

Passive Acoustics Research for Fisheries

On July 1st this year the Centre for Marine Science and Technology (CMST) at Curtin University commenced a two year study funded by the Fisheries Research and Development Corporation investigating the vocal behaviour of aggregating fish species along the coast of Western Australia. Led by Dr Miles Parsons, hydrophones are being used to record sounds produced by spawning fish in order to provide new and valuable information on some of WA's iconic fish species. The study aims to

identify and record sounds of spawning mulloway at various WA locations, including the Swan and Blackwood Rivers, to improve knowledge of the relative numbers of fish. Also under investigation, from Shark Bay to the Nornalup Inlet, is whether westralian dhufish snapper and black bream exhibit vocal behaviour. If so, the study aims to find out what these vocalisations can tell us about the species and also how useful the sounds are for monitoring their spawning aggregations.



PHOTO: FRANK THOMAS

Dr Miles Parsons deploying an acoustic logger to record fish sounds in the Swan River.

Stereo Cameras in the Gulf of Mexico

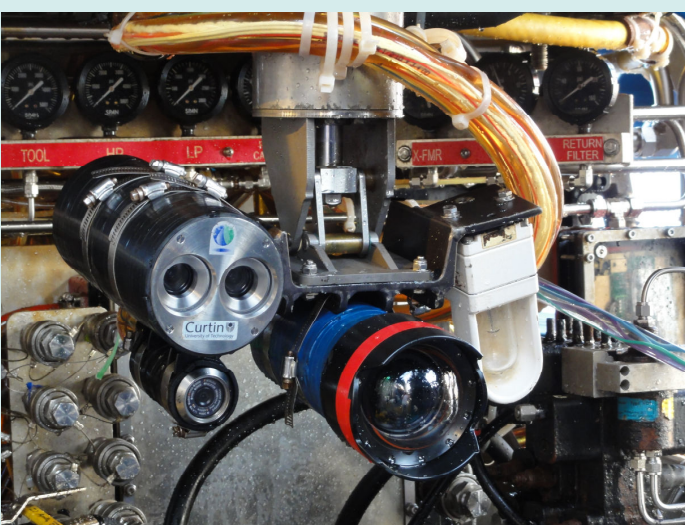


PHOTO: ANDREW WOODS

CMST underwater 3D camera mounted on the 'Maxxim' ROV aboard the 'Ocean Intervention III' vessel at the site of the Macondo oil well.

Underwater 3D video cameras developed by CMST were recently deployed to the Gulf of

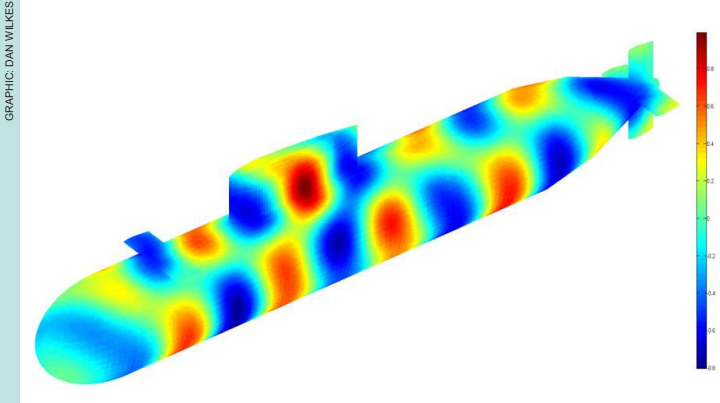
Mexico to assist with efforts to repair the ruptured Macondo oil well. Canadian oil and gas service

company Welaptega Marine has eight of CMST's underwater 3D cameras and was contracted to use its underwater 3D technologies to assess damage to the broken well. CMST's underwater 3D camera technologies are designed to provide operators with an added sense of depth perception when viewing underwater infrastructure. Tony Hall, Principal of Welaptega, said that although they were not authorised to divulge details of the work, he could confirm that two of the company's 4000m rated underwater 3D cameras were used at the site.

