



OCEANS'10
IEEE Sydney
24-27 May 2010
Program Book



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	Bayside 101	Bayside 102	Bayside 103	Bayside 104	Bayside 105	Bayside 106	Bayside 107	Bayside Grand Hall
M O N D A Y	0830	Tutorial T01	Tutorial T03	Tutorial T05	Tutorial T07			
	1300	Tutorial T02	Tutorial T04	Tutorial T06	Tutorial T08			
	1700	Ice Breaker Reception, Bayside Gallery						
T U E S D A Y	0830	Welcoming Ceremony & Plenary Talks:Bayside Auditorium A						
	1030	Morning tea						
	1100	Exhibition Opening						
	1200	Lunch						
	1300	EM & opto-acoust sensing	Underwater comms 1	IMOS 1	AUV 1	Array signal processing 1	Sound propgn & scattering	Student posters 1
	1415	Afternoon tea						
	1515	HF radars	Underwater comms 2	Exploration/recovery oil & gas	Vehicle navigation 1	AUV 2	Imaging & vision	Student posters 2
	1700	Exhibition Reception						
W E D N E S D A Y	0830	Current measurement	Sonar signal processing 1	Marine management	AUV 3	Numerical modeling & simulation	Systems & observatories 1	Student posters 3
	1015	Morning tea						
	1045	Oceanography 1	Underwater comms 3	Underwater imaging & mapping	Vehicle navigation 2	ROV	Classification & pattern recognition	
	1230	Lunch						
	1330	Hydrography Seafloor map Geodesy	Sonar signal processing 2	IMOS 2	Vehicle design 1	Signal coherence & fluctuation	Marine optics	Ocean energy & offshore structures
	1515	Afternoon tea						
	1545	Oceanography 2	Underwater comms 4	Bioacoustics	Collaborative autonomous vehicles 1	Automatic control	Sonar imaging	Marine safety
	1815	Assemble at Convention Jetty for boat departure						
1900	Conference Gala Function, Luna Park							
T H U R S D A Y	0830	Naval architecture	Sonar signal processing 3	Marine envir W Pacific 1	AUV 4	Data assimilation & info mgt	Systems & observatories 2	Marine radars & comms
	1015	Morning tea						
	1045	Model based signal proc	Underwater comms 5	Marine envir W Pacific 2	Vehicle navigation 3	Autonomous surface vehicles	Anti-submarine warfare	Marine geology & geophysics
	1230	Lunch						
	1330	SAR / ocean color hypersp	Underwater comms 6	IMOS 3	Vehicle design 2	Array signal processing 2	Maritime secur & harbor protection	Sustainable energy E Asia
	1515	Afternoon tea						
1545		Underwater comms 7	Buoy technology	Collaborative autonomous vehicles 2	Data visualization & info mgt	Sonar & transducers/ ocean sensors	Marine envir engineering E Asia	

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EDITORIAL SCHEDULE

JULY/AUGUST 2010

Seabed Mapping & Sub-bottom Profiling

Editorial closing date May 14;

Advertising closing date May 28

SEPTEMBER/OCTOBER

Ocean Data Processing & Interpretation

* Oceans 2010, Seattle, WA, USA

Editorial closing date July 16;

Advertising closing date July 30

NOVEMBER/DECEMBER

Surface & Subsea Navigation and Precise Positioning; Maritime Security; Imaging Systems

* MAST, Rome, Italy

Editorial closing date September 15;

Advertising closing date
September 30

JANUARY/FEBRUARY 2011

ROVs/AUVs/Towed Bodies

* Underwater Intervention, New Orleans,
LA, USA

Editorial closing date November 15;

Advertising closing date
November 30

MARCH/APRIL 2011

Oceanographic Instrumentation; Environmental Monitoring

* Ocean Business, Southampton, UK

Editorial closing date January 17;

Advertising closing date January 31

MAY/JUNE 2011

Connectors/Cables/Winches; Offshore Renewables/ Offshore Technology

* OTC, Houston, TX, USA

* UDT Europe, Cannes, France

* Seawork, Southampton, UK

Editorial closing date March 15;

Advertising closing date March 31

* Editorial preview and bonus distribution at exhibition

INTERNATIONAL
Ocean Systems
MAGAZINE

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Welcome Message



On behalf of the Local Organising Committee for the OCEANS '10 IEEE Sydney Conference and Exhibition, I warmly welcome you to OCEANS Down Under. This international event is being staged at a magnificent venue in a unique city that is graced by the **world's finest natural harbour and the splendour of its ocean beaches.** This OCEANS conference and exhibition has been planned to provide each of you with an unforgettable human

experience underpinned by Aussie humour, hospitality and friendliness.

Australia is a small nation inhabiting a continent that is an island. Its people are coastal dwellers, seafarers and ocean **sports enthusiasts.** Australia's ocean jurisdiction is vast in its expanse. The natural resources that abound in our waters and under the seabed enrich this lucky country. Australian marine scientists and engineers apply insight and ingenuity to understanding, observing, and protecting the ocean environment on which we are so dependent.

OCEANS '10 IEEE Sydney is an opportunity to showcase internationally Australia's capabilities in marine science and ocean engineering. **It's a forum that brings together** representatives from universities, industry and government organisations with policy makers, stakeholders and clients. The technical program and tutorials enable us to learn from international experts, to expand our professional network and to update us on the latest advances in marine science and engineering. The exhibition enables us to see and feel the latest sensors, systems, structures, information processing and display tools that are used to probe, measure, monitor and **manage the world's oceans.** Also, **OCEANS is an opportunity to promote marine science and ocean engineering as professional pursuits worthy of engagement by young Australians.**

Venture down under for an unforgettable OCEANS experience!

Dr Brian Ferguson
Conference General Chair



Keynote Speakers



MEETING SOCIAL CHALLENGES USING MARINE TECHNOLOGY

Craig McLean

*National Oceanic and Atmospheric
Administration, USA*

Craig McLean is the deputy for NOAA's Oceanic and Atmospheric Research programs and administration. He is responsible for daily operations and administration of NOAA's research enterprise, and the execution of NOAA programs including the Climate program, the National Sea Grant College program, and, Ocean Exploration and Research.

He has previously served in NOAA as Executive Officer of the National Ocean Service, and was the founding Director of NOAA's Office of Ocean Exploration. McLean served in uniform for nearly 25 years, retiring from NOAA's Commissioned Corps in the grade of Captain after service at sea, underwater, and in operational, legal, and marine resource management positions. McLean served aboard hydrographic, oceanographic, and fisheries research ships and was the first commanding officer of NOAA's largest fisheries research vessel, the 224-foot Gordon Gunter. He was instrumental in the development of the Smithsonian Institution's Ocean Hall, and in obtaining a dedicated ship for the national ocean exploration program, the NOAA Ship Okeanos Explorer.

A life long diver, he began exploring deep shipwrecks through decompression diving while in junior high school. These experiences have taken him to the Amazon River searching for freshwater dolphins, and to the RMS Titanic searching for solutions in international shipwreck management.

Craig McLean is also an attorney and has practiced marine resource law for NOAA. He has been awarded the Departmental Silver and Bronze Medals, the NOAA Corps Commendation Medal, and Special Achievement Medal. He is a Fellow of the Explorers Club, and of the Marine Technology Society, and a Past-President and Chairman of the Sea-Space Symposium.



UNDERSTANDING THE OCEANS – A NAVY PERSPECTIVE

Commodore Bruce Kafer
AM,[†] CSC,[‡] Royal Australian Navy

[†]Member of the Order of Australia

[‡]Conspicuous Service Cross

Commodore Bruce Kafer joined the Royal Australian Navy as a Cadet Midshipman in 1977. In 1982 he specialised in hydrographic surveying and, on completion of his basic survey course, served in hydrographic survey ships of the RAN and Royal Navy.

The highlights of Commodore Kafer's seagoing career have been command of the RAN ships HMAS FLINDERS and HMAS LEEUWIN. He has also had a variety of senior staff appointments ashore, most recently as the Chief, Combat Support Group in Fleet Headquarters. He also served for four years as Hydrographer and Commander of the RAN's Hydrographic, Meteorological and Oceanographic Force Element Group.

For seven months in 2008-09 Commodore Kafer held command of Combined Task Force 158, then Combined Task Force 152, coalition maritime task forces responsible for security in the Persian Gulf. In late 2009 he assumed duties as the Commandant, Australian Defence Force Academy.



WHY OCEAN SCIENCE MATTERS FOR AUSTRALIA

Dr Neville Smith
*Bureau of Meteorology, Melbourne,
Australia*

Dr Neville Smith is the Deputy Director (Research and Systems) at the Bureau of Meteorology. Dr Smith was previously Chief Scientist and head of the Bureau of Meteorology Research Centre, prior to the creation of the Centre for Australian Weather and Climate Research. As a scientist, Dr Smith played a key role in the development of ocean and climate prediction systems and has worked with the international community in the development of observing systems for climate. Dr Smith is currently the National Delegate to the Intergovernmental Oceanographic Commission and a member of the IPCC Bureau.



General Information

Accommodation

Ibis Darling Harbour	Tel. +61 2 9563 0888 Fax +61 2 9288 7189
Novotel Darling Harbour	Tel. +61 2 9934 0000 Fax +61 2 9934 0099
Grand Mercure Apartments	Tel. +61 2 9563 6666 Fax +61 2 92887189
Oaks Goldsbrough Apartments	Tel. +61 2 9518 5166
Crowne Plaza Darling Harbour	Tel. +61 2 9261 1188 Fax +61 2 9261 8766

Business Centre

Public internet and computer access is available at the Bayside Business Lounge, Ground Floor, Convention Centre Bayside.

Delegate Entitlements

Tutorial Registration

- Conference tutorial sessions (Monday 24 May 2010)

Full Registration and Paper Registration

- All Conference sessions (Tuesday 25 to Thursday 27 May 2010)
- Ice Breaker Reception (Monday 24 May 2010)*
- Entry to the Conference Welcome (Tuesday 25 May 2010)
- Exhibitor Reception (Tuesday 25 May 2010)*
- Conference Gala Function (Wednesday 26 May 2010)*
- Morning and afternoon teas (Tuesday 25 to Thursday 27 May 2010) *
- Lunch (Tuesday 25 to Thursday 27 May 2010) *
- Entry to exhibition in the Bayside Grand Hall (Tuesday 25 to Thursday 27 May 2010)
- Conference satchel with conference proceedings on CD-ROM
- Conference material

Student Registration

- All Conference sessions (Tuesday 25 to Thursday 27 May 2010)
- Entrance to the Conference Welcome (Tuesday 25 May 2010)
- Morning and afternoon teas (Tuesday 25 to Thursday 27 May 2010) *
- Lunch will need to have been purchased ahead of time via online registration form (Tuesday 25 to Thursday 27 May 2010) *
- Entrance to exhibition in the Bayside Grand Hall (Tuesday 25 to Thursday 27 May 2010)
- Conference satchel with conference proceedings on CD-ROM
- Conference material



One Day Registration

- All Conference sessions on the selected day (Tuesday, Wednesday or Thursday)
- Entrance to the exhibition on the selected day
- Morning and afternoon teas on the selected day *
- Lunch will need to have been purchased ahead of time via online registration form
- Conference satchel with conference proceedings on CD-ROM
- Conference material

*Kosher and Halal meals needed to have been ordered in advance via the registration form. Special meals may incur additional fees. If you have ordered a special meal please speak to a member of the catering staff to have it brought to you at break times.

Exhibition

The exhibition is located in the Grand Hall, Ground Floor, Convention Centre Bayside. The exhibition opening hours are as follows:

Monday 24 May 2010	Exhibition Closed
Tuesday 25 May 2010	1030 – 1900
Wednesday 26 May 2010	0830 - 1730
Thursday 27 May 2010	0830 - 1600

Internet

Wireless internet connection is available for all delegates to use in the Exhibition Area, located in the Bayside Grand Hall, ground floor. See below for the login details:

Wireless Network Name: OCEANS10

User ID: sydney

Password: bluesea

Messages

For delegates' convenience, messages for other delegates may be left at the Registration Desk. The staff at the Registration Desk will contact the recipient to help ensure the message is received.

Mobile Phones

For the convenience of all delegates please ensure your mobile is turned to silent or off during sessions.

Unauthorised Audio/Video Recording of tutorial, plenary or technical sessions is not permitted.

Name Badges

For security purposes, delegates and exhibitors must wear their name badges at all times during the Conference. Entrance to the exhibition and the sessions will be limited to badge holders only. All fully registered delegates, paper registrations and accompanying persons name badges will allow entry to the Ice Breaker Reception (Monday), Conference Welcome (Tuesday),



Exhibitor Reception (Tuesday), Conference Gala Function (Wednesday) and the Exhibition (Tuesday to Thursday).

Parking

The Exhibition Centre car park is conveniently located off Darling Drive, underneath the Centre's five exhibition halls. The car park has direct access to the venue and the many attractions and facilities available in Darling Harbour.

Car park opening hours:

Monday to Thursday	0600 - 0100 the next day
Friday	Open from 0600 (24 hours)
Saturday	Open 24 hours
Sunday	Closes at 1am Monday morning

Rates:

Day Rates for all vehicles are:

0-1 hours = \$8.00
1-2 hours = \$16.00
2-3 hours = \$22.00
3-4 hours = \$26.00
4+ hours = \$28.00

Evening Rates for all vehicles are:

0-1 hours = \$7.00
1-2 hours = \$13.00
2+ hours = \$18.00

Evening Rates apply for entry after 5pm and exit before 9am the following day.

Automatic pay stations are located throughout the car park, with a central pay station in the area under Hall 5. Payment is made at these stations prior to exiting the car park. Prepayment is also available. Please note that the ceiling height of the Exhibition Centre car park is 1.8 metres. For any enquiries please telephone +61 2 9282 5000.

Registration Desk

The Registration Desk is located on the Ground Floor of the Convention Bayside at the entry to the Grand Hall (Exhibition Area). The Registration Desk will be open during the following times:

Monday 24 May 2010	0730 – 1730
Tuesday 25 May 2010	0730 - 1730
Wednesday 26 May 2010	0730 - 1800
Thursday 27 May 2010	0730 - 1800

Refreshments and Lunch

See below for the catering times and locations during the Conference. All onsite meals are included for fully registered delegates and paper registrations. Morning and afternoon teas are included for registered students however student lunch vouchers should be purchased ahead of time via the online registration form.



Date	Time	Event	Venue
MON 24 May	1000-1030	Morning Tea	Bayside Gallery, Level 1
	1200-1300	Lunch at own expense	Darling Harbour Precinct has a range of restaurants and cafes for delegates to select from.
	1430-1500	Afternoon Tea	Bayside Gallery, Level 1
	1700-1900	Ice Breaker Reception	Bayside Gallery, Level 1
TUE 25 May	1030-1100	Morning Tea	Bayside Grand Hall, Ground
	1200-1300	Lunch	Bayside Grand Hall, Ground
	1445-1515	Afternoon Tea	Bayside Grand Hall, Ground
	1700-1900	Exhibition Reception	Bayside Grand Hall, Ground
WED 26 May	1015-1045	Morning Tea	Bayside Grand Hall, Ground
	1230-1330	Lunch	Bayside Grand Hall, Ground
	1515-1545	Afternoon Tea	Bayside Grand Hall, Ground
	1800-2200	Conference Gala Function	Luna Park, Sydney
THU 27 May	1015-1045	Morning Tea	Bayside Grand Hall, Ground
	1230-1330	Lunch	Bayside Grand Hall, Ground
	1515-1545	Afternoon Tea	Bayside Grand Hall, Ground

Speaker Preparation

Speakers are asked to report to the Speaker Preparation Room in Bayside 108, Level 1 of the Convention Centre preferably the day before their presentation or if this is not possible, at least 3 hours prior to their session start time. Opening hours are as follows:

Monday 24 May 2010	0730 – 1730
Tuesday 25 May 2010	0730 – 1730
Wednesday 26 May 2010	0730 – 1730
Thursday 27 May 2010	0730 – 1400



Social Program

Ice Breaker Reception

Monday 24 May 2010

Venue: Bayside Gallery, Level 1 Sydney Convention and Exhibition Centre

Time: 1700 – 1900

Who may attend: Inclusive for Fully Registered Delegates and those who have paid for their attendance via the online registration form. Additional tickets may be purchased from the registration desk on Monday up until lunchtime for AUD\$99.00. Meet with your colleagues in the Bayside Gallery for networking opportunities as you relax and enjoy drinks and canapés.

Conference Welcome

Tuesday 25 May 2010

Time: 0830 – 0900

Venue: Bayside Auditorium A

Who may attend: Inclusive for all conference attendees.

Welcome Address:

Professor Mary O’Kane

NSW Chief Scientist and Scientific Engineer

Exhibition Reception

Tuesday 25 May 2010

Time: 1700 – 1900

Venue: Bayside Grand Hall, Ground Floor, Sydney Convention and Exhibition Centre

Who may attend: Inclusive for Fully Registered Delegates and Exhibitors and those who have paid for their attendance via the online registration form. Additional tickets may be purchased from the registration desk until Tuesday lunchtime for AUD\$77.00.

The Exhibition will be a major component of the Conference and the Exhibition Reception is the best opportunity to network with exhibitors and delegates alike. The Exhibition will feature cutting edge technology across the spectrum of Oceanic Sciences, Oceanography and Marine Engineering as supported by leaders in this industry. Be there at the Exhibition Reception as this zone develops as the networking hub of the Conference! You will enjoy drinks and canapés in a relaxed atmosphere.



Conference Gala Function



Wednesday 26 May 2010

Time: 1900 - 2300

Venue: Luna Park, Sydney

Who may attend: Inclusive for Fully Registered Delegates and those who have paid for their attendance via the online registration form. Additional tickets may be purchased from the registration desk until Wednesday lunchtime for AUD\$165.00.

Ferry Transfers will depart from Convention Wharf located directly in front of the Convention Centre Bayside. Meet at 1815 for the main departure at 1830. A smaller ferry will depart at 1845 for Luna Park.

Return Coaches will depart from Luna Park at The Face entrance. Delegates will be returned to the Convention Centre, the Ibis hotel Darling Harbour, the Novotel Darling Harbour, the Oaks Goldsbrough Hotel or Central Station.

1st return time: 2200

2nd return time: 2230

3rd return time: 2315

Sure to be the social highlight of the Conference Social Program, the Conference Gala Function will see delegates and guests cruising Sydney Harbour followed by a spectacular event where OCEANS '10 IEEE Sydney 2010 has secured exclusive rights to Luna Park for the entire evening! Superb entertainment, award winning cuisine and fine Australian wines will be combined with the stunning backdrop of the Sydney Opera House and the Harbour Bridge. This event is guaranteed to be a night of pure enjoyment and a fitting social climax of the OCEANS '10 Conference.

Awards Presentation

The OCEANS '10 Student Poster Awards will be presented at the Gala Function by COL Norm Miller, IEEE OES Student Activities Chair, and Dr Stefan Williams, Chair of the Student Program.



Conference Organisation & Secretariat

Sponsor: IEEE Oceanic Engineering Society

Honorary Co-Chairs:



Prof. Hugh Durrant-Whyte
Fellow, IEEE; ARC Federation
Fellow; Professor of Mechatronic
Engineering
University of Sydney, Australia



Prof. William Carey
Fellow, IEEE; Professor of
Aerospace & Mechanical
Engineering
Boston University, USA



Dr John Riley
Chief, Maritime Operations
Division
Defence Science & Technology
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Local Organising Committee:



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Chair of Technical Program
DSTO



Dr Phil Chapple
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Chair of Tutorials
University of Canterbury,
Christchurch, New Zealand



Dr Stefan Williams
Chair of Student Program
University of Sydney



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Prof. Mal Heron
IEEE Oceanic Engineering Society
Liaison
James Cook University,
Townsville, Australia



Nancy Jensen
CSIRO Wealth from Oceans
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Conference Services Coordinator



List of Reviewers

We thank our abstract reviewers for their outstanding work that has ensured the technical excellence of the program.

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Roy Hughes	Manell Zakharia
Marcia Isakson	Shengli Zhou



Tutorials: Abstracts and Biographies



T01: Shallow water acoustics

Prof. William Carey

Time: 0830 - 1230

Room: Bayside 101

This tutorial is intended for engineers and scientists concerned with the assessment of long range acoustic communication and sound transmission in deep and shallow water. The bottom is typically a sandy-sediment and has the dominant influence on the attenuation. The present tutorial surveys the basic science and experimental results that will enable one to make realistic interpretations and predictions. The session plan consists of a primer on the fundamentals of underwater acoustics, beginning with the wave equation, deep-water propagation, shallow water propagation, and the question of standards and a brief overview of ambient noise. The shallow water model of the Pekeris is discussed, progressing to a discussion of the modal solutions for realistic downward refracting sound velocity profiles, with a detailed examination of sample calculations for propagation in range-independent oceans. An assessment and review of representative effects of attenuation and a discussion of the importance of attenuation is presented. Current physical models of ocean sediments are reviewed, beginning with the original phenomenological model introduced by Biot in 1956. Later evidence justifying and extending this model, especially the rigorous theory of Burridge and Keller in 1981, is reviewed, and the applicable predictions of the theory, such as that the attenuation in the sediment varies as the square of the frequency at low frequencies. The fourth hour is concerned with the field measurements of sediment properties and of how these can be incorporated into propagation predictions.

Biography: William M. Carey is a Professor of Aerospace and Mechanical Engineering at Boston University, an Adjunct Professor of Applied Mathematics at the Rensselaer Polytechnic Institute and an Adjunct Scientist at the Woods Hole Oceanographic Institution. He was the Editor of the Journal of Oceanic Engineering is currently an Associate Editor for Underwater Acoustics, the Journal of the Acoustical Society of America. He has been a Physicist at several the Naval Laboratories and the ASW Program Manager at the Defense **Advanced Project Agency**. At the University of Chicago's Argonne National Laboratory, he was an Associate Scientist and Section Manager of acoustic surveillance. He has been a consultant to both industry and government in the areas of



non-destructive testing, nuclear science/ environmental measurements, and applied ocean acoustics.

Dr. Carey is a Fellow of the Acoustical Society of America, a Fellow of the IEEE Oceanic Engineering Society, a full member of Sigma Xi, a member of the Connecticut Academy of Science and Engineering, and also a member of the Cosmos Club. He is the recipient of the IEEE-OES Distinguished Technical Achievement Award, the IEEE-OES Distinguished Service Award and an IEEE Millennium Medal. He recently received Pioneer of Underwater Acoustics Silver Medal. He received the B.S. degree in Mechanical Engineering, the M.S. degree in Physics, and the Ph.D. degree in Nuclear Science from the Catholic University of America.



T02: High Frequency Surface Wave Radar

Dr Stuart Anderson

Time: 1300 – 1630

Room: Bayside 101

HF surface wave radars exploit the electromagnetic ground wave mode of propagation to illuminate the ocean surface at **'over-the-horizon' ranges, up to several hundred kilometres**. In most cases they are deployed at coastal sites within ~ 100 metres of the shoreline. Echoes provide information on waves and currents, as well as the presence of ships and other discrete features.

Existing HFSWR systems are clustered into two main categories : (i) low power, reasonably compact remote sensing systems designed to monitor ocean currents and measure wave spectra, and (ii) high power military systems with greater sensitivity and extended range coverage, employed for detection and tracking of ships, smaller ocean-going vessels and low-flying aircraft **which fall below the horizon of microwave 'line-of-sight' radar systems**. In addition, mention should be made of ship-borne HFSWR systems, though these remain the subject of research and development rather than being fitted to operational platforms.

