MARINE ZERO
Doctoral Programme for Zero Emission Marine Technology

Newcastle University

PhD Studentship in the manoeuvring-structural performance of a novel ship propeller-rudder system

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.

The project aims to characterise the flow conditions and subsequent structural response during the manoeuvring of a ship fitted with a novel propeller-rudder technology system that improves propulsive efficiency and contributes to decarbonising future shipping. The work will be completed through numerical methods and extensive experimental research in a cavitation tunnel.

This research complements a wider effort at Newcastle University, within a consortium of 17 industry partners and funded by the EU Horizon 2020 programme, to develop and prove the application of a novel Energy Saving and Manoeuvring Device (ESMD) for ships, which is known as the Gate Rudder System. This has already been shown to make a significant impact on the reduction of fuel consumption and emissions from ships, especially in coastal regions. The technology could be a revolutionary step in the next generation of ship propulsion systems. See https://www.gatersproject.com/ for more details.

A potential benefit of the gate rudder is the enhanced course keeping at sea and better manoeuvring capabilities in restricted waters. However, the novel positioning of the rudders around the propeller creates a complex hydrodynamic flow environment which has the potential to cause large structural loads on the rudders themselves. The PhD project will contribute new understanding into modelling and predicting this effect for the gate rudder and more widely for ship propulsion systems in general. This has wider implications for other devices where propellers and/or other lifting devices work closely to their support structures, such as tidal turbines and podded thrusters.

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, 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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