrastructure and operations cost. The Research Fellow/Associate will conduct research primarily on the hydrodynamic and wave aspects of the project, with a focus on understanding the dynamics of shelf-to-nearshore wave transformation, with the goal to use this information to fundamentally optimise WEC array configuration and location along coastlines. This will be achieved by using a combination of wave-averaged (e.g. SWAN, Delft3D) and wave-resolving (e.g. SWASH, XBeach) numerical models. A key challenge will be to assess the impact of increasing non-linearity of the wave field in shallower water on generation potential as well as the optimal array configuration. For example, locating WEC arrays in shallower water is advantageous from a cost perspective as this reduces both the initial infrastructure (e.g. shorter cable runs to shore) and maintenance cost (e.g. ship time to get to the array) but this may increase the cost of foundations and potentially reduce wave energy extraction. This project will take an integrated approach to consider both generation potential as well as cost in determining optimal array location; as such the Research Fellow/Associate will collaborate with researchers who will be investigating methods to reduce WEC array foundation and mooring cost.

The project is significant due to the potential for considerable cost savings in the deployment and operations of WEC arrays internationally, thus making wave-energy derived electricity more cost competitive compared to traditional non-renewable sources. Wave energy has the potential to supply a significant part of the Australian Federal Government mandated Renewable Energy Target, but only if costs are considerably reduced.

Organisation chart



Role statement

To work with the Chief Investigators (CIs) and the industry partner (CWE) to undertake research and assist with research student training.

Key responsibilities

1. Conduct high quality research in wave and hydrodynamic modelling in nearshore and intermediate water depths; develop/improve capacity to account for wave energy extraction/dissipation by a range of wave energy conversion devices, development of tools or predictive models for optimal WEC array location and configuration.

2. Collaborate and engage with Carnegie Wave Energy on research and aspects of array placement.

3. Promote research projects via publication of research papers and presentations at international conferences and workshops.

4. Support transfer of the research results into practice in collaboration with Carnegie Wave Energy.
5. Supervise and assist with the training of research students.
6. Publish academic papers and other scholarly outputs to a high international standard.
7. Assist the research team in achieving the goals of the ARENA project.

Specific work capabilities (selection criteria)

1. A PhD (or nearly completed) in a discipline relevant to nearshore wave modelling and hydrodynamics.
2. Relevant research experience using numerical wave models (ideally with both phase-averaged and phase-resolving classes of models).
3. Experience with scientific computing, compiling open source numerical models, and ideally being comfortable modifying numerical codes.
4. Experience in preparing manuscripts for publication and giving presentations at conferences.
5. Previous experience in supervising and training postgraduate or undergraduate research students, would be beneficial but not required.
6. Highly developed written and verbal communication skills.
7. Ability to work independently, show initiative and work productively as part of a team.
8. Commitment to service roles in the workplace.
9. Commitment to inclusivity and diversity in the workplace.

Special Requirements

There are no special requirements.