This tutorial sets out to describe the principle characteristics of HFSWR systems, both the low power remote sensing systems and the military surveillance radars. The main subsystems of such radars are described, emphasising the factors which impact on HFSWR design. The electromagnetics of ground wave propagation and scattering is treated in some depth. A fairly detailed account of the geometry and dynamics of the ocean surface is provided, since it is effectively this surface that constitutes **the 'channel' connecting radar to target, as well as serving as the target of interest** in the case of remote sensing. The issue of radar siting is treated in detail, as in practice this



often entails important compromises in radar design and capability. Advanced signal processing techniques are discussed and their efficacy demonstrated.

These precepts are then brought together to show how HFSWR can address a wide range of oceanographic remote sensing missions. A comprehensive overview of the oceanographic remote sensing capabilities of HFSWR is presented, balanced by a frank account of some of the limitations which have been encountered in real-world experience. Remote sensing products from a number of HFSWR systems around the world are used to illustrate the contributions that HFSWR can make to diverse fields of oceanography, from hydrodynamics to the signatures of climate change.

Biography: Stuart Anderson holds BSc (Hons) and PhD degrees from the University of Western Australia. Since 1972 Dr Anderson has worked in the Australian Defence Science and Technology Organisation, where he was responsible for developing the ocean surveillance and remote sensing capabilities of the Jindalee over-the-horizon skywave radar system and the Iluka HF surface wave radar system. He has worked as a visiting scientist in several countries, contributing to various national and international HF radar programs, as well as holding adjunct appointments at Curtin University of Technology (Professor of Applied Physics), the University of New South Wales (Professor of Mathematics), and the University of Rennes I, France, (Professor and Docteur honoris causa). He was the recipient of the 1992 Minister of Defence Award for Research Achievement, and is an elected Fellow of the Electromagnetics Academy. His active research interests include electromagnetic scattering, ionospheric physics, radio oceanography, physics-based signal processing, microwave radar polarimetry, passive coherent location, and the exploitation of HF radar systems for a wide variety of missions.



T03: Stochastic matched filters for sonar signals

Prof. Philippe Courmontagne

Time: 0830 – 1200

Room: Bayside 102

In several domains of signal processing, such as detection or de-noising, it may be interesting to provide a second-moment characterization of a noise-corrupted signal in terms of uncorrelated random variables. Doing so, the noisy data could be described by its expansion into a weighted sum of known vectors by uncorrelated random variables. Depending on the choice of the basis vectors, some random variables are carrying more signal of interest information than noise ones. This is the case, for example, when a signal disturbed by a white noise is expanded



using the Karhunen-Loève expansion. In these conditions, it is possible either to approximate the signal of interest by keeping only its associated random variables, or to detect a signal in a noisy environment with an analysis of the random variable power. The purpose of this tutorial is to present such an expansion, available for both the additive and multiplicative noise cases, and its application to detection and de-noising. This noisy random signal expansion is known as the stochastic matched filter, where the basis vectors are chosen so as to maximize the signal to noise ratio after processing.

This tutorial is divided into three parts:

- The first part concerns the theory itself: the stochastic matched filter theory will be described for 1-D discrete-time signals and its extension to 2-D discrete-space signals. Furthermore, a study will be realized on two different noise cases: the white noise case and the speckle noise case.
- In the second part, the stochastic matched filter will be described in a detection context and this method will be confronted with signals resulting from underwater acoustics. The results obtained are then compared with those resulting from the classical matched filter theory.
- In the last part, the stochastic matched filter will be presented in a de-noising context. The de-noising being performed by a limitation to order Q of the noisy data expansion, two criteria to determine Q will be introduced. Experimental results on real SAS data are given to evaluate the performances of such an approach.

This tutorial is intended for people or scientists connected with 1-D/2-D signal or array processing, and interested to have a fly-over about these effective methods.

Biography: Philippe Courmontagne was born in 1970. He received the Ph. D. degree in Physics at the University of Toulon (France) in 1997. In 1999, he became Professor in a French electronic engineering school: the Institut Supérieur de l'Électronique et du Numérique (ISEN Toulon, France), in the field of signal processing and image processing. He joined in 2001 the Provence Materials and Microelectronics Laboratory (L2MP UMR CNRS 6137), which is a unit of the French national research center (CNRS). In 2005, he obtained his Habilitation (HDR - Habilitation to Supervise Research) for his works in the field of noisy signal expansion. In 2007, he has been elected to the degree of IEEE Senior Member in recognition of professional standing for his works in the field of signal de-noising (SAR, SAS images), signal detection in noisy environment and signal transmission.



T04: Localisation and Mapping

Dr Stefan Williams

Time: 1300 – 1630

Room: Bayside 102

This tutorial will examine current developments in the area of localisation and mapping for underwater systems. In particular, we will review methods for Simultaneous Localisation and Mapping (SLAM) using both high resolution optical and acoustic data collected by underwater vehicles. We will demonstrate how observations of the terrain from the vehicle's mapping sensors can be used as part of the navigation solution to correct for drift in the vehicle's position estimate. Techniques for three dimensional scene reconstruction, visualisation, novelty detection and classification will also be described. Results from recent AUV deployments will be used to illustrate the process.

Biography: Stefan B. Williams is a Senior Lecturer in the University of Sydney's School of Aerospace, Mechanical and Mechatronic Engineering. He is a member of the Australian Centre for Field Robotics where he leads the Marine Robotics group. He is also the head of Australia's Integrated Marine Observing System AUV Facility. His research interests include Simultaneous Localisation and Mapping in unstructured underwater environments as well as algorithms for autonomous navigation and control. He received his PhD from the University of Sydney in 2002 and completed a Bachelor of Applied Science with first class honours in 1997 at the University of Waterloo, Canada.



T05: Overview of high resolution sonar

Dr Marc Pinto

Time: 0830 – 1200

Room: Bayside 103

The basic principles of aperture will be reviewed including near field operation and related concepts such as Fresnel distance, focusing and depth of field. Next, principles of aperture sampling, i.e. array design, will be presented including undersampled arrays exhibiting grating lobes and their minimization with the two-way beampattern of the transmitter and receive element. Frequency dependence and wideband operation will be discussed as well as the impact of calibration errors and uncertainties in the sound velocity profile on sonar resolution. This will be illustrated by different high resolution sonar designs



for seafloor imaging such as dynamic focusing, dynamic aperture and synthetic aperture sonar.

The basic sonar equation will be used to illustrate some of the factors limiting the range of high resolution sonar systems. It is shown how the signal to noise ratio can be enhanced by the frequency modulation and state of the art front end electronics. More fundamental factors such as cross-range resolution and multipath propagation are discussed as well as improved sonar designs which attempt to push back these limits.

Finally the design of bathymetric imaging systems will be discussed. The two competing designs, which are multi-beam echo-sounders and interferometric systems, will be presented and their respective merits and drawbacks will be discussed using criteria such as area coverage, bathymetric accuracy and spatial resolution as well as robustness. The principles of angle of arrival estimation for random seafloor echoes (rather than echoes of deterministic targets) will be discussed in detail including fundamental factors limiting the accuracy such as baseline decorrelation.

Biography: Marc Pinto was born in Wellington, India in 1960. He graduated from the Ecole Nationale des Ponts et Chaussees, Paris (France) in 1983. From 1985 to 1989 and 1989 to 1993 he worked as a research engineer for Thomson-CSF, specializing in the development of finite element techniques for solving non-linear magnetostatics to support the modeling of the magnetic recording process. In 1991, he received the Ph. D. degree in Solid State Physics from the University of Paris, Orsay. In 1993 he joined Thomson-Sintra ASM (now Thales Underwater Systems) as Head of the Signal Processing Group, specializing in research into advanced MDM and airborne ASW sonar. In 1997 he joined the NATO Saclant Undersea Research Center, La Spezia, Italy as principal scientist. He was appointed Head of the Mine Countermeasures Group, in the Signal and Systems Division in 1998 and held this position until the Group was dissolved in 2000. From 2000 to 2004 he conducted, as project leader, research into synthetic aperture sonar systems for hunting proud and buried mines. In 2004 he was appointed Head of the Expeditionary MCM and Port Protection Department where he presently oversees the research into AUV-based mine-hunting, electronic mine countermeasures and harbour defence.



T06: Synthetic aperture sonar

Dr Roy E Hansen

Time: 1300 – 1630

Room: Bayside 103

This tutorial will describe the principles, benefits and challenges of synthetic aperture sonar (SAS) imaging of the seafloor. The tutorial starts with the basic principles of SAS including derivation of resolution and area coverage. The similarities and differences between SAS, synthetic radar aperture radar (SAR) and seismic exploration will be shown. Next, the frequency dependence in SAS will be discussed. The tutorial continues to describe the challenges in SAS. These are: How to navigate with sufficient accuracy to obtain well focussed images in SAS; The effect of varying ocean environment on SAS; The effect of platform behaviour on SAS. SAS in rough terrain or SAS on non-straight paths; SAS in shallow waters or in areas of multipath; The tutorial will describe critical design for robust SAS, and how to do robust SAS processing. Finally, the tutorial will describe the properties of SAS images, and shows techniques to enhance or suppress specific properties. This includes shadow enhancement, echo enhancement and multi-aspect imagery.

Biography: Roy Edgar Hansen received the M.Sc. degree in physics in 1992, and the Ph.D. in physics in 1999, both from the University of Tromsø, Norway. The Ph.D. thesis title is Measurements in the Mixed Layer by a Bistatic multi-CW Doppler Sonar. From 1992 to 2000 he was with the Norwegian research company TRIAD, working on multistatic sonar, multistatic radar, SAR and underwater communications. Since 2000, he has been working at the Norwegian Defence Research Establishment (FFI), Kjeller, Norway. He is currently principal scientist and project manager for the HUGIN autonomous underwater vehicle development and the synthetic aperture sonar development at FFI. He is also adjunct associated professor at Centre for Imaging at University in Oslo, Norway.



T07: Underwater Communications

Dr Milica Stojanovic & Lee Freitag

Time: 0830 – 1200

Room: Bayside 104



Wireless information transmission is an enabling technology for the development of future ocean-observation systems, whose applications range from marine biology to oil industry, and involve the emerging concepts of cooperating autonomous vehicles and ad-hoc deployable sensor networks. Communication between such devices often relies on transmission of acoustic waves, since electro-magnetic waves propagate only over very short distances underwater. However, acoustic signals are confined to low frequencies (usually no more than several tens of kHz) making the available bandwidth extremely limited.

Within a constrained bandwidth, acoustic communications are governed by propagation that occurs over multiple paths and at low speed (nominally 1500 m/s). Delay spreading over tens or even hundreds of milliseconds results in a frequency-selective signal distortion, while motion creates an extreme Doppler effect. The worst properties of radio channels—poor link quality of a mobile terrestrial channel, and long delay of a satellite channel—thus appear combined in an underwater acoustic channel, which is generally recognized as one of the most difficult communication media in use today.

The quest for high rate communications over these channels is tightly coupled with the use of bandwidth-efficient modulation methods and signal processing solutions that can counteract the channel distortions. Since the early 90's, when adaptive equalization was employed to demonstrate the feasibility of phase-coherent detection underwater, research has yielded innovative signal processing solutions, as well as the first networking concepts for underwater acoustic systems.

This lecture offers a top-level overview of the basic concepts of acoustic communications:

- **Channel characteristics:** attenuation, noise, multipath and Doppler spreading
- **Modulation/detection:** single-carrier and multi-carrier (OFDM) broadband methods; equalization, synchronizations, diversity combining; multi-input multi-output (MIMO) communication
- **Networking:** topology/architecture selection, resource allocation
- **Multiple access and channel sharing:** deterministic (e.g., TDMA/CDMA) and random (MAC, routing).



Acoustic modem implementation will also be discussed, as it **pertains to the Woods Hole Oceanographic Institution's "micro-modem."**

Throughout the lecture, the emphasis will be on the fundamental differences between the acoustic and radio systems, and various signal processing concepts will be discussed through a series of experimental data examples, which illustrate transmission over shallow and deep water acoustic channels at highest bit-rates demonstrated to date.

Biography: Dr Milica Stojanovic

Milica Stojanovic graduated from the University of Belgrade, Serbia, in 1988, and received the M.S. and Ph.D. degrees in electrical engineering from Northeastern University, Boston, MA, in 1991 and 1993. After a number of years with the Massachusetts Institute of Technology, where she was a Principal Scientist, she joined the faculty of Electrical and Computer Engineering Department at Northeastern University in 2008. She is also a Guest Investigator at the Woods Hole Oceanographic Institution, and a Visiting Scientist at MIT. Her research interests include digital communications theory, statistical signal processing and wireless networks, and their applications to mobile radio and underwater acoustic communication systems. Milica is an Associate Editor for the IEEE Journal of Oceanic Engineering and the IEEE Transactions on Signal processing.

Biography: Lee Freitag

Lee Freitag holds BS and MS degrees in Electrical Engineering from the University of Alaska, Fairbanks which he received in 1986 and 1987 respectively. He is currently a Senior Engineer at the Woods Hole Oceanographic Institution where he has worked on projects related to underwater acoustics for twenty years. His research programs focus on underwater acoustic communication and navigation with a strong focus on unmanned underwater vehicles, sensors and submarine systems.



T08: AUV technology

Presenter: William Kirkwood

Time: 1300 – 1630

Room: Bayside 104

AUV Application Basics is a short course that provides an overview of current AUV technologies and operations. The objective is to establish a basic understanding of what currently available AUVs for oceanographic applications. The attendee will gain basic understanding of AUV types, technologies, terminology, and navigation techniques, including discussion of the comparative strengths of AUVs and alternative methods of data collection. The attendee will also be provided an understanding of tradeoffs in AUV operations, including power estimation, endurance considerations, and mission structure to acquire the desired data sets. Key points are illustrated by applications and results from the Monterey Bay Aquarium Research Institute's (MBARI) Dorado AUV and other AUV operations. Topics include: Basic AUV technology, AUV at-sea Operation, Payload Considerations, Mission Planning, Upper and Mid-Water AUV missions, Benthic and Mapping AUV missions, Data Collection and Reduction, AUV Integration into Sampling Networks, and a look at coming AUV advances. The interactive format, using the materials provided, allows the attendee discussion time for relevance and demonstration purposes regarding real or potential AUV plans.

Biography: Bill is a Senior Research and Development Engineer at the Monterey Bay Aquarium Research Institute (MBARI) located in Monterey Bay, California. Bill has a BS in Mechanical Engineering and a MS in Computer Science which he has applied to controls and automation of electromechanical systems and robotics since 1978. Bill has been with MBARI for 19 years as a lead mechanical engineer and program manager developing the Tiburon remotely operated vehicle and Dorado class autonomous underwater vehicles. Bill's current focus is development of underwater instrumentation for science studying hydrates and ocean acidification issues associated with anthropogenic CO₂.



Special Topics



Advances in Integrated Marine Observing Systems

Topic Chair:

Simon Allen

Technical Director, Integrated Marine Observing System,
University of Tasmania, Hobart,
Australia



Advances in Exploration and Recovery for the Offshore Oil & Gas Industry

Topic Chair:

Dr Jeanne Young

Leader, OCEANMAG project
CSIRO Wealth from Oceans
Flagship
Sydney, Australia



Advances in Understanding of Marine Environments in the Western Pacific

Topic Chairs:

Prof. Toru Sato

Department of Ocean Technology,
Policy, and Environment
University of Tokyo
Tokyo, Japan



Prof. Yusaku Kyojuka

Department of Environmental
Fluid Science and Technology
Kyushu University
Kasuga, Japan



Prof. Beom-Soo Hyun
Division of Naval Architecture and
Ocean Systems Engineering
Korea Maritime University
Busan, Korea



Dr Dong-Jiing Doong
Department of Marine
Environmental Informatics
National Taiwan Ocean University
Keelung, Taiwan R.O.C.



**Advances in Marine
Management**

Topic Chair:
Dr Peter Doherty
Research Director, Australian
Institute of Marine Science
Townsville, Australia



**Advances in Underwater
Imaging and Mapping**

Topic Chair:
Dr Marc Pinto
NURC, a NATO Research Centre
La Spezia, Italy



Program Monday 24 May

Tutorials

All OCEANS '10 tutorials take place on Monday 24 May 2010. Morning session tutorials begin at 08:30. Afternoon session tutorials begin at 13:00.

T01: Shallow water acoustics

Presenter: Prof. William Carey
Time: 0830 - 1200
Room: Bayside 101

T02: High Frequency Surface Wave Radar

Presenter: Dr Stuart Anderson
Time: 1300 - 1630
Room: Bayside 101

T03: Stochastic matched filters for sonar signals

Time: 0830 - 1200
Room: Bayside 102

T04: Localisation and Mapping

Presenter: Dr Stefan Williams
Time: 1300 - 1630
Room: Bayside 102

T05: Overview of high resolution sonar

Presenter: Dr Marc Pinto
Time: 0830 - 1200
Room: Bayside 103

T06: Synthetic aperture sonar

Presenter: Dr Roy E Hansen
Time: 1300 - 1630
Room: Bayside 103

T07: Underwater Communications

Presenter: Dr Milica Stojanovic & Lee Freitag
Time: 0830 - 1200
Room: Bayside 104

T08: AUV technology

Presenter: William Kirkwood
Time: 1300 - 1630
Room: Bayside 104



Program Tuesday 25 May

Conference Welcome and Plenary Sessions

Room: Bayside Auditorium A

Session Time: 0830 – 1030

- 0830-0900 Conference Welcome
Welcome Address: Prof. Mary O’Kane,
NSW Chief Scientist & Scientific
Engineer
- 0900-0930 Plenary Talk 1: Craig McLean,
National Oceanic & Atmospheric
Administration: *Meeting Social
Challenges Using Marine Technology*
- 0930-1000 Plenary Talk 2: CDRE Bruce Kafer,
Royal Australian Navy: *Understanding
the Oceans – a Navy Perspective*
- 1000-1030 Plenary Talk 3: Dr Neville Smith,
Bureau of Meteorology, Australia:
*Why Ocean Science Matters for
Australia*
- 1030-1100 Morning Tea, Bayside Grand Hall
- 1100-1115 Open Exhibition, Bayside Grand Hall
- 1115-1700 Exhibition, Bayside Grand Hall
- 1200-1300 Lunch, Bayside Grand Hall



Technical Sessions

TUESDAY 1:00PM – 2:45PM

E-M and opto-acoustic sensing

Bayside 101

Tuesday, May 25 (1:00PM - 2:45PM)

Chair: Roy Hughes, DSTO

Opto-Acoustic Underwater Remote Sensing (OAURS) - An Optical Sonar?

David Farrant, *CSIRO Materials Science & Engineering, Australia*

Jan Burke, *CSIRO Materials Science & Engineering, Australia*

Laurence Dickinson, *CSIRO Materials Science & Engineering, Australia*

Philip Fairman, *CSIRO Materials Science & Engineering, Australia*

John Wendoloski, *Defence Science & Technology Organisation, Australia*

Development Of A High Temperature Superconducting Magnetic Tensor Gradiometer For Underwater UXO Detection

Jeanne Young, *CSIRO Materials Science & Engineering, Australia*

David Clark, *CSIRO Materials Science & Engineering, Australia*

Shane Keenan, *CSIRO Materials Science & Engineering, Australia*

Peter Sullivan, *CSIRO Materials Science & Engineering, Australia*

Stephen Billings, *Sky Research Inc, USA*

Requirements For Unexploded Ordnance Detection And Discrimination In The Marine Environment Using Magnetic And Electromagnetic Sensors

Stephen Billings, *Sky Research Inc, USA*

Fridon Shubitidze, *Sky Research Inc, USA*

Leonard Pasion, *Sky Research Inc, USA*

Laurens Beran, *Sky Research Inc, USA*

Jack Foley, *Sky Research Inc, USA*



Underwater communications 1

Bayside 102

Tuesday, May 25 (1:00PM - 2:45PM)

Chair: Michael Frater, AFDA

Experimental Results On Adaptive MMSE Turbo Equalization In Shallow Underwater Acoustic Communication

Christophe Laot, *Télécom Bretagne, France*

Pascal Coince, *Sercel, France*

Check And Validate Reed Solomon Block Turbo Codes In Shallow Underwater Acoustic Communication

Joël TRUBUIL, *Télécom Bretagne, France*

André GOALIC, *Télécom Bretagne, France*

Christophe LAOT, *Télécom Bretagne, France*

Nicolas BEUZELIN, *Groupe & Etudes Sous-Marines de l'Atlantique, France*

On Joint Acoustic Communication And Positioning Through MFSK-Modulated Signals And Costas Arrays

Sébastien PENNEC, *IXSEA, France*

Gildas Touin, *IXSEA, France*

Stéphane Azou, *Laboratoire des sciences et techniques de l'information de la communication et de la connaissance, France*

Ludovic Collin, *Laboratoire des sciences et techniques de l'information de la communication et de la connaissance, France*

Coherent And Differential Acoustic Communication In Shallow Water Using Transmitter And Receiver Arrays

Dmitry Chizhik, *Bell Laboratories, USA*

Allan Rosenberg, *Johns Hopkins University, Applied Physics Laboratory, USA*

Qinqing Zhang, *Johns Hopkins University, Applied Physics Laboratory, USA*

Underwater Acoustic QPSK Receiver Implementation And Its Test Results At The Very Shallow Water

Seung-Geun Kim, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*

Sea-Moon Kim, *Maritime & Ocean Engineering Research*



Institute / Korea Ocean Research & Development Institute
Sung-Hoon Byun, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*
Jong-Won Park, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*
Changho Yun, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*
Young-Kon Lim, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*

**Advances in integrated marine observing systems 1
Bayside 103**

Tuesday, May 25 (1:00PM - 2:45PM)

Chair: Simon Allen, *University of Tasmania*

Connecting The Dots: Ocean Observing Systems And Public Policy

Martin Taylor, *Ocean Networks Canada*

Brian Bornhold, *Coastal and Ocean Resources Inc, Canada*

The VENUS Facility - A Bottom-Up Approach To Building An Ocean Observing System

Paul Macoun, *VENUS Facility, University of Victoria, Canada*

Adrian Round, *VENUS Facility, University of Victoria, Canada*

Richard Dewey, *VENUS Facility, University of Victoria, Canada*

Integrating Observation Systems: An Example From The Great Barrier Reef

Scott Bainbridge, *Australian Institute of Marine Science*

Craig Steinberg, *Australian Institute of Marine Science*

Mal Heron, *James Cook University, Australia*

Miles Furnas, *Australian Institute of Marine Science*

BLUElink: An Integrator Of The Integrated Marine Observing System

David Griffin, *CSIRO Wealth from Oceans Flagship, Australia*

Peter Oke, *CSIRO Wealth from Oceans Flagship, Australia*



Advances In The Gulf Of Maine Ocean Observing System: Technical Capabilities And Scientific Results

Neal Pettigrew, *University of Maine, USA*

Charles Fikes, *University of Maine, USA*

M. Beard, *University of Maine, USA*

Autonomous underwater vehicles 1

Bayside 104

Tuesday, May 25 (1:00PM - 2:45PM)

Co-Chairs: **David Lane**, *Heriot-Watt University, UK*

Torsten Pfuetzenreuter, *Fraunhofer Application Center System Technology, Germany*

