OCEANS 2013 MTS/IEEE San Diego

THE WORLD'S PREMIER OCEANS EVENT

*An Ocean in Common*

# Program Book

**September 23-26, 2013**

**Town & Country Resort & Conference Center**

**San Diego, California**

MTS marine technology society · IEEE OES

## Patrons

Newfoundland Labrador

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marine technology SOCIETY
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AMERICAN FISHERIES SOCIETY

AMERICAN METEOROLOGICAL SOCIETY

SEG
Society of Exploration Geophysicists
*The international society of applied geophysics*

ADC INTERNATIONAL

AGU

SME Society of Manufacturing Engineers

San Diego Underwater Photographic Society

THE MARITIME ALLIANCE
"Promoting Blue Tech & Blue Jobs"

## Table of Contents

NOTES

**Please note that this is the preliminary technical session schedule; dates, times, and session assignments may change.**

| | | Exhibit Hall | Pacific Salon One | Pacific Salon Two | Pacific Salon Three | Pacific Salon Four | Pacific Salon Five | Pacific Salon Six | Pacific Salon Seven | Royal Palm One | Royal Palm Two | Royal Palm Three | Royal Palm Four | Royal Palm Five | Royal Palm Six |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monday | 7:00am | | Registration, Atlas Foyer | | | | | | | | | | | | |
| | 5:00pm | | Ice Breaker Reception, Exhibit Hall | | | | | | | | | | | | |
| Tuesday | 7:00am | | Registration, Atlas Foyer | | | | | | | | | | | | |
| | 8:30am | | Plenary Session, Town & Country Room | | | | | | | | | | | | |
| | 10:00am | | Morning Break, Exhibit Hall | | | | | | | | | | | | |
| | 10:00am | | Exhibit Hall Opens | | | | | | | | | | | | |
| | 12:00pm | | IEEE / OES Awards Luncheon, Golden Ballroom | | | | | | | | | | | | |
| | 1:20pm | | PacX Challenge: Fostering Scientific Discoveries Across the Pacific | International Business Special Session: Improve Your Global Market Position with US Government Resources | Marine Spatial Planning- Why Here? Why Now? | AUV Control and Simulation 1 | Marine Life and Ecosystems | Current Measurement Technology 1 | Optical Sensors and Instrumentation | Offshore Structures | Array Signal Processing and Array Design 1 | Sonar Imaging 1 | Radars | Geoacoustic Inversion | AUV Design |
| | 3:00pm | | Afternoon Break, Exhibit Hall | | | | | | | | | | | | |
| | 3:30pm | | NOAA Town Hall on Interagency Ocean Exploration and Research Technology | Technology Transfer and Commercialization | Lightning Talks: Marine Technology Innovation in the Pacific | AUV Control and Simulation 2 | Bioacoustics | Current Measurement Technology 2 | Holography and 3D Imaging | Deepwater Development Technology and Seafloor Engineering | Array Signal Processing and Array Design 2 | Sonar Imaging 2 | Remote Sensing | Marine Archaeology | AUV Performance |
| | 5:00pm | | Exhibits Reception, Exhibit Hall | | | | | | | | | | | | |