Finalist in Innovator Awards

CMST's underwater 3D video cameras were finalists in the WA Innovator of the Year Awards, in the Woodside Oil and Gas Encouragement Award category. The awards promote a culture of innovation and entrepreneurship across the State's public, private and education sectors.

PhD Student Research

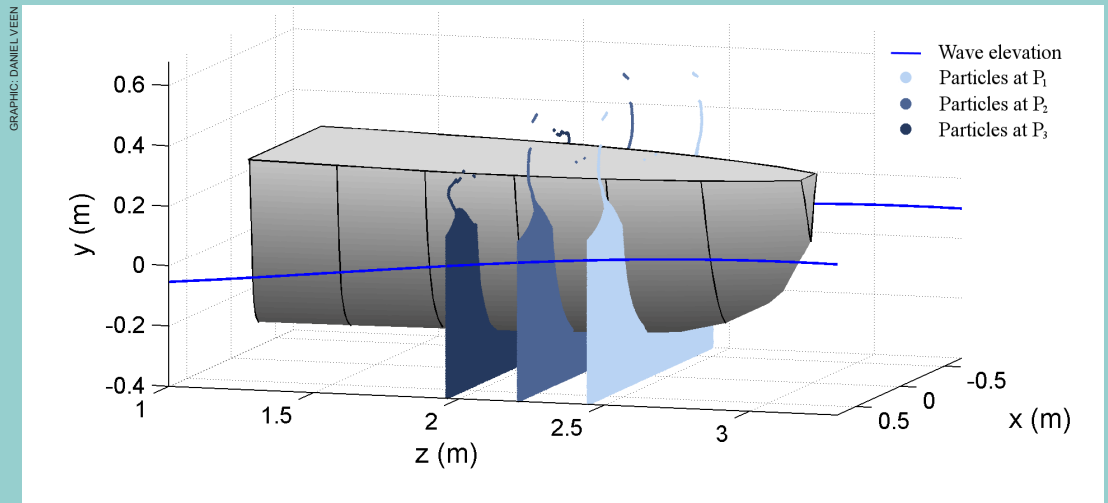


Acoustic pressure field around a submarine without near-field component

PhD student Dan Wilkes is improving the modelling of fluid-structure acoustic interaction by using fast multipole techniques. The goal is to estimate the effect of a submarine hull on the scattering of sound back into its passive sonar arrays. The Boundary Element Method (BEM) allows acoustic scattering from an arbitrarily shaped body to be calculated. The fast multipole method can be used to significantly reduce

the computational cost and memory requirements. The diagram shows the acoustic pressure field around a generic submarine hull without the near-field terms. This is the first iteration in the development of a full multipole model with both near- and far-field terms. This research is being conducted with support from the Defence Science and Technology Organisation (DSTO).

PhD student Daniel Veen has recently submitted his PhD thesis, entitled "A Smoothed Particle Hydrodynamics Study of Ship Slamming in Ocean Waves". His project focused on developing a two-dimensional Smooth Particle Hydrodynamics (SPH) code to model impact loads of ship hull sections in waves. The code was validated using a variety of experimental and analytical test cases, including the classic dam break problem and a simple wedge impacting a free surface. An important output of Daniel's research was a generalized



Smoothed Particle Hydrodynamics analysis of a ship bow section during a slamming event in head seas.

boundary method using "ghost particles", which enabled slamming pressures to be accurately calculated on solid boundaries. The 2D

method was finally developed into a 2D + t strip theory for analyzing the slam impact of a ship in head seas, including jet formation, impact

pressures and slamming loads.



Drs Juan Zeng, Kim Klaka and Licheng Lu.

International Collaboration

Drs Licheng Lu and Juan Zeng from the Institute of Acoustics, Chinese Academy of Science have recently completed a two month research visit at CMST. Dr Lu has been investigating the

acoustic properties of seabeds off the Australian coast, in order to improve the accuracy of sound propagation modeling. Dr Zeng has been carrying out pre-processing and quality

control management of the acoustic data from the IMOS acoustic observatory installed by CMST off the coast of Southern Australia.

The Centre for Marine Science & Technology (CMST) conducts world-class consulting, research, development and education for the marine industry and for government agencies.

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