ConSys - A New Software Framework For Underwater Vehicles

Torsten Pfuetzenreuter, *Fraunhofer Application Center System Technology, Germany*

Helge Renkewitz, *Fraunhofer Application Center System Technology, Germany*

MarineSIM : Robot Simulation For Marine Environment

P.G. Chaminda Senarathne, *Nanyang Technological University, Singapore*

Wijerupage Wijesoma, *Nanyang Technological University, Singapore*

Kwang Lee, *DSO National Laboratories, Singapore*

Bharath Kalyan, *Nanyang Technological University, Singapore*

Diluka Moratuwage, *Nanyang Technological University, Singapore*

Nicholas Patrikalakis, *Massachusetts Institute of Technology, USA*

Franz Hover, *Massachusetts Institute of Technology, USA*

A Versatile Underwater Tracking System For AUV Testing

Jesse Pentzer, *University of Idaho, USA*

Douglas Odell, *Naval Surface Warfare Center, Carderock Division, Acoustic Research Detachment, USA*

John Canning, *Center for Intelligent Systems Research, University of Idaho, USA*



Dean Edwards, *Center for Intelligent Systems Research, University of Idaho, USA*

A Tool Chain For AUV System Testing

Marco Jacobi, *Fraunhofer IOSB-AST, Germany*

Thomas Rauschenbach, *Fraunhofer IOSB-AST, Germany*

The Memorial Explorer: Developing The Role Of AUVs In Under-Ice Research

Peter King, *Memorial University of Newfoundland, Canada*

Ron Lewis, *Memorial University of Newfoundland, Canada*

Dan Walker, *Memorial University of Newfoundland, Canada*

Polly Alexander, *University of Tasmania, Australia*

Neil Bose, *University of Tasmania, Australia*

Anthony Worby, *Australian Antarctic Division*

Array signal processing and array design 1

Bayside 105

Tuesday, May 25 (1:00PM - 2:45PM)

Chair: Michael Clark, *Thales*

Optimal Spatial Filtering Of Real Data From Submarine Sonar Arrays

Brian Ferguson, *Defence Science & Technology Organisation, Australia*

Dragana Carevic, *Defence Science & Technology Organisation, Australia*

Multipath Reduction For Bathymetry Using Adaptive Beamforming

Ann Blomberg, *University of Oslo, Norway*

Michael Hayes, *University of Canterbury, New Zealand*

Iterative Adaptive Approach For Wide-Band Active Sonar Array Processing

Zhaofu Chen, *University of Florida, USA*

Jian Li, *University of Florida, USA*

Petre Stoica, *Uppsala University, Sweden*

Kam Lo, *Defence Science & Technology Organisation, Australia*



**Near-Field Beamforming For A Multi-Beam Echo
Sounder - Approximation And Error Analysis**

Ying Jiang, *Zhejiang University, China*

Wen Xu, *Zhejiang University, China*

Lingsheng Chen, *Zhejiang University, China*

Xiang Pan, *Zhejiang University, China*

**Comparison Of The Performance Of Time Domain
And Time-Frequency Domain Adaptive Beamforming**

Chaoying Bao, *Defence Science & Technology
Organisation, Australia*

George Farag, *University of Western Australia*

Jie Pan, *University of Western Australia*

**Sound propagation and scattering
Bayside 106**

Tuesday, May 25 (1:00PM - 2:45PM)

Chair: Chris Gillard, DSTO

**Modelling Acoustic Reflection Loss At The Ocean
Surface For Small Angles Of Incidence**

Adrian Jones, *Defence Science & Technology
Organisation, Australia*

Alec Duncan, *Centre for Marine Science & Technology,
Curtin University of Technology, Australia*

Amos Maggi, *Centre for Marine Science & Technology,
Curtin University of Technology, Australia*

Janice Sendt, *Thales, Australia*

Paul Clarke, *Defence Science & Technology Organisation,
Australia*

**On Some Rigorous Computational Ocean-Acoustic
Modelling Tools**

David Bartel, *Defence Science & Technology Organisation,
Australia*

Calcarenite As A Poroelastic Granular Medium

Nicholas Chotiros, *Applied Research Laboratories,
University of Texas, USA*

Marcia Isakson, *Applied Research Laboratories, University
of Texas, USA*



Sonar Uncertainty And Sensitivity Analysis Techniques

Douglas Sweet, *Defence Science & Technology Organisation, Australia*

Chris Gillard, *Defence Science & Technology Organisation, Australia*

Student poster oral presentation 1

Bayside 107

Tuesday, May 25 (1:00PM - 2:45PM)

Co-Chairs: **Stefan Williams**, *University of Sydney*
Norm Miller, *IEEE/OES*

A Maximum Entropy Framework For Statistical Modeling Of Underwater Acoustic Communication Channels

François-Xavier Socheleau, *Télécom Bretagne, France*

Christophe Laot, *Télécom Bretagne, France*

Jean-Michel Passerieux, *Thales Underwater Systems, France*

Target Tracking In State Dependent Wake Clutter

Edmund Brekke, *Unik, Norway*

Oddvar Hallingstad, *Unik, Norway*

John Glattetre, *Kongsberg Maritime, Norway*

Underwater Glider Propulsion Using Chemical Hydrides

Jo Borchsenius, *Auckland University of Technology, New Zealand*

Shane Pinder, *Auckland University of Technology, New Zealand*

Time Reversal Mirror: Temporal And Spatial Focusing Tool

Divya Parihar, *Indian Institute of Technology Delhi*

Ankit Agarwal, *Indian Institute of Technology Delhi*

Monika Agrawal, *Indian Institute of Technology Delhi*

Video-Image Processing Applied To The Analysis Of The Behaviour Of Deep-Water Lobsters (*Nephrops norvegicus*)

Sergi Pons Freixes, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*



Jaume Piera, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Jacopo Aguzzi, *Institute of Marine Sciences, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Constrained Stereo Correspondence For 3D Sea-Floor Reconstruction

Gabrielle Inglis, *University of Rhode Island, USA*

Chris Roman, *University of Rhode Island, USA*

Water Column Current Profile Aided Localisation For Autonomous Underwater Vehicles

Lashika Medagoda, *Australian Centre for Field Robotics, University of Sydney, Australia*

Stefan Williams, *Australian Centre for Field Robotics, University of Sydney, Australia*

Michael Jakuba, *Australian Centre for Field Robotics, University of Sydney, Australia*

Oscar Pizarro, *Australian Centre for Field Robotics, University of Sydney, Australia*

TUESDAY 3:15PM – 5:00PM

High frequency radars

Bayside 101

Tuesday, May 25 (3:15PM - 5:00PM)

Chair: **Stuart Anderson**, *Defence Science & Technology Organisation, Australia*

Further Analysis Of The Modulation Of High Frequency Radar Spectra Due To Sea-Induced Antenna Platform Motion

John Walsh, *Memorial University of Newfoundland, Canada*

Bernard Ryan, *Memorial University of Newfoundland, Canada*

Eric Gill, *Memorial University of Newfoundland, Canada*

Jacques El Khoury, *Ecole Supérieure d'Electricité (Supelec), France*

Wind Direction Manifestation On HF Ocean Radar Echoes

Malcolm Heron, *Australian Coastal Ocean Radar Network*

Peter Marrone, *Daromont Technologies, Australia*



The Use Of HF Radar Surface Currents For Computing Lagrangian Trajectories: Benefits And Issues

Alessandra Mantovanelli, *James Cook University, Australia*

Malcolm Heron, *James Cook University, Australia*

Arnstein Prytz, *James Cook University, Australia*

Rapid Deployable HF Radar For Norwegian Emergency Spill Operations

Chad Whelan, *CODAR Ocean Sensors, Ltd., USA*

Anton Kjelaas, *CodarNor AS, Norway*

Donald Barrick, *CODAR Ocean Sensors, Ltd., USA*

Peter Lilleboe, *CODAR Ocean Sensors, Ltd., USA*

Vicente Fernandez, *Qualitas Remos, Spain*

Andrés Martirena, *Qualitas Remos, Spain*

Øyvind Breivik, *Norwegian Meteorological Institute*

Bruce Hackett, *Norwegian Meteorological Institute*

Can Vertical Mixing From Turbulent Kinetic Energy Mitigate Coral Bleaching? An Application Of HF Ocean Radar

Diane DiMassa, *Massachusetts Maritime Academy, USA*

Malcolm Heron, *James Cook University, Australia*

Alessandra Mantovanelli, *James Cook University, Australia*

Scott Heron, *National Oceanographic & Atmospheric Administration, USA*

Craig Steinberg, *Australian Institute of Marine Science*

Underwater communications 2

Bayside 102

Tuesday, May 25 (3:15PM - 5:00PM)

Chair: **Craig Benson**, *University of New South Wales, Australia*

Acoustic Modems, Navigation Aids, And Networks For Undersea Operations

Dale Green, *Teledyne Benthos, USA*

Design Of A Low-Cost Short-Range Underwater Acoustic Modem

Bridget Benson, *University of California San Diego, USA*



Ying Li, *University of California San Diego, USA*
Brian Faunce, *University of California San Diego, USA*
Kenneth Domond, *California Institute for
Telecommunications and Information Technology, USA*
Donald Kimball, *California Institute for
Telecommunications and Information Technology, USA*
Curt Schurgers, *University of California San Diego, USA*
Ryan Kastner, *University of California San Diego, USA*

**Design Of A High Frequency FPGA Acoustic Modem
For Underwater Communication**

Nusrat Nowsheen, *University of New South Wales,
Australia*
Craig Benson, *University of New South Wales, Australia*
Michael Frater, *University of New South Wales, Australia*

**DSP Implementation Of Siso And MIMO OFDM
Acoustic Modems**

Hai Yan, *University of Connecticut, USA*
Shengli Zhou, *University of Connecticut, USA*
Zhijie Shi, *University of Connecticut, USA*
Jun-Hong Cui, *University of Connecticut, USA*
Lei Wan, *University of Connecticut, USA*
Jie Huang, *University of Connecticut, USA*
Hao Zhou, *University of Connecticut, USA*

**The Design And Experiment Of A Software-Defined
Acoustic Modem For Underwater Sensor Network**

Yu Li, *Institute of Acoustics, Chinese Academy of
Sciences*
Haining Huang, *Institute of Acoustics, Chinese Academy
of Sciences*

**Advances in exploration and recovery for the
offshore oil & gas industry**

Bayside 103

Tuesday, May 25 (3:15PM - 5:00PM)

Chair: **Jeanne Young**, *CSIRO Materials Science &
Engineering, Australia*

Offshore Petroleum Exploration From Space

Magnus Wettle, *Geoscience Australia*
Paul Daniel, *CSIRO Land & Water, Australia*



Graham Logan, *Geoscience Australia*

Medhavy Thankappan, *Geoscience Australia*

Correction Of Electric And Magnetic Fields And Gradients Measured Within And Around An Insulating Sensor Capsule In Seawater

David Clark, *CSIRO Materials Science & Engineering, Australia*

Development Of An Arrayed Hydrocarbon Sensing System For The Detection Of Seeped Hydrocarbons

Xiubin Qi, *CSIRO Earth Science & Resource Engineering, Australia*

Emma Crooke, *CSIRO Earth Science & Resource Engineering, Australia*

Andrew Ross, *CSIRO Earth Science & Resource Engineering, Australia*

The Assessment And Evolution Of Offshore Gas Hydrate Deposits Using Seafloor Controlled Source Electromagnetic Methodology

Nigel Edwards, *University of Toronto, Canada*

Reza Mir, *University of Toronto, Canada*

Ele Willoughby, *University of Toronto, Canada*

Katrin Schwalenberg, *Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Germany*

Carsten Scholl, *Fugro Electro Magnetic GmbH, Germany*

Proven High Efficiency Anchor For Harsh Cyclonic Environments

Evan Zimmerman, *Delmar, USA*

Vehicle navigation 1

Bayside 104

Tuesday, May 25 (3:15PM - 5:00PM)

Co-Chairs: Wen Xu, Zhejiang University, China

Eric Wolbrecht, University of Idaho

AUV Navigation With An Extended Kalman Filter In A Magnetic Disturbance

Benjamin Armstrong, *University of Idaho, USA*

Eric Wolbrecht, *University of Idaho, USA*

Dean Edwards, *Center for Intelligent Systems Research, University of Idaho, USA*



USBL Pose Estimation Using Multiple Responders

Leif Christensen, *DFKI Bremen - Robotics Innovation Center, Germany*

Martin Fritsche, *DFKI Bremen - Robotics Innovation Center, Germany*

Jan Albiez, *DFKI Bremen - Robotics Innovation Center, Germany*

Frank Kirchner, *DFKI Bremen - Robotics Innovation Center, Germany*

AUV Positioning Based On Interactive Multiple Model

Hongqing Liu, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Mandar Chitre, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Rui Gao, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Cooperative Positioning Using Range-Only Measurements Between Two AUVs

Rui Gao, *Tropical Marine Science Institute, National University of Singapore*

Mandar Chire, *Tropical Marine Science Institute, National University of Singapore*

Log Sensor Calibration Using M-Estimate

Daxiong Ji, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Jian LIU, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Kaizhou LIU, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Autonomous underwater vehicles 2

Bayside 105

Tuesday, May 25 (3:15PM - 5:00PM)

Chair: Justin Manley, *Liquid Robotics, USA*

Sensing The Underwater Acoustic Environment With A Single Hydrophone Onboard An Undersea Glider

Brian Ferguson, *Defence Science & Technology Organisation, Australia*

Kam Lo, *Defence Science & Technology Organisation,*



Australia

Joshua Rodgers, *Defence Science & Technology Organisation, Australia*

Estimation Of Wave Parameters From Accelerometry Data To Aid AUV-Shore Communication

Arvind de Menezes Pereira, *University of Southern California, USA*

Gaurav Sukhatme, *University of Southern California, USA*

Slocum Glider Energy Measurement And Simulation Infrastructure

Hans Woithe, *Rutgers University, USA*

Ulrich Kremer, *Rutgers University, USA*

Ivan Seskar, *Rutgers University, USA*

Oscar Schofield, *Rutgers University, USA*

Scott Glenn, *Rutgers University, USA*

Murium Iqbal, *Rutgers University, USA*

David Aragon, *Rutgers University, USA*

Ilya Chigirev, *Rutgers University, USA*

Yuriy Shames, *Rutgers University, USA*

Hydrodynamic Implications For Submarine Launched Underwater Gliders

Joshua Rodgers, *Defence Science & Technology Organisation, Australia*

John Wharington, *Defence Science & Technology Organisation, Australia*

Motion Characteristic Analysis Of A Hybrid-Driven Underwater Glider

Shuxin Wang, *Tianjin University, China*

Xiujun Sun, *Tianjin University, China*



Imaging and vision

Bayside 106

Tuesday, May 25 (3:15PM - 5:00PM)

Co-Chairs: **Christopher Roman**, *University of Rhode Island, USA*

Roman Ilin, *Air Force Research Laboratory, USA*

Simultaneous Detection And Tracking Of Multiple Objects In Noisy And Cluttered Environment Using Maximum Likelihood Estimation Framework

Roman Ilin, *Air Force Research Laboratory, USA*

Ross Deming, *Solid State Scientific Corporation, USA*

Underwater Object Reconstruction Method For 3D Target Recognition In An Autonomous Underwater Vehicle.

Pavan Kumar Ambekar, *Rashtriya Vidhyalaya College of Engineering, India*

Mutanna Kadal, *Indian Institute of Science*

Karthik Sheshadri, *Rashtriya Vidhyalaya College of Engineering, India*

Application Of Structured Light Imaging For High Resolution Mapping Of Underwater Archaeological Sites

Christopher Roman, *University of Rhode Island, USA*

Gabrielle Inglis, *University of Rhode Island, USA*

James Rutter, *University of Rhode Island, USA*

An Approach Of Image Decomposition For Underwater Target Detection By Inhomogeneous Illumination Based On G-Space And PDE

Haiyong Zheng, *Ocean University of China*

Bing Zheng, *Ocean University of China*

Guangrong Ji, *Ocean University of China*



Student poster oral presentation 2

Bayside 107

Tuesday, May 25 (3:15PM - 5:00PM)

Co-Chairs: **Stefan Williams**, *University of Sydney*
Norm Miller, *IEEE/OES*

Modeling Underwater Acoustic Communications For Multi-Robot Missions In A Robotics Simulator

Anuj Sehgal, *Jacobs University, Germany*

Daniel Cernea, *Jacobs University, Germany*

Andreas Birk, *Jacobs University, Germany*

The Signal-To-Noise Ratio Of Human Divers

Edmund Brekke, *Unik, Norway*

Oddvar Hallingstad, *Unik, Norway*

John Glattetre, *Kongsberg Maritime, Norway*

Station Keeping Of Small Outboard-Powered Boats

Aaron Fisher, *Florida Atlantic University, USA*

James VanZwieten, *Florida Atlantic University, USA*

Tannen VanZwieten, *NASA Marshall Space Flight Center, USA*

Probabilistic Sonar Scan Matching SLAM For Underwater Environment

Angelos Mallios, *Universitat de Girona, Spain*

Pere Ridao, *Universitat de Girona, Spain*

David Ribas, *Universitat de Girona, Spain*

Emilli Hernandez, *Universitat de Girona, Spain*

Particle Diversity Reduction For AUV'S Active Localisation

Francesco Maurelli, *Heriot-Watt University, UK*

Yvan Petillot, *Heriot-Watt University, UK*

Rugosity, Slope And Aspect Derived From Bathymetric Stereo Image 3D Reconstructions

Ariell Friedman, *Australian Centre for Field Robotics, University of Sydney, Australia*

Oscar Pizarro, *Australian Centre for Field Robotics, University of Sydney, Australia*



Stefan Williams, *Australian Centre for Field Robotics,
University of Sydney, Australia*

**Dirichlet Process Mixture Models For Autonomous
Habitat Classification**

Daniel Steinberg, *Australian Centre for Field Robotics,
University of Sydney, Australia*

Oscar Pizarro, *Australian Centre for Field Robotics,
University of Sydney, Australia*

Stefan Williams, *Australian Centre for Field Robotics,
University of Sydney, Australia*

Michael Jakuba, *Australian Centre for Field Robotics,
University of Sydney, Australia*



Program Wednesday 26 May

WEDNESDAY 8:30AM – 10:15AM

Current measurement technology

Bayside 101

Wednesday, May 26 (8:30AM - 10:15AM)

Co-Chairs: **Albert Williams**, *Woods Hole Oceanographic Institution, USA*

Mal Heron, *James Cook University, Australia*

Motion Tracking In An Acoustic Point-Measurement Current Meter

Albert Williams, *Woods Hole Oceanographic Institution, USA*

Fredrik Thwaites, *Woods Hole Oceanographic Institution, USA*

Archie Morrison, *Nobska Development, Inc., USA*

John Toole, *Woods Hole Oceanographic Institution, USA*

Richard Krishfield, *Woods Hole Oceanographic Institution, USA*

High-Frequency Radar Two-Station Baseline Bisector Comparisons Of Radial Components

Daniel Atwater, *James Cook University, Australia*

Mal Heron, *James Cook University, Australia*

Sea Surface Current Mapping By Radar Doppler Current Profiler

Marius Cysewski, *Department of Radar Hydrography, GKSS Research Center, Germany*

Friedwart Ziemer, *Department of Radar Hydrography, GKSS Research Center, Germany*

Joerg Seemann, *Department of Radar Hydrography, GKSS Research Center, Germany*

The First Chinese Coastal Acoustic Tomography Experiment

Xiao-Hua ZHU, *State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China*

Arata Kaneko, *Graduate School of Engineering, Hiroshima University, Japan*

Qingsong Wu, *State Key Laboratory of Satellite Ocean*



Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China

Noriaki Gohda, *Graduate School of Engineering, Hiroshima University, Japan*

Chuanzheng Zhang, *State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China*

Naokazu Taniguchi, *Graduate School of Engineering, Hiroshima University, Japan*

Reciprocal Sound Transmission Experiments For Current Measurement In A Tidal River

Chuanzheng Zhang, *State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China*

Xiao-Hua ZHU, *State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China*

Arata Kaneko, *Graduate School of Engineering, Hiroshima University, Japan*

Qingsong Wu, *State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, China*

Xiaopeng Fan, *Second Institute of Oceanography, State Oceanic Administration, China*

Bo Li, *Second Institute of Oceanography, State Oceanic Administration, China*

Guanghong Liao, *Second Institute of Oceanography, State Oceanic Administration, China*

Tao Zhang, *Second Institute of Oceanography, State Oceanic Administration, China*

Sonar signal processing 1

Bayside 102

Wednesday, May 26 (8:30AM - 10:15AM)

Chair: **Peter Gough**, *Acoustics Research Group, University of Canterbury, New Zealand*

Sonar Waveform Design For Optimum Target Detection: The Impact Of Object Burial State

Brandon Hamschin, *University of Pittsburgh, USA*

Patrick Loughlin, *University of Pittsburgh, USA*



**Detection Of Weak Signals In Non-Gaussian Noise
Using Nonlinear Wavelet Denoising**

Zahra Madadi Ardekani, *Nanyang Technological University,
Singapore*

Gargeshwari Anand, *Department of Electrical
Communication Engineering, Indian Institute of Science*

Benjamin Premkumar, *Nanyang Technological University,
Singapore*

Chiew Tong Lau, *Nanyang Technological University,
Singapore*

An Improvement To The Pulse Compression Scheme

Philippe Courmontagne, *Institut Supérieur de
l'Electronique et du Numerique Toulon, France*

Gregory Julien, *French Research Institute for Exploitation
of the Sea*

Marie-Edith Bouhier, *French Research Institute for
Exploitation of the Sea*

**Acceleration Of Underwater Acoustic Source
Localization Algorithms On The CELL Multi-Core
Processor Via Vectorization**

Neena Imam, *Oak Ridge National Laboratory, USA*

Jacob Barhen, *Oak Ridge National Laboratory, USA*

Travis Humble, *Oak Ridge National Laboratory, USA*

**Recovering Data And Voice Recorders Following At-
Sea Crashes**

Dale Green, *Teledyne Benthos, USA*

Advances in marine management

Bayside 103

Wednesday, May 26 (8:30AM - 10:15AM)

Chair: **Douglas Cato**, *Defence Science &
Technology Organisation / University of
Sydney, Australia*
Diane di Massa, *Massachusetts Maritime
Academy, USA*

**Smart Sensors - A New Paradigm For Marine
Management: An Example From The Great Barrier
Reef**

Scott Bainbridge, *Australian Institute of Marine Science*

Damien Eggeling, *Australian Institute of Marine Science*



Geoff Page, *Australian Institute of Marine Science*

Acoustic Surveying For Beaked Whales In The Coral Sea As A Mitigation Measure For Naval Exercises.

