

# CMST News

The Newsletter of the Centre for Marine Science & Technology

#10

## Under Keel Clearance and Ship Squat

It is critical for ship operations to have accurate information on the clearance between the keel of a ship and the sea bed in order to minimise the risk of the ship running aground as it passes through shipping channels. In February, CMST performed a set of full-scale trials on 11 ships transiting the Torres Strait. The trials used GPS surveying techniques to measure the ships' squat, heel and trim. The measured data was compared to predictions by the ship under-keel clearance software "KeelClear", developed by CMST for Voyage Management Systems, which is currently in use in the Torres Strait. The trials were part of the ongoing validation process for the Australian Maritime Safety Authority. The trials were an Australian first in using both mobile and fixed reference stations. "KeelClear" helps to maximise cargo carrying capacity and has potential for deployment in ports around the world.

PHOTO: NICOLA GOURLAY



Container vessel "ANL Windarra" being escorted through the Torres Strait by a pilot vessel fitted with a DGPS mobile reference station.

## Study of High Speed Slamming

Numerical modelling of extreme motion of large floating objects in ocean waves has met with only limited success using available techniques in Computational Fluid Dynamics, particularly when wave impacts are involved. In recent years the Smoothed Particle Hydrodynamics (SPH) method has been developed for non-marine applications and there is a growing realisation that use of SPH

might improve fluid-structure interface models. CMST PhD student Daniel Veen and his supervisor Dr Tim Gourlay are now applying SPH to the problem of high speed ship slamming, and have completed a

two-dimensional schematic dam break validation as the first step. Their results will be presented at the third International SPHERIC conference in Switzerland in June.

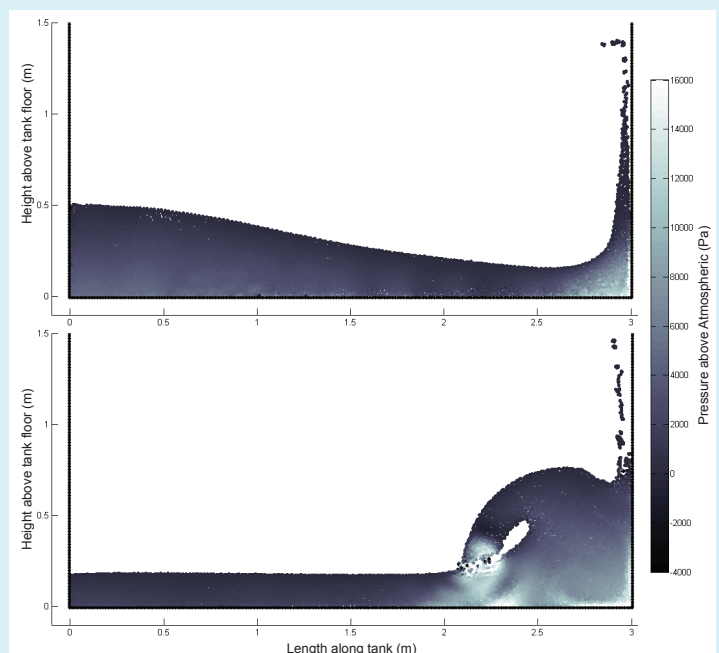
## Visiting Researchers



PHOTO: ANDREW WOODS

CMST hosted two visiting researchers from the Institute of Acoustics, Chinese Academy of Sciences for two months at the beginning of this year. Professor Jian-Heng Lin and Associate Professor Tao Hu investigated various aspects of sea-bed acoustic properties during their stay.

John Penrose, Tao Hu and Jian-Heng Lin



Dam break simulation using SPH at 0.74 (top) and 1.63 seconds (bottom).

## Curtin New Inventors

CMST and the Department of Imaging & Applied Physics scooped half of the 2007 Curtin New Inventor Competition awards. The competition attracted fifteen applications which were assessed for their innovation, value proposition and potential market application. The judges were impressed by the high standard of the entries and four winners were announced. The commercial potential of these inventions is being pursued through Curtin's IP Commercialisation Office. Two of the four winners were:

### Mini-3D underwater stereoscopic video cameras

CMST researcher Andrew Woods' winning invention was the Mini-3D Underwater

Stereoscopic Video Cameras which provide a stereoscopic 3D view of the underwater environment. The cameras have a depth rating of 1000m and are designed for use on remotely operated vehicles (ROVs) which are routinely used in the offshore oil and gas industry.

### Portable electroplating device

The invention of Glen Lawson, Laboratory Manager for the Department of Imaging & Applied Physics, may be of interest to the marine industry. It is a portable electroplating device for corrosion protection of steel. This invention provides a way of electroplating zinc onto steel without the need to immerse the entire item in a liquid bath.

## Monitoring of Pipelines

CMST is a contributor to the CSIRO Subsea Pipeline Flagship Cluster with the project "Continuous Monitoring of Pipelines". The Subsea Pipeline Collaboration Cluster combines the research capabilities of six universities and the CSIRO Wealth from Oceans Flagship to design new pipelines for transporting offshore hydrocarbon resources. Mr Grant Pusey, PhD student at CMST, was awarded a top-up scholarship under this project for his thesis "Real-time sensor measurement retrieval using acoustic modems along subsea pipelines." He

started his research in January 2007 under the supervision of Dr Alec Duncan. Work to date has focussed on preparation for an acoustic modem field trial, currently scheduled for this month. The aim is to monitor the performance of several pairs of acoustic modems over a period of a number of days, and to correlate this with environmental parameters. The location and timing of the trial have been chosen to take advantage of an array of oceanographic instrumentation that has been deployed off Hillarys, Western Australia by CSIRO's Marine Division.

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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## Pursuit of Knowledge

A new major exhibition entitled "The Pursuit of Knowledge: Curtin, looking ever forward" recently opened at the John Curtin Gallery. CMST's work "Underwater acoustics –

sounds in the ocean" forms a highlight of the display. It is open to the public Monday to Friday from 12 noon to 5pm. For more information visit: [www.john.curtin.edu.au](http://www.john.curtin.edu.au) (and click on exhibitions)



## High Speed Conference

The Royal Institution of Naval Architects (RINA) will be hosting the inaugural "International Conference on Marine Innovation in High Speed Vessels" in Fremantle in January 2009. CMST will

be assisting with this event and our inaugural Innovator-in-Residence Dr Nigel Gee will play a key role in the conference. Further information is available here: [www.rina.org.uk/hsmv2009](http://www.rina.org.uk/hsmv2009)

## Farewell to Justy

Underwater acoustician Dr Justy Siwabessy bade farewell to CMST in February to take up a position with Geoscience Australia in Canberra. Justy first joined CMST as a PhD student in 1997. He completed his PhD thesis in 2002, which then formed the basis of CMST's expansion into benthic habitat mapping. Justy was a major contributor to our efforts under the Coastal Zone CRC. He will continue



Justy Siwabessy

his links with CMST as an Adjunct Research Fellow.

## CMST Lunchbox Seminars

CMST holds weekly seminars, with speakers from interstate and overseas, as well as CMST staff.

The schedule of seminars is listed on our website: [www.cmst.curtin.edu.au/seminars](http://www.cmst.curtin.edu.au/seminars)

If you would like to receive email updates regarding CMST seminars, simply send an email to the following address: [seminars@cmst.curtin.edu.au](mailto:seminars@cmst.curtin.edu.au)