MPhil/PhD Opportunities

National Centre for Maritime Engineering and Hydrodynamics (Australian Maritime College, University of Tasmania)

► BACKGROUND

Intelligent Marine Vehicles (IMVs) include Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles (AUVs) and Autonomous Surface Vehicles (ASVs).

They are increasingly used in various applications and missions for marine exploration and investigation; and for educational and training purposes.

A fundamental aspect to the operation of the IMVs is the control process. The vehicles are operated in two ways: remotely controlled by a computer and data communication connection cable or autonomously running like a robot. The accurate modelling of IMVs is essential to human-interfacing simulation and accurate and precise control of IMVs. The aim is to develop mathematical models, computer-based real-time and intelligent control algorithms and simulation of IMVs.

The control of IMVs is complex, including data communication and human-machine interfacing software programs, and high-performance control algorithms.

Human interfacing simulations are good tools for design of IMVs and improvement of their performance. The development of mathematical models and computer simulation will be a combination of commercial scientific computation software MATLAB / Simulink, LabVIEW and open source and/or commercial CFD software packages. The control algorithms are developed based on modern intelligent control laws. This is a challenging subject to study, both experimentally and numerically.

The AMC is undertaking various projects to develop IMVs for industrial and academic use. AMC’s ROV, AUV and surface vessel models, Training Vessel (Bluefin), Towing Tank, Model Test Basin and Circulating Water Channel with data acquisition devices allow model-scaled and full-scaled experiments to be conducted to quantify the behaviours of these models and real training vessel.

► AIMS

The purpose of the MPhil/PhD program will build on the existing body of work at AMC. Aims are to:

• Build new model-scaled vehicles
• Implement model-scaled and full-scaled experiments with the hydrodynamics facilities;
• Estimate the transient hydrodynamic coefficients of vehicles through experiments and numerical models;
• Interface the CFD and MATLAB / Simulink models or LabVIEW or other programming languages with hardware (joysticks and keyboard);
• Develop methods for human interfacing simulation and
• Real-time control of IMVs; and
• Develop control algorithms and hardware for educational and commercial purposes.

► FUNDING

The projects are carried out at the National Centre for Maritime Hydrodynamics at the Australian Maritime College (NCMEH/AMC), University of Tasmania (UTAS).

Prospective students may apply for a school scholarship or an Australian Postgraduate Award (APA) or one of the following scholarships, through University of Tasmania.

www.utas.edu.au/research/graduate-research/elite
www.endeavour.deewr.gov.au
www.ausaid.gov.au/scholar/ala.cfm
www.utas.edu.au/research/graduate-research/scholarships

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