Douglas Cato, *Defence Science & Technology Organisation / University of Sydney, Australia*

Mark Savage, *Defence Science & Technology Organisation, Australia*

Rebecca Dunlop, *University of Queensland, Australia*

Iain Parnum, *Curtin University, Australia*

Michelle Blewitt, *University of Sydney, Australia*

Sue Gibbs, *Macquarie University, Australia*

David Donnelly, *Dolphin Research Institute, Australia*

Jane Cleary, *Defence Science & Technology Organisation, Australia*

Robert McCauley, *Curtin University, Australia*

Developments In Mapping Of Seabed Habitats For Marine Protected Area Planning And Monitoring

Alan Jordan, *New South Wales Department of Environment, Climate Change and Water, Australia*

Peter Davies, *New South Wales Department of Environment, Climate Change and Water, Australia*

Tim Ingleton, *New South Wales Department of Environment, Climate Change and Water, Australia*

Edwina Mesley, *New South Wales Department of Environment, Climate Change and Water, Australia*

Joe Neilson, *New South Wales Department of Environment, Climate Change and Water, Australia*

Tim Pritchard, *New South Wales Department of Environment, Climate Change and Water, Australia*

Using An Autonomous Underwater Vehicle To Inform Management Of Biodiversity In Shelf Waters

Neville Barrett, *University of Tasmania, Australia*

Tara Anderson, *Geoscience Australia*

Stefan Williams, *Australian Centre for Field Robotics, University of Sydney, Australia*

Nicole Hill, *Tasmanian Aquacultures & Fisheries Institute, Australia*

Jan Seiler, *Tasmanian Aquacultures & Fisheries Institute, Australia*

Scott Nicol, *Geoscience Australia*



Autonomous underwater vehicles 3

Bayside 104

Wednesday, May 26 (8:30AM - 10:15AM)

Co-Chairs: **Oscar Pizarro**, *Australian Centre for Field Robotics*

Daniel Sgarioto, *Defence Technology Agency, New Zealand*

High Resolution, Consistent Navigation And 3D Optical Reconstructions From AUVs Using Magnetic Compasses And Pressure-Based Depth Sensors

Michael Jakuba, *Australian Centre for Field Robotics, University of Sydney, Australia*

Oscar Pizarro, *Australian Centre for Field Robotics, University of Sydney, Australia*

Stefan Williams, *Australian Centre for Field Robotics, University of Sydney, Australia*

Adaptive Behaviour For An Autonomous Underwater Vehicle To Perform Chemical Mappings

Breen Jeremy, *Tasmanian Information & Communication Technologies Centre, Australia*

Paulo de Souza, *Tasmanian Information & Communication Technologies Centre, Australia*

Timms Greg, *Tasmanian Information & Communication Technologies Centre, Australia*

Ollington Robert, *School of Computing and Information Systems, University of Tasmania, Australia*

Reactive AUV Motion For Thermocline Tracking

Nuno Cruz, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

Aníbal Matos, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

A Sub-Region Priority Reaching Control Scheme With A Fuzzy-Logic Algorithm For An Underwater Vehicle Subject To Uncertain Restoring Forces

Zool Ismail, *School of Engineering and Physical Sciences, Heriot-Watt University, UK*

Matthew Dunnigan, *School of Engineering and Physical Sciences, Heriot-Watt University, UK*



**The Influence Of Tidal Currents On The REMUS
Autonomous Underwater Vehicle**

Daniel Sgarioto, *Defence Technology Agency, New Zealand*

Numerical modeling and simulation

Bayside 105

Wednesday, May 26 (8:30AM - 10:15AM)

Chair: Frederick Maltz, *Consultant*

**Numerical Simulation Of Deep-Towed Streamer Cable
In Ocean Current By ALE Finite Element Method**

Junichi Takekawa, *Kyoto University, Japan*

Hitoshi MIKADA, *Kyoto University, Japan*

Tada-nori GOTO, *Kyoto University, Japan*

Eiichi ASAKAWA, *JGI Inc., Japan*

Takuya SHIMURA, *Japan Agency for Marine-Earth Science
and Technology*

Simple Karman Street Model

Cecilia Tapia Siles, *Italian Institute of Technology*

Ryad Chellali, *Italian Institute of Technology*

**3D Simulation Of Robotic Fish Interactions With
Physic-Based Underwater Environment**

Laura Taverna, *Italian Institute of Technology*

Ryad Chellali, *Italian Institute of Technology*

Lorenzo Rossi, *Italian Institute of Technology*

**Time Domain Numerical Simulation Of Microwave
Backscattering From Sea Surface For Radar Remote
Sensing**

Takero Yoshida, *Department of Ocean Technology Policy &
Environment, University of Tokyo, Japan*

Chang-Kyu Rheem, *IIS, The university of Tokyo, Japan*

**Validation Of Numerical Model For Bubble Dispersion
Over A Hydrofoil**

Shuang Zhu, *University of Melbourne, Australia*

Andrew Ooi, *University of Melbourne, Australia*

Hugh Blackburn, *Monash University, Australia*

Brendon Anderson, *Defence Science & Technology
Organisation, Australia*



Systems and observatories 1

Bayside 106

Wednesday, May 26 (8:30AM - 10:15AM)

Co- Andrew Clark, CSnet International, Inc., USA
Chairs: Neal Pettigrew, University of Maine, USA

November 2009 Tropical Cyclone Phyan In The Eastern Arabian Sea: Oceanic Response Along West India Coast And Kavaratti Lagoon

Antony Joseph, *National Institute of Oceanography, India*
R Prabhudesai, *National Institute of Oceanography, India*
Prakash Mehra, *National Institute of Oceanography, India*
Vijay Kumar, *National Institute of Oceanography, India*
Yogesh Agarvadekar, *National Institute of Oceanography, India*

Ryan Luis, *National Institute of Oceanography, India*
Pradhan Rivankar, *National Institute of Oceanography, India*

Blossom Viegas, *National Institute of Oceanography, India*

A Combined Benthic Grab And Observation System For Rapid Assessment Of Water Column And Seabed

Matthew Sherlock, *CSIRO Marine & Atmospheric Research, Australia*

Rudy Kloser, *CSIRO Marine & Atmospheric Research, Australia*

Tim Ryan, *CSIRO Marine & Atmospheric Research, Australia*

Alan Williams, *CSIRO Marine & Atmospheric Research, Australia*

The Coral Proto Free Ocean Carbon Enrichment System (CP-FOCE): Engineering And Development

Malcolm Marker, *University of Queensland, Australia*

David Kline, *University of Queensland, Australia*

Bill Kirkwood, *Monterey Bay Aquarium Research Institute, USA*

Kent Headley, *Monterey Bay Aquarium Research Institute, USA*

Peter Brewer, *Monterey Bay Aquarium Research Institute, USA*

Edward Peltzer, *Monterey Bay Aquarium Research Institute, USA*



Thomas Miard, *University of Queensland, Australia*
Aaron Chai, *University of Queensland, Australia*
Mark James, *University of Queensland, Australia*
Kenneth Schneider, *Carnegie Institution, Department of Global Ecology, USA*
Jack Silverman, *Israel Oceanographic & Limnological Research Ltd*
Ken Caldeira, *Carnegie Institution, Department of Global Ecology, USA*
Stephen Monismith, *Stanford University, USA*
Brad Opdyke, *Australian National University*
Rob Dunbar, *Stanford University, USA*
Ray White, *University of Queensland, Australia*
Sophie Dove, *Centre for Marine Studies, University of Queensland, Australia*
Ove Hoegh-Guldberg, *Centre for Marine Studies, University of Queensland, Australia*

The Nazare Canyon (W Portugal) Observatory - Real Time Monitoring Of A Large Submarine Canyon.

Ines Martins, *Instituto Hidrografico, Portugal*
Joao Vitorino, *Instituto Hidrografico, Portugal*
Sara Almeida, *Instituto Hidrografico, Portugal*

Design Of A Prototype Tsunami Warning And Early Response System For Cyprus - TWERC

Georgios Georgiou, *University of Cyprus*
Andrew Clark, *CSnet International, Inc., USA*
George Zodiatis, *University of Cyprus*
Daniel Hayes, *University of Cyprus*
Dimitris Glekas, *CSnet CYPRUS Ltd., Cyprus*

Student poster oral presentation 3

Bayside 107

Wednesday, May 26 (8:30AM - 10:15AM)

Co-Chairs: Stefan Williams, University of Sydney
Norm Miller, IEEE/OES

Precise Sound Source Localisation Of Dolphin Biosonar Pulse Transmissions

Eric Ferguson, *University of Sydney, Australia*



Effects Of Climate Change And Anthropogenic Ocean Acidification On Underwater Acoustic Communications

Anuj Sehgal, *Jacobs University, Germany*

Iyad Tumar, *Jacobs University, Germany*

Jürgen Schönwälder, *Jacobs University, Germany*

Mapping Marine Phytoplankton Assemblages From A Hyperspectral And Artificial Intelligence Perspective

Elena Torrecilla, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Sergi Pons, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Albert Vilamala, *Artificial Intelligence Research Institute, Spanish Council for Scientific Research*

Ismael F. Aymerich, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Josep Arcos, *Artificial Intelligence Research Institute, Spanish Council for Scientific Research*

Enric Plaza, *Artificial Intelligence Research Institute, Spanish Council for Scientific Research*

Jaume Piera, *Marine Technology Unit, Centre Mediterrani d'Investigacions Marines i Ambientals, Spain*

Water Profile Navigation With An Acoustic Doppler Current Profiler

Michael Stanway, *Massachusetts Institute of Technology / Woods Hole Oceanographic Institution Joint Program, USA*

Calibration Of Optical Camera Coupled To Acoustic Multibeam For Underwater 3D Scene Reconstruction

Natàlia Hurtós, *Universitat de Girona, Spain*

Xavier Cufí, *Universitat de Girona, Spain*

Joanquim Salvi, *Universitat de Girona, Spain*

The Role Of Carbonic Anhydrase Enzyme In The Biocalcification Process Of Coral And Its Resilience To Global Climate Change

M. Azizur Rahman, *University of the Ryukyus, Japan*

Tamotsu Oomori, *University of the Ryukyus, Japan*

Control System Performance And Efficiency For A Mid-Depth Lagrangian Profiling Float

Bryan McGilvray, *University of Rhode Island, USA*



Christopher Roman, *University of Rhode Island, USA*

WEDNESDAY 10:45AM – 12:30PM

Oceanography 1

Bayside 101

Wednesday, May 26 (10:45AM - 12:30PM)

Co-Chairs: **Paulo de Souza**, *Tasmanian Information & Communication Technologies Centre, Australia*

Nobuyoshi Kouguchi, *Kobe University, Graduate School of Maritime Sciences, Japan*

Wave Remote Sensing System By GPS

Nobuyoshi Kouguchi, *Kobe University, Graduate School of Maritime Sciences, Japan*

Jian CUI, *Kobe University, Graduate School of Maritime Sciences, Japan*

Akihiro IKAWA, *Kobe University, Graduate School of Maritime Sciences, Japan*

Shigeyuki OKUDA, *Kobe Marine Technical College, Japan*

Yasuo ARAI, *Kobe Marine Technical College, Japan*

Waves In The Southern Great Barrier Reef

Jasmine Jaffrés, *Marine Geophysical Laboratory, James Cook University, Australia*

Malcolm Heron, *Marine Geophysical Laboratory, James Cook University, Australia*

Andrew Middleditch, *Seaview Sensing Ltd, UK*

Craig Steinberg, *Australian Institute of Marine Science*

Tom Durrant, *Australian Bureau of Meteorology*

What Is Driving The Fast Warming Rate Of The Southern Hemisphere Midlatitude Ocean?

Timothy Cowan, *CSIRO Marine & Atmospheric Research, Australia*

Wenju Cai, *CSIRO Marine & Atmospheric Research, Australia*

Susan Wijffels, *CSIRO Wealth from Oceans Flagship, Australia*

Stuart Godfrey, *CSIRO Marine & Atmospheric Research, Australia*



**Statistical Clustering Of Curves In The Geosciences -
The Answer To Everything?**

Les Hamilton, *Defence Science & Technology Organisation,
Australia*

**Characterization Of Suspended Particles Collected
From An Estuary In An Urban And Industrialised
Centre Using Magnets Onboard An Autonomous
Underwater Vehicle**

Paulo de Souza, *Tasmanian Information & Communication
Technologies Centre, Australia*

Edward Butler, *CSIRO Wealth from Oceans Flagship,
Australia*

Andrew Davie, *Tasmanian Information & Communication
Technologies Centre, Australia*

Greg Timms, *Tasmanian Information & Communication
Technologies Centre, Australia*

Vijayendra Garg, *Instituto de Fisica, Universidade de
Brasilia, Brazil*

Underwater communications 3

Bayside 102

Wednesday, May 26 (10:45AM - 12:30PM)

Chair: **Milica Stojanovic**, *Northeastern
University, USA*

**Estimation And Compensation Of Doppler Effect In
UAC OFDM Systems**

Sadia Ahmed, *University of South Florida, USA*

Huseyin Arslan, *University of South Florida, USA*

**Capacity Of Underwater Acoustic OFDM Cellular
Networks**

Balakrishnan Srinivasan, *University of California Santa
Barbara, USA*

Volkan Rodoplu, *University of California Santa Barbara,
USA*

**Alamouti Space Time Coded OFDM For Underwater
Acoustic Channels**

Baosheng Li, *Northeastern University, USA*

Milica Stojanovic, *Northeastern University, USA*



Progressive Inter-Carrier Interference Equalization For OFDM Transmission Over Time-Varying Underwater Acoustic Channels

Jianzhong Huang, *University of Connecticut, USA*

Shengli Zhou, *University of Connecticut, USA*

Jie Huang, *University of Connecticut, USA*

Christian Berger, *Carnegie Mellon University, USA*

Petter Willett, *University of Connecticut, USA*

Comparison Of Basis Pursuit Algorithms For Sparse Channel Estimation In Underwater Acoustic OFDM

Jianzhong Huang, *University of Connecticut, USA*

Christian Berger, *Carnegie Mellon University, USA*

Shengli Zhou, *University of Connecticut, USA*

Jie Huang, *University of Connecticut, USA*

**Advances in underwater imaging and mapping
Bayside 103**

Wednesday, May 26 (10:45AM - 12:30PM)

Chair: Marc Pinto, NURC

Preliminary Investigations Using A Helicopter Time-Domain System For Bathymetric Measurements And Depth-To-Bedrock Estimation In Shallow Coastal Waters - A Case Study In Broken Bay, Australia

Julian Vrbancich, *Defence Science & Technology Organisation, Australia*

Overview Of Australian R & D For Acoustic Mine Imaging

Ronald Wyber, *Midspar Systems, Australia*

Interferometric Synthetic Aperture Sonar In Pipeline Inspection

Roy Hansen, *Norwegian Defence Research Establishment*

Torstein Sabo, *Norwegian Defence Research Establishment*

Per Hagen, *Kongsberg Maritime, Norway*

Hayden Callow, *Norwegian Defence Research Establishment*



**Autonomous Detection And Volume Determination
Of Tubeworm Colonies From Underwater Robotic
Surveys**

Toshihiro Maki, *University of Tokyo, Japan*

Ayaka Kume, *University of Tokyo, Japan*

Tamaki Ura, *University of Tokyo, Japan*

Takashi Sakamaki, *University of Tokyo, Japan*

Hideyuki Suzuki, *University of Tokyo, Japan*

**Development Of A Landing Algorithm For
Autonomous Underwater Vehicles Using Laser
Profiling**

Mehul Sangekar, *Underwater Robotics & Application
Laboratory, University of Tokyo, Japan*

Blair Thornton, *Underwater Robotics & Application
Laboratory, University of Tokyo, Japan*

Tamaki Ura, *Underwater Robotics & Application
Laboratory, University of Tokyo, Japan*

Takeshi Nakatani, *Underwater Robotics & Application
Laboratory, University of Tokyo, Japan*

Vehicle navigation 2

Bayside 104

Wednesday, May 26 (10:45AM - 12:30PM)

Co-Chairs: **Jenhwa Guo**, *Department of Engineering
Science and Ocean Engineering, National
Taiwan University*

Hsin-Hung Chen, *National Sun Yat-sen
University, Taiwan*

**Study On Underwater Terrain Matching Positioning
Based On The Integration Of TERCOM And MCTM**

Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan
University, China*

Kai Zhang, *School of Geodesy and Geomatics, Wuhan
University, China*

Hongmei Zhang, *School of Geodesy and Geomatics,
Wuhan University, China*

Kun Yang, *Tianjin Research Institute For Water Transport
Engineering, China*

**Deep-Sea AUV Navigation Using Side-Scan Sonar
Images And SLAM**

Philipp Woock, *Fraunhofer Institute of Optronics, System*



Technologies and Image Exploitation, Germany

Christian Frey, *Fraunhofer Institute of Optronics, System Technologies and Image Exploitation, Germany*

Study On The Underwater Geomagnetic Navigation Based On The Integration Of TERCOM And K-Means Clustering Algorithm

Shengping wang, *School of Geodesy and Geomatics, Wuhan University, China*

Hongmei Zhang, *School of Power and Mechanical Engineering, Wuhan University, China*

Kun Yang, *Tianjin Research Institute For Water Transport Engineering, China*

Chunhe Tian, *Tianjin Research Institute For Water Transport Engineering, China*

Seabed Topographic Contour Match Based On Angle Code Technique

Hongmei Zhang, *Automation Department, Wuhan University, China*

Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan University, China*

Kun Yang, *Tianjin Research Institute For Water Transport Engineering, China*

Chunhe Tian, *Tianjin Research Institute For Water Transport Engineering, China*

Map Uncertainties For Unmanned Underwater Vehicle Navigation Using Sidescan Sonar

Jenhwa Guo, *Department of Engineering Science and Ocean Engineering, National Taiwan University*

WH Wang, *Department of Engineering Science and Ocean Engineering, National Taiwan University*

SW Huang, *Taiwan Ocean Research Institute*

Edward Chen, *Taiwan Ocean Research Institute*

FC Chiu, *Department of Engineering Science and Ocean Engineering, National Taiwan University*



Remotely operated vehicles

Bayside 105

Wednesday, May 26 (10:45AM - 12:30PM)

Co-Chairs: **Shinichi Takagawa**, *Institute of Industrial Science, University of Tokyo, Japan*

Tomoya Inoue, *Japan Agency for Marine-Earth Science and Technology*

Flipper Type Crawler System For Running On The Irregular Seafloor

Tomoya Inoue, *Japan Agency for Marine-Earth Science and Technology*

Takuya Shiosawa, *Japan Agency for Marine-Earth Science and Technology / University of Tokyo*

Ken Takagi, *Japan Agency for Marine-Earth Science and Technology / University of Tokyo*

Development Of A Human-Sized ROV With Dual-Arm

Norimitsu Sakagami, *Tokai University, Japan*

Mizuho Shibata, *Ritsumeikan university, Kyoto, Japan*

Yuuta Hagiwara, *Ritsumeikan university, Kyoto, Japan*

Kouhei Ishimaru, *Ritsumeikan university, Kyoto, Japan*

Tomohiro Ueda, *Ritsumeikan university, Kyoto, Japan*

Takayuki Saito, *Ritsumeikan university, Kyoto, Japan*

Kazuhiro Fujita, *Ritsumeikan university, Kyoto, Japan*

Hideki Hashizume, *Ritsumeikan university, Kyoto, Japan*

Toshifumi Inoue, *Dainippon Screen Manufacturing, Japan*

Shigeo Murakami, *Dainippon Screen Manufacturing, Japan*

Hiroyuki Onishi, *Dainippon Screen Manufacturing, Japan*

Sadao Kawamura, *Ritsumeikan university, Kyoto, Japan*

A New Concept Design Of Heave Compensation System For Longer Life Of Cables

Shinichi Takagawa, *Institute of Industrial Science, University of Tokyo, Japan*

Deep Water ROV Design For The Mexican Oil Industry

Tomas Salgado-Jimenez, *Center for Engineering and Industrial Development (CIDESI), Mexico*

Jose Luis Gonzalez-Lopez, *Center for Engineering and Industrial Development (CIDESI), Mexico*



Luis Martinez-Soto, *Center for Engineering and Industrial Development (CIDESI), Mexico*

Edgar Olguin Lopez, *Center for Engineering and Industrial Development (CIDESI), Mexico*

Pedro Resendiz Gonzalez, *Center for Engineering and Industrial Development (CIDESI), Mexico*

Manuel Bandala-Sanchez, *Center for Engineering and Industrial Development (CIDESI), Mexico*

Classification and pattern recognition

Bayside 106

Wednesday, May 26 (10:45AM - 12:30PM)

Chair: Phil Chapple, DSTO

False-Alarm Reduction In Mine Classification Using Multiple Looks From A Synthetic Aperture Sonar

Johannes Groen, *NATO Undersea Research Centre*

David Williams, *NATO Undersea Research Centre*

Enrique Coiras, *NATO Undersea Research Centre*

Detection Of Buried And Partially Buried Objects Using A Bio-Inspired Wideband Sonar

Chris Capus, *Heriot-Watt University, UK*

Yan Pailhas, *Heriot-Watt University, UK*

Keith Brown, *Heriot-Watt University, UK*

David Lane, *Heriot-Watt University, UK*

Featureless Classification For Active Sonar Systems

Mary Soules, *Johns Hopkins University Applied Physics Laboratory, USA*

Joshua Broadwater, *Johns Hopkins University Applied Physics Laboratory, USA*

Towards Generalized Benthic Species Recognition And Quantification Using Computer Vision

Adam Gobi, *Memorial University of Newfoundland, Canada*



WEDNESDAY 1:30PM – 3:15PM

Hydrography / seafloor mapping / geodesy

Bayside 101

Wednesday, May 26 (1:30PM - 3:15PM)

Co-Chairs: **Magnus Wettle**, *Geoscience Australia*

Jianhu Zhao, *School of Geodesy and
Geomatics, Wuhan University, China*

**Mapping The Fine-Scale Shallow Water Bathymetry
Of The Great Barrier Reef Using ALOS AVNIR-2 Data**

Stephen Sagar, *Geoscience Australia*

Magnus Wettle, *Geoscience Australia*

**Mapping The Coastal Bathymetry With FORMOSAT-2
Image**

Shih-Jen Huang, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Nan-Jung Kuo, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Chung-Ru Ho, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Cheng-Han Tsai, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Hsien-Wen Li, *Department of Civil Engineering and
Environmental Informatics, Minghsin University of Science
and Technology, Taiwan*

Yao-Tsai Lo, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Dong-Jiing Doong, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Hung-Jen Lee, *Department of Marine Environmental
Informatics, National Taiwan Ocean University*

Young-Zehr Kehr, *Department of Systems Engineering
and Naval Architecture, National Taiwan Ocean University*

**Evaluation Of An Off-The-Shelf Acoustic System For
Precision Positioning Of Seabed Transponders**

Hsin-Hung Chen, *National Sun Yat-sen University, Taiwan*

Chau-Chang Wang, *National Sun Yat-sen University,
Taiwan*

Jia-Pu Jang, *Taiwan Ocean Research Institute*



Software Development For The Determination And Transfer Of Chart Datum

Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan University, China*

Hao Ke, *School of Geodesy and Geomatics, Wuhan University, China*

Baohua Xu, *Survey Bureau of Hydrology and Water Resources of Changjiang Estuary, China*

Fengnian Zhou, *Survey Bureau of Hydrology and Water Resources of Changjiang Estuary, China*

Sonar signal processing 2

Bayside 102

Wednesday, May 26 (1:30PM - 3:15PM)

Chair: Peter Gough, *Acoustics Research Group, University of Canterbury, New Zealand*

Localisation And Tracking Of Underwater Acoustic Source Using A Modified Particle Filter

Dragana Carevic, *Defence Science & Technology Organisation, Australia*

Underwater Acoustic Sensor Localization Using A Broadband Sound Source In Uniform Linear Motion