**Please note that this is the preliminary technical session schedule; dates, times, and session assignments may change.**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wednesday | 7:00am | Exhibition & Student Posters | Registration, Atlas Foyer | | | | | | | | | | | |
| | 8:20am | | Ultra-Deep Ocean Science and Enabling Technology: Overview | The Blue Economy-The Great Unknown | Analysis, Management, and Distribution of Georeferenced Oceanographic Data | Ocean Energy: Wave Power | Information Management and Data Assimilation | Oceanographic Instrumentation and Sensors 1 | Imaging and Vision 1 | Buoy Technology 1 | Sonar Signal Processing 1 | Acoustic Imaging and Target Detection | Systems and Observatories 1 | Automatic Control | AUV Autonomy 1: Pandora |
| | 10:00am | | Morning Break, Exhibit Hall | | | | | | | | | | | |
| | 10:30am | | Ultra-Deep Ocean Science and Enabling Technology: Science Opportunities | The Importance of Maritime Technology Clusters | Students at Sea | Ocean Energy: Power Conversion | Numerical Modeling and Simulation 1 | Oceanographic Instrumentation and Sensors 2 | Imaging and Vision 2 | Buoy Technology 2 | Sonar Signal Processing 2 | Acoustic Telemetry and Communication 1 | Systems and Observatories 2 | Glider Technologies | AUV Autonomy 2 |
| | 12:00am | | MTS Awards Luncheon, Golden Ballroom | | | | | | | | | | | |
| | 1:20pm | | Ultra-Deep Ocean Science and Enabling Technology: Vehicles and Payloads | International Business Special Session: Technology Innovation to Operate Effectively in the Arctic | Wet Diving in the Industrial and Scientific Shallows | Ocean Energy: Tidal Power | Numerical Modeling and Simulation 2 | Oceanographic Instrumentation and Sensors 3 | Imaging and Vision 3 | Cables and Connectors | Sonar Signal Processing 3 | Acoustic Telemetry and Communication 2 | Systems and Observatories 3 | Glider Missions | AUV Autonomy 3 |
| | 3:00pm | | Afternoon Break, Exhibit Hall | | | | | | | | | | | |
| | 3:30pm | | Research and Technology Needs for Stewardship of the Deep Sea | Building Successful Inter-Sector Partnerships with the National Oceanographic Partnership Program (NOPP) | Coastal Zone Management and Policy | Ocean Energy: Fuel Cells and More | Numerical Modeling and Simulation 3 | Oceanographic Instrumentation and Sensors 4 | Sound Propagation and Scattering | Ropes and Tension Members | Biologically Inspired Processing | Acoustic Telemetry and Communication 3 | Systems and Observatories 4 | Glider Data | AUV Autonomy 4 |
| | 7:00pm | | Oceans '13 Reception Gala, USS Midway Museum | | | | | | | | | | | |
| Thursday | 7:00am | | Registration, Atlas Foyer | | | | | | | | | | | |
| | 8:20am | | | Dynamic Positioning | Ocean Exploration 2020: A National Forum Panel Discussion | Vehicle Navigation 1 | Data Visualization 1 | Oceanographic Instrumentation and Sensors 5 | Acoustical Oceanography | Remotely Operated Vehicle Design | Classification and Pattern Recognition 1 | Acoustic Telemetry and Communication 4 | Systems and Observatories 5 | Vehicle Performance | AUV Operations 1 |
| | 10:00am | | Morning Break, Exhibit Hall | | | | | | | | | | | |
| | 10:30am | | | San Diego Maritime History | NOAA Town Hall on Systematic Telepresence-Enabled Ocean Exploration | Vehicle Navigation 2 | Data Visualization 2 | Marine Security and Defense 1 | Oceanography 1 | Remotely Operated Vehicle Manipulators | Classification and Pattern Recognition 2 | Acoustic Telemetry and Communication 5 | Marine Education and Outreach 1 | Vehicle Design 1 | AUV Operations 2 |
| | 12:00am | | Exhibitor's Luncheon, Exhibit Hall | | | | | | | | | | | |
| | 1:20pm | | | International Business Special Session: US Export Control Reform Affecting the Maritime Industry | Everything You Didn't Know to Ask about Ships to Reefs | Vehicle Navigation 3 | Marine Geology and Geodesy | Marine Security and Defense 2 | Oceanography 2 | Remotely Operated Vehicle Controls | Model Based Signal Processing | Acoustic Telemetry and Communication 6 | Marine Education and Outreach 2 | Vehicle Design 2 | AUV Operations 3 |
| | 3:00pm | | Afternoon Break, Exhibit Hall | | | | | | | | | | | |

## Welcome from the General Chair

Dear Conference Attendees, Exhibitors and Guests,

I'd like to take this opportunity to welcome you to beautiful San Diego and the OCEANS '13 MTS/IEEE San Diego conference—the world's most diverse and prestigious conference and exposition regarding our most critical resource—the oceans. This will be the 7th time the OCEANS conference has come to San Diego and my 3rd time to be honored with the exhilarating position of Conference Chair. The team that orchestrated the OCEANS '03 MTS/IEEE San Diego conference—the largest OCEANS conference to date—has returned to raise the bar even higher with the theme "An Ocean in Common."

Before going any further, I want to thank all the members of the Local Organizing Committee who have put in the long hours to make this event possible. If you have never participated on a conference committee, consider it. You not only make new friends, expand your network, but you become part of a new family. A large number on this esteemed committee have been putting on conferences in San Diego for 35 years—please shake their hands and say "Thanks."

