

Research Training Centre for Naval Design and Manufacturing



PhD SCHOLARSHIP

Smart system for structural health monitoring of Naval Vessels

Closing Date

15 July 2020

Applicants should contact the primary supervisor, and submit their Expression of Interest (EOI) with a cover letter and CV to the APPLY NOW button at <https://www.utas.edu.au/research/degrees/available-phd-projects/phd-projects/college-of-sciences-and-engineering/australian-maritime-college/smart-system-for-structural-health-monitoring-for-naval-vessels>

Further info: Jonathan.Binns@utas.edu.au

Funding

RTCNDM Scholarship 2020: This scholarship provides a \$30,000 living allowance for 3.5 years with no extension, plus access to funds for associated research and training costs as approved.

The Research Project

Marine structures are subject to dynamic loadings and material changes due to exposure to the harsh marine environment. The loadings may be short-term and long-term, extreme and cyclic, while erosion, corrosion, etc. can reduce material thickness. To enhance the reliability and safety of these structures, a structural health monitoring system is required. The utilisation of a reliable health monitoring system can provide assurance of reduction in the maintenance cost of these assets in future. More importantly, in naval vessels, it helps to ensure that the ship retains its design characteristics, and the navy has battle-ready platforms.

The structural health monitoring system will include the selection of appropriate sensing techniques for accurate fault detection, and prediction capability of the forthcoming condition of the structural members. Experiments to analyse the best locations of the sensors are costly and time-consuming; instead, finite element analysis (FEA) will be used to assist in the monitoring of displacement and stress in ship structures and in finding the optimum locations for sensors. These data will be coupled with machine learning algorithms to predict the future health of the structures. The methodology developed in this PhD research will also help in scheduling the maintenance/replacement of the current structural members in a ship, thus enhancing the reliability of its operations.

Eligibility & Selection Criteria

The following eligibility criteria apply to this project:

- Honours degree or equivalent in mathematics, science or engineering

The following maritime and offshore engineering expertise & outcomes is highly desirable:

- Publications & awards relative to opportunity
- Sound knowledge of the ship structures
- Knowledge of risk and reliability engineering in shipping operations
- Basic knowledge of developing/using machine learning algorithms
- Basic knowledge of finite element analysis (FEA)

The successful candidate must be prepared to submit a valid application for Australian Security Clearance (for further information, see www.defence.gov.au/security/clearances).

For More Project Information

Please contact Dr Vikram Garaniya (v.garaniya@utas.edu.au) for more information on the project.