



Case Study

Nian Liu

An Unexpected New Direction

Nian wasn't looking for a career in renewables, it found her. During the COVID pandemic she had been reflecting on her options with the careers service at her university who suggested an EngD as a good compromise between pursuing a research post and seeking a role in industry. It was in looking for an EngD in a suitable location that suited her skill set that she discovered IDCORE.

Nian came straight into IDCORE after graduating from the integrated Master's in Aero-Mechanical Engineering at the University of Strathclyde in 2021. It was the only EngD programme that she applied for, and it was a good decision. Because she didn't have a background in renewables, the first year of the programme provided her with an excellent overview of how the industry works and assisted with understanding key issues like the levelized cost of energy when comparing different renewable energy technologies.

I'm so glad I took the decision to join IDCORE, I have learnt a lot and I am really enjoying working with Mocean which is a very relaxed, friendly and supportive working environment. The support of others in my cohort has also been invaluable. Those of us based in Edinburgh still meet up on a regular basis. I think a normal PhD can be a lonely experience but that's certainly not been a problem in IDCORE, and the friendly rivalry helps to keep you going even when things get tough.

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Why Mocean?

Mocean Energy is a wave energy device developer based in Scotland, and Nian chose to work with them because they were offering a technical project which would draw on the training she received in her first degree. There has not yet been any technology convergence in the wave energy sector and this attracted Nian because it offers greater opportunity to be creative.



The work that Nian is doing is core to the way in which the company is seeking to develop their wave energy converter which is centred around the development of novel geometries to maximise energy capture by the device. The breadth of this challenge meant that this has taken time to find a specific focus for the project, but Nian is now concentrating on how to change the shape of the device's wave channel to improve resonance in the system. Her approach is using numerical modelling to run a series of optimisation cases and select designs that can be validated with higher fidelity CFD models. This is introducing a new capability to Mocean who haven't previously had in-house CFD capabilities, which has been greatly helped by the access Nian has to computing facilities at the University of Edinburgh.

Benefits to Mocean

The relationship with IDCORE with is clearly working for Mocean. Nian is the third IDCORE Research Engineer they have taken on and they are looking to sponsor more projects in the future. Developing effective relationships with academia can take a long time, but initiatives like IDCORE help to accelerate that process which is really important for an organisation like Mocean who are working at the cutting edge of technology.

The WAMIT frequency domain modelling approach that Nian is using is one that I am very familiar with. However, she is applying it to a very complex geometry which makes it hard to validate the results. This is an excellent opportunity to apply state-of-the-art academic research to a challenging commercial development environment. It has also allowed me to re-engage with Mocean and I am hoping this will lead to further mutually beneficial collaborations in the future.

David Forehand, Academic Supervisor, University of Edinburgh



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