Kam Lo, *Defence Science & Technology Organisation, Australia*

Brian Ferguson, *Defence Science & Technology Organisation, Australia*

Comparing Of LPC-EKF, LPC-UKF In UUV Bearings-Only Tracking Systems

Jin Xu, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Shenzhen Ren, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Xisheng Feng, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Changlong Lin, *Shenyang Institute of Automation, Chinese Academy of Sciences*

A Sweeper Scheme For Localization And Mobility Prediction In Under Water Acoustic Sensor Networks

Dharan Kuppusamy, *Vellore Institute of Technology, India*



Soo Park, *Kookmin University, South Korea*
Srimathi Chandhrasekaran, *Vellore Institute of
Technology, India*

**Passive Localization Of An Autonomous Underwater
Vehicle With Periodic Sonar Signaling**

Zhiguo Yang, *Zhejiang University, China*
Wen Xu, *Zhejiang University, China*
Zhuan Xiao, *Zhejiang University, China*
Xiang Pan, *Zhejiang University, China*

**Advances in integrated marine observing systems 2
Bayside 103**

Wednesday, May 26 (1:30PM - 3:15PM)

Chair: **Simon Allen**, *University of Tasmania*

**The Australian IMOS Southern Ocean Time Series
Facility**

Thomas Trull, *Antarctic Climate & Ecosystems Cooperative
Research Centre, Australia*
Eric Schulz, *Australian Bureau of Meteorology*
Stephen Bray, *Antarctic Climate & Ecosystems
Cooperative Research Centre, Australia*
Lindsay Pender, *CSIRO Marine & Atmospheric Research,
Australia*
Danny McLaughlan, *CSIRO Marine & Atmospheric
Research, Australia*
Bronte Tilbrook, *CSIRO Marine & Atmospheric Research,
Australia*
Mark Rosenberg, *Antarctic Climate & Ecosystems
Cooperative Research Centre, Australia*
Tim Lynch, *CSIRO Marine & Atmospheric Research,
Australia*

**The Lucinda Jetty Coastal Observatory's Role In
Satellite Ocean Colour Calibration And Validation For
Great Barrier Reef Coastal Waters.**

Vittorio Brando, *CSIRO Land & Water, Australia*
Rex Keen, *CSIRO Land & Water, Australia*
Paul Daniel, *CSIRO Land & Water, Australia*
Adam Baumeister, *CSIRO Land & Water, Australia*
Matt Nethery, *CSIRO Land & Water, Australia*
Henry Baumeister, *CSIRO Land & Water, Australia*



Aaron Hawdon, *CSIRO Land & Water, Australia*
Garry Swan, *CSIRO Land & Water, Australia*
Ross Mitchell, *CSIRO Marine & Atmospheric Research, Australia*
Susan Campbell, *CSIRO Marine & Atmospheric Research, Australia*
Thomas Schroeder, *CSIRO Land & Water, Australia*
Young Park, *CSIRO Land & Water, Australia*
Rebecca Edwards, *CSIRO Land & Water, Australia*
Andy Steven, *CSIRO Land & Water, Australia*
Simon Allen, *CSIRO Marine & Atmospheric Research, Australia*
Lesley Clementson, *CSIRO Marine & Atmospheric Research, Australia*
Arnold Dekker, *CSIRO Land & Water, Australia*

The Wave Glider, A Persistent Platform For Ocean Science

Justin Manley, *Liquid Robotics, USA*
Scott Willcox, *Liquid Robotics, USA*

Sustained Oceanographic Observations Around Australia Using Autonomous Ocean Gliders

Ben Hollings, *University of Western Australia*
Charitha Pattiaratchi, *University of Western Australia*
Mun Woo, *University of Western Australia*
Christine Hanson, *University of Western Australia*

Bright Blue: Advanced Technologies For Marine Environmental Monitoring And Offshore Energy

Richard Camilli, *Woods Hole Oceanographic Institution, USA*
Andrew Bowen, *Woods Hole Oceanographic Institution, USA*
Norman Farr, *Woods Hole Oceanographic Institution, USA*



Vehicle design 1

Bayside 104

Wednesday, May 26 (1:30PM - 3:15PM)

Co-Chairs: **Hayato Kondo**, *Tokyo University of Marine Science and Technology, Japan*

Yun Hae Kim, *Korea Maritime University*

Material Design Of Al/CFRP Hybrid Composites For The Hull Of Autonomous Underwater Vehicle

Yun Hae Kim, *Korea Maritime University*

Young dae Jo, *Korea Maritime University*

Sung youl Bae, *Korean Register of Shipping*

Seokjin Sin, *Korea Maritime University*

Kyung man Moon, *Korea Maritime University*

Min Jung Kim, *Korea Maritime University*

New Ceramic Pressure Hull Design For Deep Water Applications

Shinichi Takagawa, *Institute of Industrial Science, University of Tokyo, Japan*

Hull Form Design Of Underwater Vehicle Applying CFD

Tomoya Inoue, *Japan Agency for Marine-Earth Science and Technology*

Hiroyoshi Suzuki, *Osaka University, Japan*

Risa Kitamoto, *Osaka University, Japan*

Yoshitaka Watanabe, *Japan Agency for Marine-Earth Science and Technology*

Hiroshi Yoshida, *Japan Agency for Marine-Earth Science and Technology*

Pressure Tolerant Systems For Deep Sea Applications

Martin Lueck, *Department for Electromechanical and Optical Systems, Technical University Berlin, Germany*

Moritz Buscher, *Department for Electromechanical and Optical Systems, Technical University Berlin, Germany*

Heinz Lehr, *Department for Electromechanical and Optical Systems, Technical University Berlin, Germany*

Carl Thiede, *ENITECH Energietechnik-Elektronik GmbH, Germany*

Gerhard Körner, *ENITECH Energietechnik-Elektronik*



GmbH

Jochen Martin, *ENITECH Energietechnik-Elektronik GmbH*

Marion Schlichting, *ENITECH Energietechnik-Elektronik GmbH*

Siegfried Krüger, *Leibniz Institut for Baltic Sea Research Warnemünde, Germany*

Hartmut Huth, *Leibniz Institut for Baltic Sea Research Warnemünde, Germany*

Autonomic Element Based Architecture For Unmanned Underwater Vehicles

Changlong Lin, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Shenzhen Ren, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Xisheng Feng, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Yiping Li, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Jinbao Xu, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Signal coherence and fluctuation

Bayside 105

Wednesday, May 26 (1:30PM - 3:15PM)

Chair: **Adrian Jones**, *Defence Science & Technology Organisation, Australia*

Experimental Study Of The Space-Time Properties Of Acoustic Channels For Underwater Communications

Beatrice Tomasi, *University of Padova, Italy*

Giovanni Zappa, *NATO Undersea Research Centre*

Kim McCoy, *NATO Undersea Research Centre*

Paolo Casari, *University of Padova, Italy*

Michele Zorzi, *University of Padova, Italy*

Temporal Variation Of The Statistical Properties Of An Underwater Acoustic Channel Measured At A Shallow Water In 2009

Sea-Moon Kim, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*

Sung-Hoon Byun, *Maritime & Ocean Engineering Research Institute / Korea Ocean Research & Development Institute*

Seung-Geun Kim, *Maritime & Ocean Engineering Research*



Institute / Korea Ocean Research & Development Institute
Yong-Kon Lim, *Maritime & Ocean Engineering Research*
Institute / Korea Ocean Research & Development Institute

The High Frequency Underwater Acoustic Channel

Craig Benson, *University of New South Wales, Australia*
Timothy Hajenko, *University of New South Wales,*
Australia

**Improving Resolution And SNR Of Correlation
Function With The Increase In Bandwidth Of
Recorded Noise Fields During Estimation Of Bottom
Profile Of Ocean**

Md Jahangir Alam, *Australian Defence Force Academy*
Michael Frater, *Australian Defence Force Academy*
Elanor Huntington, *Australian Defence Force Academy*

**Marine optics technology and instrumentation
Bayside 106**

Wednesday, May 26 (1:30PM - 3:15PM)

Co-Chairs: John Watson, *University of Aberdeen*
David Farrant, *CSIRO Materials Science &*
Engineering, Australia

**Automated Three-Dimensional Measurement Method
Of In Situ Fish With A Stereo Camera**

Jun Han, *University of Tokyo, Japan*
Akira Asada, *University of Tokyo, Japan*
Hideyuki Takahashi, *National Research Institute of*
Fisheries Engineering, Japan
Kouichi Sawada, *National Research Institute of Fisheries*
Engineering, Japan

**A Combined Acoustic And Optical Instrument For
Fisheries Studies**

Matthew Sherlock, *CSIRO Marine & Atmospheric Research,*
Australia
Tim Ryan, *CSIRO Marine & Atmospheric Research,*
Australia
Rudy Kloser, *CSIRO Marine & Atmospheric Research,*
Australia



**The Low Distortion All-Around View System Using
The Fisheye Lens For An Underwater Vehicle**

Shojiro Ishibashi, *Japan Agency for Marine-Earth Science
and Technology*

**Evaluation Of Using A CCD Camera As A
Measurement System For Flume Tank Observation**

Chau-Chang Wang, *Institute of Applied Marine Physics and
Undersea Technology, National Sun Yat-sen University,
Taiwan*

Po-Chi Chen, *Taiwan Ocean Research Institute*

Hsin-Hung Chen, *Institute of Applied Marine Physics and
Undersea Technology, National Sun Yat-sen University,
Taiwan*

Wen-Li Chang, *Institute of Applied Marine Physics and
Undersea Technology, National Sun Yat-sen University,
Taiwan*

Ocean energy and offshore structures

Bayside 107

Wednesday, May 26 (1:30PM - 3:15PM)

Co-Chairs: **David Griffin**, *CSIRO Wealth from Oceans
Flagship, Australia*

Evan Zimmerman, *Delmar, USA*

**Ocean Power For Australia - Waves, Tides And
Ocean Currents**

David Griffin, *CSIRO Wealth from Oceans Flagship,
Australia*

Mark Hemer, *CSIRO Wealth from Oceans Flagship,
Australia*

**A Preliminary Analysis Of The Effect Of The Onset
Flow Structure On Tidal Turbine Blade Loads**

Ian Milne, *University of Auckland, New Zealand*

Rajnish Sharma, *University of Auckland, New Zealand*

Richard Flay, *University of Auckland, New Zealand*

Simon Bickerton, *University of Auckland, New Zealand*

**Progress In The Development Of A Multi-Mode Self-
Reacting Wave Energy Converter**

Lan Le-Ngoc, *Industrial Research Ltd, New Zealand*

Alister Gardiner, *Industrial Research Ltd, New Zealand*



Robert Stuart, *Industrial Research Ltd, New Zealand*
Alan Caughley, *Industrial Research Ltd, New Zealand*
John Huckerby, *Power Projects Ltd, New Zealand*

**Risk Management Of Moored Mobile Offshore
Drilling Units In The Western Pacific Ocean**

Evan Zimmerman, *Delmar, USA*
Daniel Alonso, *Delmar, USA*

WEDNESDAY 3.45PM – 5:30PM

Oceanography 2

Bayside 101

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: **Damian Ogburn**, *URS Australia*
Sirod Sirisup, *National Electronics and
Computer Technology Center, Thailand*

**Coastal Ocean Simulation Of The Gulf Of Thailand: A
Case Study Of Finite Volume Coastal Ocean Model**

Saifhon Tomkratoke, *National Electronics and Computer
Technology Center, Thailand*

Sirod Sirisup, *National Electronics and Computer
Technology Center, Thailand*

**Modeling Of Turbulence Prandtl Number In
Stationary And Homogeneous Stratified Turbulence**

Shinichiro Hirabayashi, *University of Tokyo, Japan*
Toru Sato, *University of Tokyo, Japan*

**Case Study Of Phytoplankton Blooms In Serangoon
Harbor Of Singapore**

Nicholas Patrikalakis, *Massachusetts Institute of
Technology, USA*

Paola Malanotte-Rizzoli, *Massachusetts Institute of
Technology, USA*

Pavel Tkalich, *National University of Singapore*

Wonjoon Cho, *Massachusetts Institute of Technology, USA*

Boon Hooi Ooi, *Singapore - MIT Alliance for Research and
Technology*

Haining Zheng, *Massachusetts Institute of Technology,
USA*

Kevin Yue, *Massachusetts Institute of Technology, USA*



Hanna Kurniawati, *Singapore - MIT Alliance for Research and Technology*

Palani Sundarambal, *Tropical Marine Science Institute, National University of Singapore*

My Ha Dao, *Tropical Marine Science Institute, National University of Singapore*

Roopsekhar Karanam, *Tropical Marine Science Institute, National University of Singapore*

Jun Wei, *Massachusetts Institute of Technology, USA*

Modeling Of The Climate And Anthropogenic Influences To The Eutro-Dynamics In Dapen Bay, Taiwan

Chia-Shun Yu, *National Sun Yat-sen University, Taiwan*

Pei-Hung Chen, *National Sun Yat-sen University, Taiwan*

Hau-Chen Yu, *National Sun Yat-sen University, Taiwan*

Mapping The Fish Fry Feeding Prism In A Saltmarsh-Estuary Ecotone

Damian Ogburn, *URS Australia*

Thomas Zeng, *Sydney University, Australia*

Underwater communications 4

Bayside 102

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: **Craig Benson**, *University of New South Wales, Australia*

Shengli Zhou, *University of Connecticut*

On The Effects Of Node Density And Duty Cycle On Energy Efficiency In Underwater Networks

Francesco Zorzi, *University of Padova, Italy*

Milica Stojanovic, *Northeastern University, USA*

Michele Zorzi, *University of Padova, Italy*

Optimizing Network Performance Through Packet Fragmentation In Multi-Hop Underwater Communications

Roberto Petrocchia, *La Sapienza, University of Rome, Italy*

Milica Stojanovic, *Northeastern University, USA*

Stefano Basagni, *Northeastern University, USA*

Chiara Petrioli, *La Sapienza, University of Rome, Italy*



COPE-MAC: A Contention-Based Medium Access Control Protocol With Parallel Reservation For Underwater Acoustic Networks

Zheng Peng, *University of Connecticut, USA*

Yibo Zhu, *University of Connecticut, USA*

Zhong Zhou, *University of Connecticut, USA*

Zheng Guo, *University of Connecticut, USA*

Jun-Hong Cui, *University of Connecticut, USA*

A Cooperative ARQ Scheme In Underwater Acoustic Sensor Networks

Ho-Shin Cho, *Kyungpook National University, Korea*

Jae Won Lee, *Kyungpook National University, Korea*

Jin Yong Cheon, *Kyungpook National University, Korea*

Opportunistic ARQ With Bidirectional Overhearing For Reliable Multihop Underwater Networking

Haojie Zhuang, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

Hwee-Pink Tan, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

Alvin Valera, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

Zijian Bai, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

Bioacoustics

Bayside 103

Wednesday, May 26 (3:45PM - 5:30PM)

Chair: **Douglas Cato**, *Defence Science & Technology Organisation / University of Sydney, Australia*

Classification Of A Large Collection Of Indo-Pacific Humpback Dolphin (*Sousa chinensis*) Whistles

Paul Seekings, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Kian Yeo, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Paul Chen, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Suranga Nanayakkara, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*



Jolyn Tan, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Petrina Tay, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Elizabeth Taylor, *Marine Mammal Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Automatic Discrimination Of Beaked Whale Clicks In Long Noisy Acoustic Time Series

Les Hamilton, *Defence Science & Technology Organisation, Australia*

Jane Cleary, *Defence Science & Technology Organisation, Australia*

Modelling Backscatter Of Marine Mammal Bio-Mimetic Sonar Signals From Bubble Clouds

Kian Yeo, *Tropical Marine Science Institute, National University of Singapore*

Elizabeth Taylor, *Tropical Marine Science Institute, National University of Singapore*

S Ong, *National University of Singapore*

Long-Term Real-Time Monitoring Of Free-Ranging Bottlenose Dolphins (*Tursiops truncatus*) In An Aquarium Using 5-Hydrophone Array System

Harumi Sugimatsu, *Institute of Industrial Science, University of Tokyo*

Tamaki Ura, *Institute of Industrial Science, University of Tokyo*

Junichi Kojima, *KDDI R&D Laboratories Inc., Japan*

hiroshi Shimura, *Izu Mito Sea Paradise Co., Ltd., Japan*

Kenji Maejima, *Izu Mito Sea Paradise Co., Ltd., Japan*

Koichi Kato, *Izu Mito Sea Paradise Co., Ltd., Japan*

Yuki Tahara, *Izu Mito Sea Paradise Co., Ltd., Japan*

Ayako Takahashi, *Izu Mito Sea Paradise Co., Ltd., Japan*

Shizuko Hiryu, *Doshisha University, Japan*

Emyo Fujioka, *Doshisha University, Japan*

Yoshiaki Watanabe, *Doshisha University, Japan*



Collaborative autonomous vehicles 1

Bayside 104

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: David Lane, *SeeByte Ltd, UK*

Michael Jakuba, *Australian Centre for Field Robotics, University of Sydney, Australia*

Collaborative Multi-Vehicle Localization And Mapping In Marine Environments

Diluka Moratuwage, *Nanyang Technological University, Singapore*

Wijerupage Wijesoma, *Nanyang Technological University, Singapore*

Bharath Kalyan, *Nanyang Technological University, Singapore*

Jun Dong, *Nanyang Technological University, Singapore*

P.G. Chaminda Senarathne, *Nanyang Technological University, Singapore*

Franz Hover, *Massachusetts Institute of Technology, USA*

Nicholas Patrikalakis, *Massachusetts Institute of Technology, USA*

Event-Based Motion Coordination Of Multiple Underwater Vehicles Under Disturbances

Pedro Teixeira, *Underwater Systems and Technologies Laboratory, Faculty of Engineering, University of Porto, Portugal*

Dimos Dimarogonas, *Massachusetts Institute of Technology, USA*

Karl Johansson, *Royal Institute of Technology, Sweden*

João Sousa, *Underwater Systems and Technologies Laboratory, Faculty of Engineering, University of Porto, Portugal*

Multi-AUV Coordination In The Underwater Environment With Obstacles

Yan Yang, *Tianjin University, China*

Shuxin Wang, *Tianjin University, China*

Zhiliang Wu, *Tianjin University, China*

Collision Free Formation Control For Multiple Autonomous Underwater Vehicles

Shibo Fan, *State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, China*



Zhengping FENG, *State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, China*

Lian LIAN, *State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, China*

A Low Cost Test Bed Of Underwater Mobile Sensing Network

Zhengping Feng, *Shanghai Jiao Tong University, China*

Guiyang Shang, *Shanghai Jiao Tong University, China*

Lian Lian, *Shanghai Jiao Tong University, China*

Automatic control

Bayside 105

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: **Chau-Chang Wang**, *Institute of Applied Marine Physics and Undersea Technology, National Sun Yat-sen University, Taiwan*

Nuno Cruz, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

Auto-Heading Controllers For An Autonomous Sailboat

Nuno Cruz, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

José Alves, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

A Sub-Region Tracking Control For An Underwater Vehicle-Manipulator System With A Sub-Task Objective

Zool Ismail, *School of Engineering and Physical Sciences, Heriot-Watt University, UK*

Matthew Dunnigan, *School of Engineering and Physical Sciences, Heriot-Watt University, UK*

Trajectory Tracking For Marine Vehicles Under Constant Disturbances: Controller Design And Tuning

Mernout Burger, *Norwegian University of Science and Technology*

Kristin Pettersen, *Norwegian University of Science and Technology*



Depth Control Of An Autonomous Underwater Vehicle, STARFISH

You Hong Eng, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*
Geok Soon Hong, *National University of Singapore*
Mandar Chitre, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

A Dynamic Compensation Mechanism For Contactless Power Transfer Systems

Wei Gu, *Shanghai Jiao Tong University, China*
Wangqiang Niu, *Shanghai Jiao Tong University, China*
Jianxin Chu, *Shanghai Jiao Tong University, China*
Jianhua Wang, *Shanghai Jiao Tong University, China*

Sonar imaging

Bayside 106

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: **Roy Hansen**, *Norwegian Defence Research Establishment*

Didier Gueriot, *Télécom Bretagne, France*

Forward Looking Sonar Data Simulation Through Tube Tracing

Didier Gueriot, *Télécom Bretagne, France*
Christophe SINTES, *Télécom Bretagne, France*

3D Reconstruction Of Underwater Scenes Using Image Sequences From Acoustic Camera

Naouraz Brahim, *Télécom Bretagne, France*
Didier Guériot, *Télécom Bretagne, France*
Sylvie Daniel, *Université Laval, Canada*

Study On The Fusion Of MBS Image And SSS Image

Hongmei Zhang, *Automation Department, Wuhan University, China*
Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan University, China*
Kun Yang, *Tianjin Research Institute For Water Transport Engineering, China*



**Study On Side Scan Sonar Image Matching Based
On The Integration Of Surf And Similarity
Calculation Of Typical Areas**

Jianhu Zhao, *Wuhan University, China*

Weiliang Tao, *Wuhan University, China*

Hongmei Zhang, *Wuhan University, China*

Kun Yang, *Tianjin Research Institute For Water Transport
Engineering, China*

On Methods Of Multi-Beam Data Error Correction

Yongting Wu, *School of Geodesy and Geomatics, Wuhan
University / First Institute of Oceanography, State
Oceanic Administration, China*

Yinan Chen, *First Institute of Oceanography, State
Oceanic Administration, China*

Kun Yang, *Tianjin Research Institute For Water Transport
Engineering, China*

Jisheng Ding, *Tianjin Research Institute For Water
Transport Engineering, China*

Qihua Tang, *Tianjin Research Institute For Water
Transport Engineering, China*

Marine safety

Bayside 107

Wednesday, May 26 (3:45PM - 5:30PM)

Co-Chairs: Etsuro Shimizu, *Tokyo University of
Marine Science and Technology, Japan*

Eiichi Kobayashi, *Kobe University, Japan*

**Basic Study On Construction Of Visual Evaluation
System For Safety Ship Navigation**

Hidenari Makino, *Kobe University, Japan*

Eiichi Kobayashi, *Kobe University, Japan*

Nobukazu Wakabayashi, *Kobe University, Japan*

Shigeaki Shiotani, *Kobe University, Japan*

**Navigator's Decision-Making And Action Model -
Synthetically Subjective Risk Of Collision**

Takashi Kubota, *Oshima National College of Maritime
Technology, Japan*

Nobuyoshi Kouguchi, *Faculty of Maritime Sciences, Kobe
University, Japan*



**Proposal Of New Generation Route Optimization
Technique For An Oceangoing Vessel**

Eriko Ishii, *Kobe University, Japan*

Eiichi KOBAYASHI , *Kobe University, Japan*

Takashi Mizunoe, *Kobe University, Japan*

Atsuo Maki, *Kobe University, Japan*

**Drift Track Simulations For Past Marine Incidents
Using SARMAP**

Tse-Nung Chu, *National Taiwan Ocean University*

Cheng-Hang Tsai, *National Taiwan Ocean University*

Field Observation On Actual Lightering Operations

Etsuro Shimizu, *Tokyo University of Marine Science and
Technology, Japan*

Egil Pedersen, *Norwegian University of Science and
Technology*

Yasunari Takano, *Tokyo University of Marine Science and
Technology, Japan*



Program Thursday 27 May

THURSDAY 8:30AM – 10:15AM

Naval architecture

Bayside 101

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: Daniel Rolland, *Alion Science and Technology, USA*

Shigeaki Shiotani, *Kobe University, Japan*

Measurement And Estimation Of Waves Generated By A Small Ship In Port

Shigeaki Shiotani, *Kobe University, Japan*

Hydrodynamic Forces And Moment Acting On A Submersible Surface Ship In Vertical Motion

