MARINE ZERO
Doctoral Programme for Zero Emission Marine Technology

Newcastle University

PhD Studentship in the cavitation, noise, vibration and hydrodynamic characteristics of highly skewed tidal turbine rotor blades

Application Deadline: 3rd March 2023
Anticipated Start Date: September 2023
Application and Funding Details: See https://research.ncl.ac.uk/marinezero/applicants/

A funded PhD studentship is available working in the Marine Propulsion Research Laboratory at Newcastle University and is supported by the Stone Marine – Sasaki Endowment Fund through the Doctoral Programme for Zero Emission Marine Technology.

Under the strong driving forces of decarbonization and net-zero mandate and policy in the world, revolutionary changes have been visualized in the ways of generation, conversion, storage, transportation, and utilization of the renewable energies. The aim of decarbonization and the net-zero is initially to reduce the impact of energy generation and its consumption to global environment, but these new renewable energy processes have and will continue to create adverse effects and hence significant impact and damage to the environment, in some different forms and ways. This research is to advance the knowledge and understanding on the noise, vibration, cavitation on the stainless-steel rotor 3D printed turbine rotors. The research output includes knowledge and understanding contributing to research, design, manufacture, and the operation of new generation environmentally friendly tidal turbines. The work will be completed through both numerical methods and extensive experimental testing in the Marine Propulsion Research Laboratory (Emerson Cavitation Tunnel) with a collaborative synergy among the academics at NU, NU Singapore and University of Victoria. The main objective of this research is to establish theory, obtain scientific evidence and draw conclusions, and hence produce scientific discoveries on the correlation among blade skew on energy generation efficiency, noise and vibration. The knowledge and understanding acquired in this research are to benefit the development, design, manufacture, operation, and maintenance of the new generation of environmentally minded tidal turbines. The main research questions are: What is the correlation among blade skew and cavitation and its induced noise/vibration, in order to reveal the long-lasting curiosity of whether tidal turbine have cavitation issue at all, when and under what circumstances it will happen? How are these correlation and findings applied to propeller cavitation and its induced noise/vibration that are important to high performance ships as well?

The applicant will be trained to a high technological standard and possess skills essential for the growth of the UK economy. In particular, the applicant will develop high technical proficiency in experimental fluid dynamics including cavitation tunnel experiments, noise and vibration measurement and analysis, computer programming, control and instrumentation.

The applicant is expected to have a 2.1 or 1st class honours degree in naval architecture, marine engineering, mechanical engineering, physics, mathematics or a related subject, with a strong background in fluid dynamics. It would be highly desirable for the applicant to have a sound understanding of experimental hydrodynamics and have relevant experience of collecting and analysing experimental data.

This award is available to **UK/EU** and **international candidates**.

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