Michio Ueno, *National Maritime Research Institute, Japan*

Yoshiaki Tsukada, *National Maritime Research Institute, Japan*

Hiroshi Sawada, *National Maritime Research Institute, Japan*

Reducing Bubble Sweepdown Effects On Research Vessels

Daniel Rolland, *Alion Science and Technology, USA*

Pamela Clark, *Alion Science and Technology, USA*

Propulsion System Considerations For Research Vessels

Daniel Rolland, *Alion Science and Technology, USA*

Pamela Clark, *Alion Science and Technology, USA*

Optimal Modeling Of Ship Moving

Inna Elyukhina, *South Ural State University, Russia*

Leonid Kholpanov, *Institute of Problems of Chemical Physics, Russian Academy of Science*

Albert Khomyakov, *Krylov Shipbuilding Research Institute, Russia*



Sonar signal processing 3

Bayside 102

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: **Douglas Abraham**, *CausaSci LLC, USA*
Christian de Moustier, *HLS Research, Inc., USA*

Uncertainty In Bearing Estimation With The Volume Search Sonar

Christian de Moustier, *HLS Research, Inc., USA*

Adaptive Motion-Compensated Temporal Filtering Of Sector Scan Sonar Image Sequences

Bin Shen, *Defence Science & Technology Organisation, Australia*

Stuart Perry, *Canon Information Systems Research Australia*

Donald Fraser, *Australian Defence Force Academy*

A Simulation Model Of The Pulse Echo Returns For A Short-Range SAS

Peter Gough, *Acoustics Research Group, University of Canterbury, New Zealand*

Michael HAYES, *Acoustics Research Group, University of Canterbury, New Zealand*

Simulation On Large Scale Of Acoustic Signals For Array Processing

Gerard Llord-Pujol, *Télécom Bretagne, France*

Christophe Sintès, *Télécom Bretagne, France*

Thierry Chonavel, *Télécom Bretagne, France*

Didier Guériot, *Télécom Bretagne, France*

René Garello, *Télécom Bretagne, France*

K-Rayleigh Mixture Model For Sparse Active Sonar Clutter

Douglas Abraham, *CausaSci LLC, USA*

James Gelb, *Applied Research Laboratories, University of Texas, USA*

Andrew Oldag, *Applied Research Laboratories, University of Texas, USA*



Advances in understanding of marine environments in the Western Pacific 1

Bayside 103

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: **Yusaku Kyojuka**, *Kyushu University, Japan*
Dong-Jiing Doong, *Department of Marine Environmental Informatics, National Taiwan Ocean University*

Laboratory Verification On Waveform Inversion Of An Internal Solitary Wave In The South China Sea

M.-H. Cheng, *Department of Marine Environment and Engineering, National Sun Yat-sen University, Taiwan*

John Hsu, *Department of Marine Environment and Engineering, National Sun Yat-sen University, Taiwan*

Numerical Simulation Of Tidal Currents Around Korea/Japan Strait And Application To Speed Trial

Hee-Su Lee, *Pusan National University, Korea*

Jong-Chun Park, *Pusan National University, Korea*

Dai-Hyun Choi, *Samsung Heavy Industries, Korea*

Se-min Jeong, *University of Tokyo, Japan*

Shigeru Tabeta, *University of Tokyo, Japan*

Shinichiro Hirabayashi, *University of Tokyo, Japan*

A Finite Element Model Of Propagation On The Southern And Western Australian Continental Shelf

Marcia Isakson, *Applied Research Laboratories, University of Texas, USA*

Nicholas Chotiros, *Applied Research Laboratories, University of Texas, USA*

Numerical Simulation Of Dispersion Of Volcanic CO₂ Seeped From Seafloor By Using Multi-Scale Ocean Model

Muneyasu Harata, *University of Tokyo, Japan*

Toru Sato, *University of Tokyo, Japan*

Shinichiro Hirabayashi, *University of Tokyo, Japan*

Numerical Simulation Of Tidal Currents Around Keelung Sill Off Northern Taiwan

Yao-Tsai Lo, *Department of Marine Environmental Informatics, National Taiwan Ocean University*



Cheng-Han Tsai, Department of Marine Environmental Informatics, National Taiwan Ocean University
Nan-Jung Kuo, Department of Marine Environmental Informatics, National Taiwan Ocean University
Chung-Ru Ho, Department of Marine Environmental Informatics, National Taiwan Ocean University
Dong-Jiing Doong, Department of Marine Environmental Informatics, National Taiwan Ocean University
Shih-Jen Huang, Department of Marine Environmental Informatics, National Taiwan Ocean University
Hung-Jen Lee, Department of Marine Environmental Informatics, National Taiwan Ocean University
Young-Zehr Kehr, Department of Systems Engineering and Naval Architecture, National Taiwan Ocean University

Autonomous underwater vehicles 4

Bayside 104

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: **Mike Eichhorn**, *National Research Council Canada*
Jose Mare, *ATSA Defence Services, Australia*

Path Following Algorithm For Minimally Specified Lawn-Mower Type AUV Missions

Jose Mare, *ATSA Defence Services, Australia*

Coverage Path Planning For Harbour Surveys Using An AUV

Chengle Fang, *University of Sydney, Australia*
Stuart Anstee, *Defence Science & Technology Organisation, Australia*

Path Planning Of Autonomous Underwater Vehicles For Optimal Environmental Sampling

Feng Sun, *Zhejiang University, China*
Wen Xu, *Zhejiang University, China*
Liling Jin, *Zhejiang University, China*
Jianlong Li, *Zhejiang University, China*



Path Planning For Gliders Using Regional Ocean Models: Application Of Pinzón Path Planner With The ESEOAT Model And The RU27 Trans-Atlantic Flight Data

Enrique Fernández-Perdomo, *University Institute of Sistemas Inteligentes y Aplicaciones Numéricas en Ingeniería (SIANI), Spain*

Jorge Cabrera-Gómez, *University Institute of Sistemas Inteligentes y Aplicaciones Numéricas en Ingeniería (SIANI), Spain*

Daniel Hernández-Sosa, *University Institute of Sistemas Inteligentes y Aplicaciones Numéricas en Ingeniería (SIANI), Spain*

Josep Isern-González, *University Institute of Sistemas Inteligentes y Aplicaciones Numéricas en Ingeniería (SIANI), Spain*

Antonio Domínguez-Brito, *University Institute of Sistemas Inteligentes y Aplicaciones Numéricas en Ingeniería (SIANI), Spain*

Alex Redondo, *Department of Biology, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain*

Josep Coca, *Department of Biology, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain*

Antonio Ramos, *Department of Biology, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain*

Enrique Álvarez Fanjul, *Organismo Público Puertos del Estado, Spain*

Marcos García Sotillo, *Organismo Público Puertos del Estado, Spain*

A Mission Planning System For The AUV "SLOCUM Glider" For The Newfoundland And Labrador Shelf

Mike Eichhorn, *National Research Council Canada*

Ralf Bachmayer, *Memorial University of Newfoundland, Canada*

Brad Young, *Memorial University of Newfoundland, Canada*

Christopher Williams, *Institute for Ocean Technology, National Research Council Canada*



**Data assimilation and information management
Bayside 105**

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: **David Griffin**, *CSIRO Wealth from Oceans
Flagship, Australia*

Nugzar Margvelashvili, *CSIRO Marine &
Atmospheric Research, Australia*

**Development Of Operational Data-Assimilating
Water Quality Modelling System For South-East
Tasmania**

Nugzar Margvelashvili, *CSIRO Marine & Atmospheric
Research, Australia*

Mike Herzfeld, *CSIRO Marine & Atmospheric Research,
Australia*

John Andrewartha, *CSIRO Marine & Atmospheric
Research, Australia*

Farhan Rizwi, *CSIRO Marine & Atmospheric Research,
Australia*

John Parslow, *CSIRO Marine & Atmospheric Research,
Australia*

Emlyn Jones, *CSIRO Marine & Atmospheric Research,
Australia*

Karen Wild-Allen, *CSIRO Marine & Atmospheric Research,
Australia*

**An Operational System For The Forecasting Of
Oceanographic Conditions In The Nazare Canyon
Area (W Portugal)**

Joao Vitorino, *Instituto Hidrografico, Portugal*

Sergio Larangeiro, *Instituto Hidrografico, Portugal*

Francisco Silva, *Instituto Hidrografico, Portugal*

José Pinto, *Instituto Hidrografico, Portugal*

Sara Almeida, *Instituto Hidrografico, Portugal*

**Software Development For The Determination Of
Instantaneous Height Of Transducer Based On The
Blend Of GPS Height And Heave**

Hongmei Zhang, *Automation Department, Wuhan
University, China*

Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan
University, China*

Baohua Xu, *Survey Bureau of Hydrology and Water
Resources of Changjiang Estuary, China*



WfSAT: A Web Based Fish Stock Assessment Tools For Generating Fish Statistical Population Information Using Fish Length Method

Mustafa Man, *Department of Computer Sciences, Universiti Malaysia Terengganu*

Mohammad Zaidi Zakaria, *Department of Fisheries Science and Aquaculture, Universiti Malaysia Terengganu*

Fakhrul Adli Mohd Zaki, *Department of Computer Science, Universiti Malaysia Terengganu*

SIDIF: Location Based Technique For Spatial Information Databases Integration Framework

Mustafa Man, *Department of Computer Sciences, Universiti Malaysia Terengganu*

Zailani Mohamed Sidek, *Universiti Teknologi Malaysia*

Md Yazid Mohd Saman, *Universiti Malaysia Terengganu*

Muhammad Zaidi Zakaria, *Universiti Malaysia Terengganu*

Systems and observatories 2

Bayside 106

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: Paulo de Souza, *Tasmanian Information & Communication Technologies Centre, Australia*

Arjuna Balasuriya, *Massachusetts Institute of Technology, USA*

Behavior-Based Planning And Prosecution Architecture For Autonomous Underwater Vehicles In Ocean Observatories

Arjuna Balasuriya, *Massachusetts Institute of Technology, USA*

Stephanie Petillo, *Massachusetts Institute of Technology, USA*

Henrik Schmidt, *Massachusetts Institute of Technology, USA*

Michael Benjamin, *Massachusetts Institute of Technology, USA*

Development Of Seafloor Geodetic Observation System Based On AUV And Submarine Cable Technologies

Masashi Mochizuki, *Institute of Industrial Science,*



University of Tokyo, Japan

Akira Asada, *Institute of Industrial Science, University of Tokyo, Japan*

Tamaki Ura, *Institute of Industrial Science, University of Tokyo, Japan*

Zengo Yoshida, *Institute of Industrial Science, University of Tokyo, Japan*

Kenichi Asakawa, *Japan Agency for Marine-Earth Science and Technology*

Takashi Yokobiki, *Japan Agency for Marine-Earth Science and Technology*

Ryoichi Iwase, *Japan Agency for Marine-Earth Science and Technology*

Tadanori Goto, *Graduate School of Engineering, Kyoto University, Japan*

Masayuki Fujita, *Hydrographic and Oceanographic Department, Japanese Coast Guard*

Mariko Sato, *Hydrographic and Oceanographic Department, Japanese Coast Guard*

Oscar Colombo, *Goddard Earth Sciences and Technology Center - University of Maryland / NASA, USA*

Teruki Tanaka, *SEA Corporation, Japan*

Hong Zheng, *SEA Corporation, Japan*

Kenji Nagahashi, *Underwater Engineering Department, Mitsui Engineering & Shipbuilding Co.,Ltd., Japan*

Acoustic Communications For Deep-Ocean Observatories: Results Of Initial Testing At The MBARI MARS Node

Lee Freitag, *Woods Hole Oceanographic Institution, USA*

Keenan Ball, *Woods Hole Oceanographic Institution, USA*

Peter Koski, *Woods Hole Oceanographic Institution, USA*

Sandipa Singh, *Woods Hole Oceanographic Institution, USA*

Eric Gallimore, *Woods Hole Oceanographic Institution, USA*

Marine Monitoring Using Fixed And Mobile Sensor Nodes

Paulo de Souza, *Tasmanian Information & Communication Technologies Centre, Australia*

Greg Timms, *Tasmanian Information & Communication Technologies Centre, Australia*

Andrew Davie, *Tasmanian Information & Communication Technologies Centre, Australia*



Ben Howell, *Tasmanian ICT Centre*

Stephen Giugni, *Tasmanian Information & Communication Technologies Centre, Australia*

Near-Optimal Collecting Data Strategy Based On Ordinary Kriging Variance

Xinke Zhu, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Jiancheng Yu, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Shenzhen Ren, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Xiaohui Wang, *Shenyang Institute of Automation, Chinese Academy of Sciences*

Marine radars and communications

Bayside 107

Thursday, May 27 (8:30AM - 10:15AM)

Co-Chairs: **Stuart Anderson**, *Defence Science & Technology Organisation, Australia*

Nobukazu Wakabayashi, *Kobe University, Japan*

On The Detection Of Marine Mammals With Ship-Borne Polarimetric Microwave Radar

Stuart Anderson, *Defence Science & Technology Organisation, Australia*

James Morris, *Defence Science & Technology Organisation, Australia*

X-Band Radar Derived Sea Surface Elevation Maps As Input To Ship Motion Forecasting

Konstanze Reichert, *OceanWaveS Pacific Ltd, New Zealand*

Jens Dannenberg, *OceanWaveS GmbH, Germany*

Henk van den Boom, *Maritime Research Institute, Netherlands*

Development Of Radar Simulator Software Using AIS Data For Ship Data

Nobukazu Wakabayashi, *Kobe University, Japan*

Hidenari Makino, *Kobe University, Japan*

Kenji Mori, *Kobe University, Japan*

Shigeaki Shiotani, *Kobe University, Japan*



Performance Study On Delay Tolerant Networks In Maritime Communication Environments

Hao-Min Lin, *Department of Computer Science and Information Engineering, National Taiwan University*

Yu Ge, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

Ai-Chun Pang, *Department of Computer Science and Information Engineering, National Taiwan University*

Jaya Pathmasuntharam, *Institute for Infocomm Research, Agency for Science, Technology & Research (A*STAR), Singapore*

A Theoretical Path Design For Long Range Over Ocean Microwave Links Using The Tropical Evaporation Duct

Andrew Kerans, *Australian Communications & Media Authority*

Andrew Kulesa, *Defence Science & Technology Organisation, Australia*

Graham Woods, *School of Engineering, James Cook University of North Queensland, Australia*

Andrew Clark, *Australian Communications & Media Authority*

THURSDAY 10:45AM – 12:30PM

Model based signal processing techniques

Bayside 101

Thursday, May 27 (10:45AM - 12:30PM)

Co-Chairs: **James Candy**, *Lawrence Livermore National Laboratory, USA*

Christophe Sintès, *Telecom-Bretagne*

Range-Dependent Acoustic Tomography By Oceanic Feature Modeling For The Monitoring Of Upwelling (Cabo Frio, Brazil)

Olivier Carrière, *Environmental Hydroacoustics Laboratory, Université libre de Bruxelles, Belgium*

Jean-Pierre Hermand, *Environmental Hydroacoustics Laboratory, Université libre de Bruxelles, Belgium*

Leandro Calado, *Marinha do Brasil - Instituto de Estudos do Mar Almirante Paulo Moreira, Brazil*

Ana de Paula, *Marinha do Brasil - Instituto de Estudos do Mar Almirante Paulo Moreira, Brazil*



Ison Almeida da Silveira, *Instituto Oceanográfico da Universidade de São Paulo, Brazil*

Virtual Time-Reversal Processing For Source Localization In Shallow Water

Tongwei Zhang, *Marine College, Northwestern Polytechnical University, China*

Kunde Yang, *Marine College, Northwestern Polytechnical University, China*

Yuanliang Ma, *Marine College, Northwestern Polytechnical University, China*

Model-Based Detection Of Radioactive Contraband For Harbor Defense Incorporating Compton Scattering Physics

James Candy, *Lawrence Livermore National Laboratory, USA*

David Chambers, *Lawrence Livermore National Laboratory, USA*

Eric Breitfeller, *Lawrence Livermore National Laboratory, USA*

Brian Guidry, *Lawrence Livermore National Laboratory, USA*

Jerome Verbeke, *Lawrence Livermore National Laboratory, USA*

Michael Axelrod, *Lawrence Livermore National Laboratory, USA*

Kenneth Sale, *Lawrence Livermore National Laboratory, USA*

Alan Meyer, *Lawrence Livermore National Laboratory, USA*

AUV Positioning Model Employing Acoustic And Visual Data Processing

Anton Myagotin, *Institute of Marine Technology Problems, Russian Academy of Science*

Igor Burdinsky, *Pacific National University, Russia*



Underwater communications 5

Bayside 102

Thursday, May 27 (10:45AM - 12:30PM)

Chair: Lee Freitag, *Woods Hole Oceanographic Institution, USA*

AquaTools: An Underwater Acoustic Networking Simulation Toolkit

Anuj Sehgal, *Jacobs University, Germany*

Iyad Tumar, *Jacobs University, Germany*

Jürgen Schönwälder, *Jacobs University, Germany*

Improved Estimation Procedure For Counting Neighbours In Underwater Networks

Md. Shafiuul Howlader, *Australian Defence Force Academy*

Michael Frater, *Australian Defence Force Academy*

Michael Ryan, *Australian Defence Force Academy*

A Scheduling Algorithm For Wireless Networks With Large Propagation Delays

Mandar Chitre, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Mehul Motani, *National University of Singapore*

Shiraz Shahabudeen, *Acoustic Research Laboratory, Tropical Marine Science Institute, National University of Singapore*

Choosing Packet Size In Multi-Hop Underwater Networks

Roberto Petrocchia, *La Sapienza, University of Rome, Italy*

Milica Stojanovic, *Northeastern University, USA*

Stefano Basagni, *Northeastern University, USA*

Chiara Petrioli, *La Sapienza, University of Rome, Italy*

An Integrated, Underwater Optical /Acoustic Communications System

Norman Farr, *Woods Hole Oceanographic Institution, USA*

Andrew Bowen, *Woods Hole Oceanographic Institution, USA*

Maurice Tivey, *Woods Hole Oceanographic Institution, USA*

Jonathan Ware, *Woods Hole Oceanographic Institution, USA*



Clifford Pontbriand, *Woods Hole Oceanographic Institution, USA*

Advances in understanding of marine environments in the Western Pacific 2

Bayside 103

Thursday, May 27 (10:45AM - 12:30PM)

Co-Chairs: **Toru Sato**, *University of Tokyo, Japan*

Beom-Soo Hyun, *Korea Maritime University*

Application Of The Wavelet Transform And Inverse Wavelet Transform To Analyze The Ocean Wave Signals From Data Buoys

Li-Chung Wu, *National Cheng Kung University, Taiwan*

Chia Chuen Kao, *National Cheng Kung University, Taiwan*

Dong-Jiing Doong, *National Taiwan Ocean University*

Searching For Freak Waves From In-Situ Buoy Measurements

Dong-Jiing Doong, *Department of Marine Environmental Informatics, National Taiwan Ocean University*

Li-Chung Wu, *National Cheng Kung University, Taiwan*

Infragravity Waves In The Hualien Harbor

Yi-Chung Yang, *National Taiwan Ocean University*

Cheng-Han Tsai, *National Taiwan Ocean University*

Heat Content And Steric Height Change In The Pacific Ocean

Takeshi Kawano, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Toshimasa Doi, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Shinya Kouketsu, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Hiroshi Uchida, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Masao Fukasawa, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Yoshimi Kawai, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*

Katsuro Katsumata, *Research Institute for Global Change, Japan Agency for Marine-Earth Science and Technology*



Estimation Of Exhaust Emissions Of Marine Traffic Using Automatic Identification System Data (Case Study: Madura Strait Area, Indonesia)

Trika Pitana, *Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia*

Eiichi Kobayashi, *Graduate School of Maritime Sciences, Kobe University, Japan*

Nobukazu Wakabayashi, *Graduate School of Maritime Sciences, Kobe University, Japan*

Vehicle navigation 3

Bayside 104

Thursday, May 27 (10:45AM - 12:30PM)

Chair: William Kirkwood, mbari

IMU-Aided Stereo Visual Odometry For Ground-Tracking AUV Applications

Marc Hildebrandt, *DFKI Bremen - Robotics Innovation Center, Germany*

Frank Kirchner, *DFKI Bremen - Robotics Innovation Center, Germany*

Long Range Acoustic Navigation Of Cruising AUV Based On Bearing Estimation

Yoshitaka Watanabe, *Japan Agency for Marine-Earth Science and Technology*

Hiroshi Ochi, *Japan Agency for Marine-Earth Science and Technology*

Takuya Shimura, *Japan Agency for Marine-Earth Science and Technology*

Takehito Hattori, *Nippon Marine Enterprises, Japan*

A Calibration Of SSBL Acoustic Positioning System In The Ocean

Takehito Hattori, *Tokyo University of Marine Science and Technology / Nippon Marine Enterprises, Ltd., Japan*

Yoshitaka Watanabe, *Japan Agency for Marine-Earth Science and Technology*

Hiroshi Ochi, *Japan Agency for Marine-Earth Science and Technology*

Takuya Shimura, *Japan Agency for Marine-Earth Science and Technology*



Accurate And Rapid Localization Of An AUV In An Absolute Reference Frame Using The Iterative Resection

Fanlin Yang, *Shandong University of Science and Technology, China*

Xiushan Lu, *Shandong University of Science and Technology, China*

Yamin Dang, *Chinese Academy of Surveying and Mapping*

Zhimin Liu, *Shandong University of Science and Technology, China*

Autonomous surface vehicles

Bayside 105

Thursday, May 27 (10:45AM - 12:30PM)

Co-Chairs: **Nuno Cruz**, *Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto), Portugal*

Chau-Chang Wang, *Institute of Applied Marine Physics and Undersea Technology, National Sun Yat-sen University, Taiwan*

Control Of Mini Autonomous Surface Vessel

Zulkifli Abidin, *Underwater Robotics Research Group (URRG), School of Electrical and Electronic Engineering, Universiti Sains Malaysia*

Mohd Rizal Arshad, *Underwater Robotics Research Group (URRG), School of Electrical and Electronic Engineering, Universiti Sains Malaysia*

Umi Kalthum Ngah, *Underwater Robotics Research Group (URRG), School of Electrical and Electronic Engineering, Universiti Sains Malaysia*

Ong Ping, *Underwater Robotics Research Group (URRG), School of Electrical and Electronic Engineering, Universiti Sains Malaysia*

Perimeter Patrol On Autonomous Surface Vehicles Using Marine Radar

Elena Oleynikova, *Franklin W. Olin College of Engineering, USA*

Nicole Lee, *Franklin W. Olin College of Engineering, USA*

Andrew Barry, *Franklin W. Olin College of Engineering, USA*

Joseph Holler, *Franklin W. Olin College of Engineering, USA*

David Barrett, *Franklin W. Olin College of Engineering, USA*



A Model Estimation And Multi-Variable Control Of An Unmanned Surface Vehicle With Two Fixed Thrusters

Jeong-Hong Park, *Korea Ocean Research & Development Institute*

Hyung-Won Shim, *Korea Ocean Research & Development Institute*

Bong-Huan Jun, *Korea Ocean Research & Development Institute*

Sea-Moon Kim, *Korea Ocean Research & Development Institute*

Pan-Mook Lee, *Korea Ocean Research & Development Institute*

Yong-Kon Lim, *Korea Ocean Research & Development Institute*

Nonlinear Modeling, Simulating And Experiment Of An Autonomous Surface Vehicle Driven By Twin Electric Thrusters

Jianhua Wang, *Shanghai Jiao Tong University, China*

Wei Gu, *Shanghai Jiao Tong University, China*

Jianxin Chu, *Shanghai Jiao Tong University, China*

Xixia Huang, *Shanghai Jiao Tong University, China*

Stereovision Aided Navigation Of An Autonomous Surface Vehicle

Jianhua Wang, *Shanghai Jiao Tong University, China*

Wei Gu, *Shanghai Jiao Tong University, China*

Jianxin Chu, *Shanghai Jiao Tong University, China*

Wangqian Niu, *Shanghai Jiao Tong University, China*

Anti-submarine warfare

Bayside 106

Thursday, May 27 (10:45AM - 12:30PM)

Chair: David Liebing, DSTO

Cooperative ASW At NURC - Moving Towards A Net-Centric Capability

Robert Been, *NATO Undersea Research Centre*

David Hughes, *NATO Undersea Research Centre*

John Potter, *NATO Undersea Research Centre*

Chris Strode, *NATO Undersea Research Centre*



Sensible Behaviour Strategies For AUVs In ASW Scenarios

David Hughes, *NATO Undersea Research Centre*

Stephanie Kemna, *NATO Undersea Research Centre*

Mike Hamilton, *NATO Undersea Research Centre*

Robert Been, *NATO Undersea Research Centre*

Improving Anti-Submarine Warfare Sonar Performance Modelling Using Range-Dependent BLUElink Forecast Environmental Data

Jarrad Exelby, *Defence Science & Technology Organisation, Australia*

Han Vu, *Defence Science & Technology Organisation, Australia*

Performance Assessment Of Sonar-System Networks For Anti-Submarine Warfare

Jane Thredgold, *Defence Science & Technology Organisation, Australia*

Matthew Fewell, *Defence Science & Technology Organisation, Australia*

Simon Lourey, *Defence Science & Technology Organisation, Australia*

Han Vu, *Defence Science & Technology Organisation, Australia*

Active Sonar Target Tracking For Anti-Submarine Warfare Applications

Jimmy Wang, *Defence Science & Technology Organisation, Australia*

Alice von Trojan, *Defence Science & Technology Organisation, Australia*

Simon Lourey, *Defence Science & Technology Organisation, Australia*



Marine geology and geophysics

Bayside 107

Thursday, May 27 (10:45AM - 12:30PM)

Co-Chairs: **Nicholas Chotiros**, *Applied Research Laboratories, University of Texas, USA*

Blair Thornton, *University of Tokyo, Japan*

The Development Of An Acoustic Probe To Measure The Thickness Of Ferro-Manganese Crusts

Blair Thornton, *University of Tokyo, Japan*

Tamaki Ura, *University of Tokyo, Japan*

Akira Asada, *University of Tokyo, Japan*

Katsumi Ohira, *Japan Probe Co. Ltd.*

Daigo Kirimura, *Link Laboratory Inc., Japan*

The Aquares Resistivity System, As An Exploration Tool For Rock Dredging Applications

Peteralv Brabers, *Demco NV, Belgium*

Jason Errey, *Demco NV, Australia*

Geomorphology And Tectonic Interpretation Of Zhujiang Submarine Canyon, In The Northern South China Sea

Xibin Han, *Second Institute of Oceanography, State Oceanic Administration, China*

Jiabiao Li, *Key Laboratory of Submarine Geosciences of SOA, China*

Fengyou Chu, *Key Laboratory of Submarine Geosciences of SOA, China*

Jun Li, *Key Laboratory of Submarine Geosciences of SOA, China*

Fanlin Yang, *Shandong University of Science and Technology, China*

Ocean Three Components Magnetometer For Seafloor Observatory

Xueting Zhang, *Zhejiang Univerisity, China*

Ying Chen, *Zhejiang Univerisity, China*

Chunyan Guan, *Hangzhou Dianzi University, China*



**Seismic Imaging Of Oceanic Crust Across The
Northwestern Subbasin, South China Sea**

Zhenli Wu, *Second Institute of Oceanography, State
Oceanic Administration, China*

Jiabiao Li, *Second Institute of Oceanography, State
Oceanic Administration, China*

Aiguo Ruan, *Second Institute of Oceanography, State
Oceanic Administration, China*

THURSDAY 1:30PM – 3:15PM

SAR / ocean color and hyperspectral measurements

Bayside 101

Thursday, May 27 (1:30PM - 3:15PM)

Chair: Roy Hughes, DSTO

**Global Change And Remote Sensing Of CDOM In
Arctic Coastal Waters**

Tiit Kutser, *Estonian Marine Institute, University of Tartu*

**Detection Of Coastal Bathymetry Using
Hyperspectral Imagery**

Enjie Jing, *Defence Science & Technology Organisation,
Australia*

Bisun Datt, *HyVista Corporation, Australia*

**Multi-Resolution Eddy Detection From Ocean Color
And Sea Surface Temperature Images**

Imen Karoui, *French Research Institute for Exploitation of
the Sea*

HERVE CHAURIS, *Centre de Géosciences, MINES-
ParisTech, France*

PIERRE GARREAU, *French Research Institute for
Exploitation of the Sea*

Phillipe Craneguy, *Actimar, France*

**Comparison Of Ship Detectors For Polarimetric SAR
Imagery**

David Crisp, *Defence Science & Technology Organisation,
Australia*

Thomas Keevers, *Defence Science & Technology
Organisation, Australia*



**InSAR Kalman Filter Phase Unwrapping Algorithm
Based On Topographic Factors**

Guolin Liu, *Shandong University of Science and
Technology, China*

Huadong Hao, *Shandong University of Science and
Technology, China*

Yamin Dang, *Chinese Academy of Surveying and Mapping*

Fanlin Yang, *Shandong University of Science and
Technology, China*

Man Yan, *Shandong University of Science and
Technology, China*

Zhixing Du, *Shandong University of Science and
Technology, China*

Underwater communications 6

Bayside 102

Thursday, May 27 (1:30PM - 3:15PM)

Co-Chairs: **Mandar Chitre**, *Acoustic Research
Laboratory, Tropical Marine Science
Institute, National University of Singapore*

Yahong Zheng, *Missouri University of
Science and Technology, USA*

**Data Driven Algorithms To Tune Physical Layer
Parameters Of An Underwater Communication Link**

Satish Shankar, *Acoustic Research Laboratory, Tropical
Marine Science Institute, National University of Singapore*

Mandar Chitre, *Acoustic Research Laboratory, Tropical
Marine Science Institute, National University of Singapore*

Melani Jayasuriya, *Department of Electrical and Computer
Engineering, National University of Singapore*

**The Performance Analysis Of Diversity Technologies
For Underwater Moving Channel Environments
Using Experimental Data**

Hak-Lim Ko, *Hoseo University, Korea*

Min-Sang Kim, *Hoseo University, Korea*

Seung-goo Lee, *Hoseo University, Korea*

Jae-Hoon Jung, *Hoseo University, Korea*

Jong-Won Park, *Maritime & Ocean Engineering Research
Institute, Korea*

Yong-Kon Lim, *Maritime & Ocean Engineering Research
Institute, Korea*



Capacity Analysis Of Underwater Acoustic MIMO Communications

Pierre-Jean Bouvet, *Underwater Acoustics Lab, Institut Supérieur de l'Electronique et du Numerique Brest, France*

Alain LouSSERT, *Underwater Acoustics Lab, Institut Supérieur de l'Electronique et du Numerique Brest, France*

Turbo Detection For Mobile MIMO Underwater Acoustic Communications

Jun Tao, *University of Missouri - Columbia, USA*

Yahong Zheng, *Missouri University of Science and Technology, USA*

Chengshan Xiao, *Missouri University of Science and Technology, USA*

Bandwidth-Efficient Frequency-Domain Equalization For MIMO Underwater Acoustic Communications

Jian Zhang, *Missouri University of Science and Technology, USA*

Yahong Zheng, *Missouri University of Science and Technology, USA*

Advances in integrated marine observing systems 3 Bayside 103

Thursday, May 27 (1:30PM - 3:15PM)

Chair: **Simon Allen**, *University of Tasmania*

Automated Assessment Of Data Quality In Marine Sensor Networks

Greg Timms, *Tasmanian Information & Communication Technologies Centre, Australia*

Paulo de Souza, *Tasmanian Information & Communication Technologies Centre, Australia*

Leon Reznik, *Department of Computer Sciences, Rochester Institute of Technology, USA*

Autonomous Adaptive Environmental Assessment And Feature Tracking Via Autonomous Underwater Vehicles

Stephanie Petillo, *Massachusetts Institute of Technology, USA*

Arjuna Balasuriya, *Massachusetts Institute of Technology, USA*

Henrik Schmidt, *Massachusetts Institute of Technology,*



USA

Autonomous Profiling Glider Observations In Storm Bay

Farhan Rizwi, *Marine and Atmospheric Research, CSIRO, Australia*

Lindsay MacDonald, *Marine and Atmospheric Research, CSIRO, Australia*

Karen Wild-Allen, *Marine and Atmospheric Research, CSIRO, Australia*

Emlyn Jones, *Marine and Atmospheric Research, CSIRO, Australia*

The Integrated Marine Observing System: Delivering Data-Streams To Support Marine Research And Applications.

Roger Proctor, *Integrated Marine Observing System, University of Tasmania, Australia*

Tim Moltmann, *Integrated Marine Observing System, University of Tasmania, Australia*

Katy Hill, *Integrated Marine Observing System, University of Tasmania, Australia*

Marian McGowen, *Integrated Marine Observing System, University of Tasmania, Australia*

A Framework For Marine Sensor Network & Autonomous Vehicle Interaction

Matthew Dunbabin, *CSIRO Information & Communication Technologies, Australia*

Peter Corke, *Queensland University of Technology, Australia*

Vehicle design 2

Bayside 104

Thursday, May 27 (1:30PM - 3:15PM)

Co-Chairs: **Hayato Kondo**, *Tokyo University of Marine Science and Technology, Japan*

Ji-Hong Li, *Pohang Institute of Intelligent Robotics, Korea*

Development Of An Intelligent Autonomous Underwater Vehicle, P-SURO

Ji-Hong Li, *Pohang Institute of Intelligent Robotics, Korea*

Byung-Ho Yoon, *Pohang Institute of Intelligent Robotics, Korea*



Seung-Sub Oh, *Pohang Institute of Intelligent Robotics, Korea*

Jung-San Cho, *Pohang Institute of Intelligent Robotics, Korea*

Jong-Geol Kim, *Pohang Institute of Intelligent Robotics, Korea*

Mun-Jik Lee, *Pohang Institute of Intelligent Robotics, Korea*

Jung-Woo Lee, *Pohang Institute of Intelligent Robotics, Korea*

Biomimetic Mechanical Design For Soft-Bodied Underwater Vehicles

Maria Fiazza, *University of Verona, Italy*

Taavi Salumäe, *Center for Biorobotics, Tallinn University of Technology, Estonia*

Guntis Kulikovskis, *Department of Theoretical Mechanics, Riga Technical University, Latvia*

Robert Templeton, *University of Bath, UK*

Otar Akanyeti, *University of Verona, Italy*

William Megill, *University of Bath, UK*

Paolo Fiorini, *University of Verona, Italy*

Maarja Kruusmaa, *Center for Biorobotics, Tallinn University of Technology, Estonia*

Madis Listak, *Tallinn University of Technology, Estonia*

Terramechanics Based Traction Control Of Underwater Wheeled Robot

Tjasa Boh, *University of Southern Queensland, Australia*

John Billingsley, *University of Southern Queensland, Australia*

Robin Bradbeer, *City University, Hong Kong*

Paul Hodgson, *City University, Hong Kong*

On Fault-Tolerant Control Of A Hovering AUV With Four Horizontal And Two Vertical Thrusters

Jin-Kyu Choi, *Tokyo University of Marine Science and Technology, Japan*

Hayato Kondo, *Tokyo University of Marine Science and Technology, Japan*

Design And Concept Of A Biointeractive Autonomous Underwater Vehicle "BA-1"

Hayato Kondo, *Tokyo University of Marine Science and*



Technology, Japan

Kenji Nakane, *Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

Etsuro Shimizu, *Tokyo University of Marine Science and Technology, Japan*

Jin-Kyu Choi, *Tokyo University of Marine Science and Technology, Japan*

Kenji Nagahashi, *Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

Masakazu Matsushima, *Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

Yasunori Nishida, *Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

Takafumi Arimoto, *Tokyo University of Marine Science and Technology, Japan*

Yoshinori Miyamoto, *Tokyo University of Marine Science and Technology, Japan*

Kazuo Amakasu, *Tokyo University of Marine Science and Technology, Japan*

Makoto Endo, *Tokyo University of Marine Science and Technology, Japan*

Ryosuke Matsui, *Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

Array signal processing and array design 2

Bayside 105

Thursday, May 27 (1:30PM - 3:15PM)

Chair: Michael Clark, *Thales*

Calibration Uncertainty Of Assembled Array Hydrophones

Yujin Gao, *Thales, Australia*

Peter Harvey, *Thales, Australia*

Patrick Cooper, *Thales, Australia*

Paul Bake, *Thales, Australia*

Fiber Laser Sensor Hydrophone Performance

Ian Bedwell, *Thales, Australia*

Dave Jones, *Thales, Australia*

Improved Noise Performance Of A DFB Fibre Laser Sonar Array Using A Frequency Reference

Andrew Michie, *University of Sydney, Australia*

David Jones, *Thales, Australia*



David Wang, *University of Sydney, Australia*

David Mann, *Thales, Australia*

Mattias Aslund, *University of Sydney, Australia*

Simon Fleming, *University of Sydney, Australia*

John Canning, *University of Sydney, Australia*

Antenna Design And Performance Assessment For Fast High Resolution Sonar Imaging Using High Bandwidth Transducers And Frequency Domain Compounding

Franzjosef Becker, *Fraunhofer Institute for Biomedical Technology, Germany*

Christian Degel, *Fraunhofer Institute for Biomedical Technology, Germany*

Heinrich Fonfara, *Fraunhofer Institute for Biomedical Technology, Germany*

Holger Hewener, *Fraunhofer Institute for Biomedical Technology, Germany*

Hansjoachim Welsch, *Fraunhofer Institute for Biomedical Technology, Germany*

Steffen Tretbar, *Fraunhofer Institute for Biomedical Technology, Germany*

Marc Fournelle, *Fraunhofer Institute for Biomedical Technology, Germany*

Robert Lemor, *Fraunhofer Institute for Biomedical Technology, Germany*

Spatio-Temporal Signal Twice-Whitening Algorithms On The hx3100 Ultra-Low Power Multicore Processor

Travis Humble, *Oak Ridge National Laboratory, USA*

Pramita Mitra, *University of Notre Dame, USA*

Bryan Schleck, *Coherent Logix, USA*

Jacob Barhen, *Oak Ridge National Laboratory, USA*

John Polcari, *Science Applications International Corporation, USA*

Michael Traweek, *Office of Naval Research, USA*



Maritime security and harbour protection

Bayside 106

Thursday, May 27 (1:30PM - 3:15PM)

Chair: Alan Theobald, *DSTO*

Using Collaborative Autonomous Vehicles In Mine Countermeasures

Vladimir Djapic, *NATO Undersea Research Centre*

Dula Nad, *University of Zagreb, Croatia*

Autonomy For Operational MCM AUVs, Based On High Resolution Sonar

Nicolas Mandelert, *Thales Underwater Systems, France*

Julien Ferrand, *Thales Underwater Systems, France*

Patrick Cooper, *Thales, Australia*

Cooperative Autonomy For Contact Investigation

Toby Schneider, *Massachusetts Institute of Technology, USA*

Henrik Schmidt, *Massachusetts Institute of Technology, USA*

Thomas Pastore, *NATO Undersea Research Centre*

Michael Benjamin, *Naval Undersea Warfare Centre, USA*

Towards The Use Of A Team Of USVs For Civilian Harbour Protection: The Problem Of Intercepting Detected Menaces

Alessio Turetta, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Giuseppe Casalino, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Enrico Simetti, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Matteo Cresta, *Selex Sistemi Integrati, Italy*

Operational Experiences For Maritime Homeland Security Operations

Alastair Cormack, *SeeByte Ltd, UK*

David Lane, *SeeByte Ltd, UK*

Jon Wood, *SeeByte Ltd, UK*



Sustainable energy in East Asia

Bayside 107

Thursday, May 27 (1:30PM - 3:15PM)

Co-Chairs: **Beom-Soo Hyun**, *Korea Maritime University*

Toru Sato, *University of Tokyo, Japan*

Current Status And Future Prospects Of Electric Generators Using Electroactive Polymer Artificial Muscle

Seiki Chiba, *SRI International, USA*

Mikio Waki, *Hyperdrive Corporation, Japan*

Koichi Masuda, *Nihon University, Japan*

Tomoki Ikoma, *Nihon University, Japan*

A Wave Focusing Device For OWC Wave Energy Converter

Beom-Soo Hyun, *Korea Maritime University*

Zhen Liu, *Ocean University of China*

JiYuan Jin, *Korea Maritime University*

Yong Hyeon Choi, *Korea Maritime University*

Hongda Shi, *Ocean University of China*

Qin Zhang, *Ocean University of China*

A Pilot Project On Ocean Energy Generation By Tidal Currents On The Northern Coast Of Taiwan

Cheng-Han Tsai, *National Taiwan Ocean University*

Dong-Jiing Doong, *National Taiwan Ocean University*

Young-Zehr Kehr, *National Taiwan Ocean University*

Hsien-Wen Li, *Minghsin University of Science and Technology, Taiwan*

Chung-Ru Ho, *National Taiwan Ocean University*

Nan-Jung Kuo, *National Taiwan Ocean University*

Shih-Jen Huang, *National Taiwan Ocean University*

Yao-Tsai Lo, *National Taiwan Ocean University*

Hung-Jen Lee, *National Taiwan Ocean University*

A Study On An Experiment Of Behavior Of A Spar Type Offshore Wind Turbine Considering Rotation Of Wind Turbine Blades

Motohiko Murai, *Yokohama National Universtity, Japan*

Ryuji Nishimura, *Yokohama National Universtity, Japan*



Mitigation Of Environmental Impact Of Power-Plant Discharge By Use Of Ocean Thermal Energy Conversion System

Hyeon-Ju Kim, *Korea Ocean Research & Development Institute*

Ho-Saeng Lee, *Korea Ocean Research & Development Institute*

Seung-Won Lee, *Korea Ocean Research & Development Institute*

Dong-Ho Jung, *Korea Ocean Research & Development Institute*

Deok-Soo Moon, *Korea Ocean Research & Development Institute*

THURSDAY 3:45PM – 5:30PM

Underwater communications 7

Bayside 102

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: **Saman Abeysekera**, *Nanyang Technological University, Singapore*

Pierre-Jean Bouvet, *Underwater Acoustics Lab, Institut Supérieur de l'Electronique et du Numerique Brest, France*

Frequency-Domain Channel Estimation For Nonlinear Multicarrier Underwater Communication Systems

Ching-Hsiang Tseng, *Department of Electrical Engineering, National Taiwan Ocean University*

Chin-Feng Lin, *Department of Electrical Engineering, National Taiwan Ocean University*

Fu-Sheng Lu, *Department of Electrical Engineering, National Taiwan Ocean University*

Hsien-Sen Hung, *Department of Electrical Engineering, National Taiwan Ocean University*

Tzong-Dar Wu, *Department of Electrical Engineering, National Taiwan Ocean University*

Hoang-Yang Lu, *Department of Electrical Engineering, National Taiwan Ocean University*

Shun-Hsyung Chang, *Department of Electrical Engineering, National Taiwan Ocean University*



Dynamic Compact Control Language: A Compact Marshalling Scheme For Acoustic Communications

Toby Schneider, *Massachusetts Institute of Technology, USA*

Henrik Schmidt, *Massachusetts Institute of Technology, USA*

Virtual Unequal Error Protection In Underwater Image Transmission

Laura Toni, *Italian Institute of Technology*

Lorenzo Rossi, *Italian Institute of Technology*

Nazim Agoulmine, *LRSM, University of Evry, Val d'Essonne, France*

Jean Guy Fontaine, *Italian Institute of Technology*

Robust Discrete Fourier Transform Based Receivers For Continuous Phase Modulation

Saman Abeysekera, *Nanyang Technological University, Singapore*

Wen Wang, *Nanyang Technological University, Singapore*

Buoy technology

Bayside 103

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: **Lindsay Pender**, *CSIRO Marine & Atmospheric Research, Australia*

David Hughes, *CSIRO Marine & Atmospheric Research, Australia*

A Robust Satellite Telemetry System For IMOS Moorings

David Hughes, *CSIRO Marine & Atmospheric Research, Australia*

Tim Lynch, *CSIRO Marine & Atmospheric Research, Australia*

Lindsay Pender, *CSIRO Marine & Atmospheric Research, Australia*

Matthew Sherlock, *CSIRO Marine & Atmospheric Research, Australia*



An Anchor Mooring Profile Monitoring Buoy Based On Underwater Non-Contact Wireless Communication

Jing Liu, *Wuhan University of Technology, China*

Guang Zhang, *Wuhan University of Technology, China*

Hai Yu, *School of Electronics & Information, Hangzhou Dianzi University, China*

Xue Zhang, *School of Electronics & Information, Hangzhou Dianzi University, China*

Design And Application Of Buoy System For On-The-Fly Observation Of Surface Current In Closure Water Area

Yuliang Gu, *Qingcao Sha Investment and Construction Corporation Ltd., China*

Fengnian Zhou, *Survey Bureau of Hydrology and Water Resources of Changjiang Estuary, China*

Baohua Xu, *Survey Bureau of Hydrology and Water Resources of Changjiang Estuary, China*

Jianhu Zhao, *School of Geodesy and Geomatics, Wuhan University, China*

Pulse - A Mooring For Mixed Layer Measurements In The Open Ocean And Extreme Weather

Lindsay Pender, *CSIRO Marine & Atmospheric Research, Australia*

Tom Trull, *CSIRO Marine & Atmospheric Research, Australia*

Danny McLaughlan, *CSIRO Marine & Atmospheric Research, Australia*

Tim Lynch, *CSIRO Marine & Atmospheric Research, Australia*

CDS-Based Coverage Control Algorithm For Buoys Based Sensor Networks

Wenyu Cai, *Hangzhou Dianzi University, China*

Jing-Biao Liu, *Hangzhou Dianzi University, China*

Xue-Ting Zhang, *Zhejiang University, China*



Collaborative autonomous vehicles 2

Bayside 104

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: **Vladimir Djapic**, *NATO Undersea Research Centre*

Ryan Smith, *University of Southern California, USA*

Cooperative Multi-AUV Tracking Of Phytoplankton Blooms Based On Ocean Model Predictions

Ryan Smith, *University of Southern California, USA*

Jnaneshwar Das, *University of Southern California, USA*

Yi Chao, *Jet Propulsion Laboratory, California Institute of Technology, USA*

David Caron, *University of Southern California, USA*

Burton Jones, *University of Southern California, USA*

Gaurav Sukhatme, *University of Southern California, USA*

Chemical Plume Source Localization With Multiple Autonomous Underwater Vehicles

Bernardo Maciel, *Underwater Systems and Technologies Laboratory, Faculty of Engineering, University of Porto, Portugal*

João Sousa, *Underwater Systems and Technologies Laboratory, Faculty of Engineering, University of Porto, Portugal*

Fernando Pereira, *Underwater Systems and Technologies Laboratory, Faculty of Engineering, University of Porto, Portugal*

Measurement Of Magnetic Field Using Collaborative AUVs

Jesse Pentzer, *University of Idaho, USA*

Brendan Crosbie, *University of Idaho, USA*

Jim Frenzel, *Center for Intelligent Systems Research, University of Idaho, USA*

John Canning, *Center for Intelligent Systems Research, University of Idaho, USA*

Thomas Bean, *Center for Intelligent Systems Research, University of Idaho, USA*

Michael Anderson, *Department of Mechanical Engineering, University of Idaho, USA*

Dean Edwards, *Center for Intelligent Systems Research, University of Idaho, USA*



Cooperative Autonomous Underwater Vehicle Localization

Marcelo Nogueira, *Faculdade de Engenharia da Universidade do Porto, Portugal*

João Sousa, *Faculdade de Engenharia da Universidade do Porto, Portugal*

Fernando Manuel Pereira, *Faculdade de Engenharia da Universidade do Porto, Portugal*

RT2: A Real-Time Ray-Tracing Method For Acoustic Distance Evaluations Among Cooperating AUVs

Giuseppe Casalino, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Andrea Caiti, *Department of Electrical Systems and Automation, University of Pisa, Italy*

Alessio Turetta, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Enrico Simetti, *Department of Communication Computer and System Sciences, University of Genova, Italy*

Data visualization and information management Bayside 105

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: **Kate Beard**, *University of Maine, USA*

Scott Bainbridge, *Australian Institute of Marine Science*

The Design Of A Novel Time Series Client For Ocean Data.

Scott Bainbridge, *Australian Institute of Marine Science*

Development Of The Red Sea Biogeographic Information System

Fahmi Machda, *King Abdullah University of Science and Technology, Saudi Arabia*

Norú Ichim-Moreno, *King Abdullah University of Science and Technology, Saudi Arabia*

Chandra Prasetyo, *King Abdullah University of Science and Technology, Saudi Arabia*

Christian Voolstra, *King Abdullah University of Science and Technology, Saudi Arabia*



Extracting Valuable Information From A Simultaneous Visualization Of Science And Engineering Data Obtained With An Autonomous Underwater Vehicle

Robert Robinson, *School of Computing and Information Systems, University of Tasmania, Australia*

Paulo de Souza, *Tasmanian Information & Communication Technologies Centre, Australia*

Andrew Davie, *Tasmanian Information & Communication Technologies Centre, Australia*

The EventViewer: A Tool For Visualizing And Exploring Events Extracted From Ocean Observing System Data

Kate Beard, *University of Maine, USA*

Heather Deese, *Island Institute, USA*

Neal Pettigrew, *University of Maine, USA*

Jake Emerson, *University of Maine, USA*

**Sonar and transducers / oceanographic sensors
Bayside 106**

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: Kenichi Asakawa, *Japan Agency for Marine-Earth Science and Technology*

Paul Macoun, *VENUS Facility, University of Victoria, Canada*

Long-Term Stability Of A New Conductivity-Temperature Sensor Tested On The VENUS Cabled Observatory

Tomohiro Horiuchi, *Rockland Oceanographic Services Inc., Canada*

Fabian Wolk, *Rockland Oceanographic Services Inc., Canada*

Paul Macoun, *VENUS Facility, University of Victoria, Canada*

A Pressure-Neutral Acoustic Transmit Receive Module (PR-TRM) With Integrated Data Processing For Deep Sea Applications

Matthias Molitor, *Fraunhofer Institute for Biomedical Technology, Germany*

Manfred Moses, *Fraunhofer Institute for Biomedical Technology, Germany*



Marc Schmieger, *Fraunhofer Institute for Biomedical Technology, Germany*

Olaf Walter, *Fraunhofer Institute for Biomedical Technology, Germany*

Peter Weber, *Fraunhofer Institute for Biomedical Technology, Germany*

Robert Lemor, *Fraunhofer Institute for Biomedical Technology, Germany*

Modeling And Theoretical Characterization Of Circular pMUT For Immersion Applications

Mohd Ikhwan Hadi Yaacob, *Universiti Sains Malaysia*

Mohd Rizal Arshad, *Universiti Sains Malaysia*

Asrulnizam Abd Manaf, *Universiti Sains Malaysia*

Standard Target Calibration Of Broad-Band Active Sonar Systems In A Laboratory Tank

Alan Islas-Cital, *University of Birmingham, UK*

Philip Atkins, *University of Birmingham, UK*

Kae Foo, *University of Birmingham, UK*

Evaluation Of Small Models Of Ceramic Housings For 11,000m Ocean Bottom Seismometers

Kenichi Asakawa, *Japan Agency for Marine-Earth Science and Technology*

Makoto Ito, *Nippon Marine Enterprises, Ltd., Japan*

Tadahiro Hyakudome, *Japan Agency for Marine-Earth Science and Technology*

**Marine environmental engineering in East Asia
Bayside 107**

Thursday, May 27 (3:45PM - 5:30PM)

Co-Chairs: **Dong-Jiing Doong**, *Department of Marine Environmental Informatics, National Taiwan Ocean University*

Yusaku Kyojuka, *Kyushu University, Japan*

A Feasibility Study On The Water Quality Improvement By Making Use Of Underground Water In Hakata Bay

Yusaku Kyojuka, *Kyushu University, Japan*

Yasufumi Uchida, *Kyushu University, Japan*

Ayano Kudoh, *Kyushu University, Japan*



Shigeyasu Kawaguchi, *Hakata-wan Kankyou Seibi Co., Ltd, Japan*

Assessment Of Environmental Restoration Plans For A Small-Scale Beach By Simulation-Based Habitat Evaluation

Shigeru Tabeta, *University of Tokyo, Japan*

Rikito Hisamatsu, *University of Tokyo, Japan*

Impact Of River Discharge On Surface Water Variability In Amagasaki Port, Japan

Ryoichi Yamanaka, *University of Tokushima, Japan*

Yasunori Kozuki, *University of Tokushima, Japan*

Machi Miyoshi, *Tokushima Bunri University, Japan*

Fumiko Nogami, *University of Tokushima, Japan*

Treatment Of Waste Seawater By Electrolysis Using Charcoal Electrodes

Daisuke Kitazawa, *Institute of Industrial Science, University of Tokyo, Japan*

Masatoshi Fujino, *Institute of Industrial Science, University of Tokyo, Japan*

Shunsuke Aoba, *Graduate School of Engineering, The University of Tokyo, Japan*



Exhibitors and Patrons

ATSA Defence Services

Contact: Jenny Taylor

Website: www.saabgroup.com

Email: jenny.taylor@atsa.com.au

Phone: +61 2 4964 3500

Booth: 37

SUS provides underwater systems for defence, offshore industry and civil security. By integrating long-standing traditions with the latest advances in underwater technology, we meet our customers needs and requirements, both on and under the surface.

Australian Hydrographic Service

Contact: Melinda McMullen

Website: www.hydro.gov.au

Email: melinda.mcmullen@defence.gov.au

Phone: +61 2 4223 6665

Booth: 35

The Australian Hydrographic Service - the national charting authority for hydrographic standards and services including provision of official nautical charts and publications to support safe navigation.

CSIRO

Contact: Nancy Jensen

Website: www.csiro.au

Email: Nancy.Jensen@csiro.au

Phone: + 61 2 9490 8467

Booth: 18

CSIRO is Australia's national science agency, with ~6,000 staff. Our science includes oceans, climate, energy, food & agriculture, water, health, landscapes, safeguarding Australia, the universe, materials & manufacturing, minerals & ICT.

Demco NV/OEMG Global

Contact: Jason Errey

Website: www.oemg-global.com

Email: jasonerrey@oemg-global.com

Phone: +61 423 112 472

Booth: 70



Jason has 15 years experience in the oceanographic industry including degrees in oceanography and geochemistry. He now is a director at OEMG Global and has partnered with Demco NV to bring the Aquares Resistivity System to Australasia.

DSTO

Contact: Julie Bebbington

Website: www.dsto.defence.gov.au

Email: julie.bebbington@dsto.defence.gov.au

Phone: +61 8 8259 4025

Booth: 48

The Defence Science and Technology Organisation (DSTO), is the Australian Government's lead agency charged with applying science and technology to protect and defend Australia and its national interests.

ESRI/Ivs3d

Contact: Kristin Frith

Email: kfrith@esri.com

Booth: 52, 53

Fastwave Communications

Contact: Nick Daws

Website: www.fastwave.com.au

Email: nick@fastwave.com.au

Phone: +61 8 9486 4256

Booth: 69

Fastwave is an Iridium Satellite integrator and developer of data acquisition systems to monitor, control and track remote assets. The field-proven OceanStar coastal marine monitoring system delivers on-line data from sub-sea sensors within seconds.

Graal Tech

Contact: Alessio Turetta

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Phone: +39 0108597683

Booth: 55

Graal Tech is a research and consultancy SME working in the fields of robotics, control system design, instrumentation and mechatronic engineering. The main application area is underwater robotics and integrated systems for marine applications.



Helzel Messtechnik GmbH

Website: www.helzel.com

Email: WERA@Helzel.com

Phone: +49 4191 9520 0

Booth: 59, 60 (Co-exhibitor)

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Hyvista Corporation Pty Ltd

Contact: Lyndall Purdy

Website: www.hyvista.com

Email: lyndall@hyvista.com

Phone: +61 2 8850 0262

Booth: 51

HyVista specialises in the supply of airborne hyperspectral remote sensing imagery & information products for a wide range of applications including geological mapping, mineral exploration, water quality monitoring, agriculture and land use planning

Imbros

Contact: Juanita Poli

Email: juanita.poli@imbros.com.au info@imbros.com.au

Phone: +61 3 6216 1500 Fax: +61 3 6216 1555

Booth: 61

Imbros supplies and supports a wide range of equipment for Oceanographic and Environmental Monitoring in Australasia.

Imbros' principals – including Sea-Bird Electronics, Wet Labs, Satlantic, Nortek, Contros, EvoLogics, VideoRay and BlueView Technologies – are exhibiting their instrumentation and technology for today's marine science projects, and are available for technical and commercial discussions.



Marine Technology Society

Contact: Liz Corbin

Website: www.mtsociety.org

Email: chris.barrett@mtsociety.org

Phone: 410 884 5330

Booth: 17

The Marine Technology Society is an international, not-for-profit professional society of ocean engineers, technologists, policy makers, the military, and educators. Founded in 1963, the society fosters education, networking, and information-sharing through conferences, workshops, local section meetings and technical committees. The society publishes a bimonthly newsletter, a monthly electronic newsletter, and six annual issues of a peer-reviewed journal.

Metocean Services International

Contact: Stefan Stimson

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Email: stefan@metoceanservices.com

Phone: +61 3 6224 0788

Booth: 62, 63, 64

Metocean Services International provide the entire range of oceanographic and meteorological services to the commercial and scientific community. Located in South Africa and Australia, MSI has conducted projects in over 27 countries since 2003.

Myriax Software Pty Ltd

Contact: Hugh Pederson

Website: www.eonfusion.com

Email: hugh.pederson@eonfusion.myriax.com

Phone: +61 439 858 742

Booth: 54

Myriax Pty Ltd is a group of R&D companies dedicated to the development of cutting edge technology. Eonfusion is Myriax's revolutionary 4D visual analysis software program at the leading edge of geospatial analysis and visualisation technology.

Naval Undersea Warfare Center

Contact: John (Jack) Griffin

Email: john.f.griffin@navy.mil

Phone: +1 401 832 7283

Booth: 50



Oceanic Engineering Society

Contact: Elizabeth Creed

Website: www.ieeeoes.org

Email: lizcreed@gmail.com

Phone: +1 609 865 6797

Booth: 8

The Oceanic Engineering Society (OES) of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) seeks to advance the science and technology of Ocean Engineering. Stop by the IEEE/OES booth for membership information.

OCEANS'10 MTS/IEEE Seattle

Contact: Sue Kingston

Website: www.oceans10mtsieeeseattle.org

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Booth: 8 (See Oceanic Engineering Society)

OCEANS 2010 MTS/IEEE SEATTLE will take place September 19-24, 2010 in the Washington State Convention and Trade Center in Seattle, WA USA. Join us in Seattle.

OceanWaveS Pacific Ltd

Email: kreichert@oceanwaves-pacific.co.nz

Phone: +64 4 5867895

Booth: 59, 60 (Co-exhibitor)

OceanWaveS is the manufacturer of WaMoS II, a Wave Monitoring System, that is based on standard marine X-Band radar technology. WaMoS II measures and displays all the essential wave field parameters such as significant wave height, period and direction, as well as surface current speed and direction. WaMoS II is applied within the offshore and shipping industry as well as for coastal monitoring. WaMoS II is embedded in various international industry and R&D projects, with new features being continuously developed.

ODIM Brooke Ocean

Contact: Derrick Peyton

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Phone: 902 468 2928

Booth: 66

ODIM Brooke Ocean specializes in the development of advanced data collection equipment and systems such as the ODIM MVP,



FFCPT and LOPC. We also supply Launch and Recovery Systems (LARS) for USVs, UUVs, and related oceanographic systems.

ORE Offshore

Contact: Gregory MacEachern

Website: www.ore.com and www.edgetech.com

Email: Greg@ore.com

Phone: +1 508 291 0960

Booth: 58

EdgeTech designs and develops side scan sonar, sub-bottom profilers, bathymetric, combined, integrated and custom-engineered products. ORE Offshore manufactures highly accurate USBL tracking systems, acoustic releases and custom-engineered products.

PortMap Remote Ocean Sensing Pty Ltd

Email: portmap@gotalk.net.au

Phone: +61 7 47281123 Mob +61 439 28 1123

Booth: 59, 60 (Co-exhibitor)

PortMap ROS manufactures the high resolution PortMap VHF coastal ocean radar. PortMap provides integrated solutions to coastal engineering problems like sewage outfalls, salinity and warm water outfalls, dredging plumes and environmental flows in Ports, channels and around headlands, islands and reefs. The PortMap radar has spatial resolution of 100 m with a range of over 3 km, and time resolution of 5 minutes. It is the ideal observation system for mapping currents in Ports and Harbours.

RF Forschungsschiffahrt GmbH

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Booth: 38

RF operates own and public research vessels around the world. The own vessel SONNE operates Pacific & Indian Ocean. It is free for charter for approx. 100 days a year. It was chartered by India, New Zealand, Australia, Indonesia, Korea, China.



SeaBotix Inc. Australia Office

Contact: Richard Rickett
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Email: jesse@seabotix.com
Phone: +61 417 978 847

Booth: 49

SeaBotix Inc. manufactures underwater remotely-operated vehicles including the Little Benthic Vehicle (LBV) and Little Benthic Crawler (LBC). New for 2010 is the revolutionary vLBV, which is the first small vectored ROV.

Seismic Asia Pacific

Contact: Ian Wegner
Email: Ian.W@seismic.com.au
Booth: 28, 29, 30, 31

Swathe Services (Australia) Pty Ltd + Valeport Ltd

Contact: Carolyn Hewitt
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Email: carolyn.hewitt@swathe-services.com
Phone: +61 434 417 018

Booth: 65

Swathe Services provide personnel, equipment, support and consultation to the hydrographic industry. Valeport are a leading manufacturer of hydrometric and oceanographic instruments.

UVS

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Phone: +61 8 9434 2544

Booth: 56, 57

Please visit the UVS stand where you will be able to see the latest subsea technology and talk to company representatives from DeepSea Power & Light, Teledyne RD Instruments, Teledyne Bethos, Liquid Robotics, Flotation Technologies, SEACON and others



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Annual Review & Forecast

FEBRUARY

Instrumentation: Measurement, Processing & Analysis

***Oceanology International*, March 9-11, London, England

MARCH

Electronic Charting/Vessel Management/Ports & Harbors/Dredging/Homeland Security

***Global Marine Renewable Energy Conference*, April 14-15, Seattle, WA

APRIL

Offshore Technology/Alternative Energy & Ocean Engineering

***Offshore Technology Conference*, May 3-6, Houston, TX

***Oceans '10 IEEE Sydney*, May 24-27, Sydney, Australia

***PACON 2010*, June 1-5, Hilo, HI

MAY

Communications, Telemetry, Data Processing

***PACON 2010*, June 1-5, Hilo, HI

***UDT Europe 2010*, June 8-10, Hamburg, Germany

***Canadian Hydrographic Conference*, June 20-23, Québec City, Canada

JUNE

Seafloor Mapping/Sonar Systems/Vessels

JULY

Deck Gear, Cable, Connectors & Power Systems

AUGUST

Ocean Resources Development & Coastal Zone Management

***UDT Asia 2010*, September 15-16, Singapore

***Oceans '10 MTS/IEEE*, September 19-24, Seattle, WA

***Euronaval 2010*, October 25-29, Paris LeBourget, France

SEPTEMBER

Geophysical Exploration/Seafloor Engineering

***SEG 2010*, October 17-22, Denver, CO

OCTOBER

Environmental Monitoring, Remote Sensing & Pollution Control

NOVEMBER

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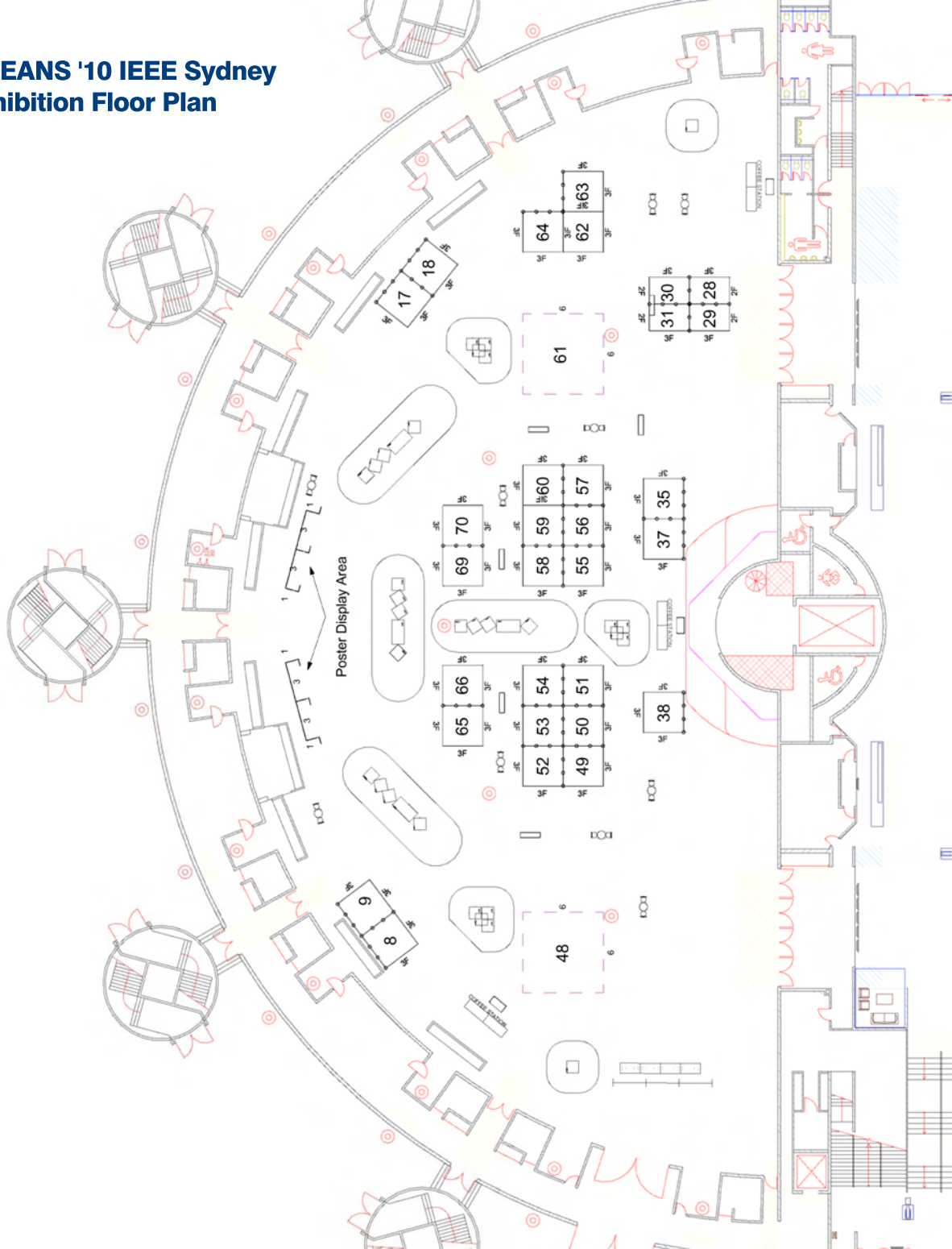


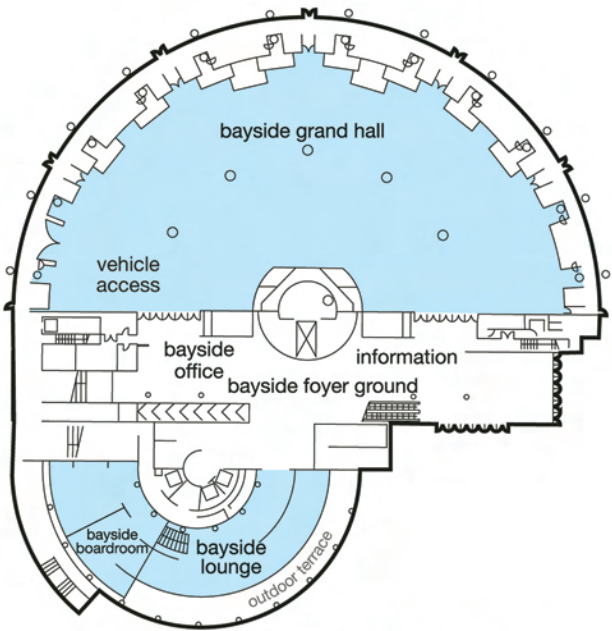
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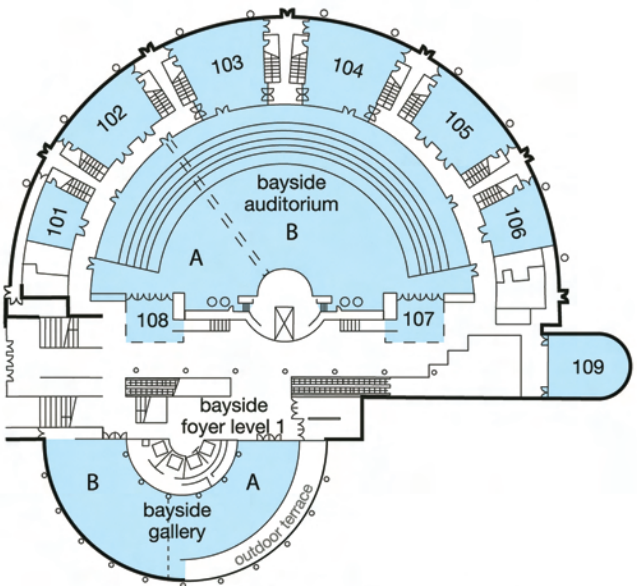
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convention centre bayside – level 1



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