The OCEANS conference is jointly sponsored by the IEEE Oceanic Engineering Society (IEEE/OES) and the Marine Technology Society (MTS). Our thanks to both societies and their representatives on the Joint Oceans Advisory Board (JOAB), which provides the guidance to ensure the OCEANS conference maintains its preeminence from year to year. Thanks also to our conference Patrons who are listed in this program and to Scripps Institution of Oceanography, our Academic Host.

We have always strived to bring innovation to the San Diego OCEANS conferences. This year we will have the option for poster presentations by accepted authors and a new app for your latest electronic gadgets. In addition to an excellent Plenary session, 200 exhibitors, over 450 technical papers, and three tracks of special sessions, we are offering a two night film festival, weekend golf tournament, a day of tutorials and a gala on the USS Midway aircraft carrier in San Diego Bay. And for your free time in San Diego, one of the most desirable destinations in the world, you can enjoy a variety of entertainment and activities.

Please take advantage of all the opportunities this prestigious event offers. Network, greet your friends and make new ones, and most of all enjoy yourself and all that our wonderful city has to offer.

Sincerely,

Robert Wernli Sr.
Conference Chair

**Kevin Hardy,**
**Co-Chairman**

It's a great privilege to welcome you, my fellow denizens of the open seas, to Oceans2013 in San Diego. We gather the aquatic clans annually in this celebration of the insatiable human desire to advance and to witness the products of our minds and hands.

It was the Oceans1975 in San Diego that introduced me to the brother societies of MTS and IEEE-OES. The exhibit hall seemed like a Caribbean blue hole, filled with marvelous things. I attended technical sessions where the great ones told me how to do it. I was warmly welcomed and encouraged by everyone, it seemed, and I found my niche in the world. In the years since, the marine industry has felt like life in the intertidal zone. The economic tide rises and falls, the waves break with changing intensity, some hang-on with their product line holdfasts, others scurry to freshly filled CBD tidepools. It's always dynamic, mixed with the sweet smell of salt air and the comforting taste of brine.

This year, we've invited new friends to join our bonfire: the Co-participating Societies. Please make them feel welcome, as we want them to join us again next year and the year after.

We have a wonderful working relationship with next year's Oceans 2014 conference team in St. Johns, Newfoundland. We've taken to calling it our own "Tale of Two Cities." Lessons learned, problems solved and new steps taken were done with their full participation, making it easy to pass the torch forward. Oceans2015 DC and Oceans16 Monterey likewise have representatives on this committee.

Please take time to check-out the Students at Sea session. Also say "hello" to the Student Co-chairs in your sessions. The kids are rocking the house, and it's a really good thing.

I know first hand, from years of experience with complex manned and unmanned undersea systems, the challenges we face offshore. These things have the real potential to go south fast and in a big way. But when it works as we imagined, as we hoped, it comes with a deep feeling of satisfaction that we got it right. Technology well implemented doesn't simply enable man, it transforms him, becoming an extension of his own body and senses. Operating a piece of gear should be like putting on a favorite baseball mitt. A perfect fit, you can feel the stitching of the ball through the hide.

The Oceans conference provides each of us the opportunity to meet and greet the best in our field, to share ideas and perhaps our dreams. You're the enablers, in the absolute best sense of the word. You enable a sustainable harvest of food and resources, continued exploration, national defense, and monitoring the planet's health, all within the context of a singular, complex and fragile global environment.

Thank you for making Oceans2013 a moment in your life's story. The Oceans2013 committee has been a true team of champions who have worked hard to honor the time you'll spend with us. Have fun and enjoy.

**VADM Admiral Peter M. Hekman, Jr. (USN, ret.)**
**Honorary Co-Chairman, Defense**

Independent Consultant, providing both technical and managerial services to various corporations

Welcome to San Diego, and the Oceans2013 MTS/IEEE conference. It's a privilege to have been invited to represent the Defense interests in marine technology, especially during the golden anniversary of one of the foremost professional societies dedicated to its advancement, the Marine Technology Society.

We pause to reflect that the MTS was founded in the wake of the loss of the USS Thresher (SSN-593), which brought into sharp focus the technological shortfalls we faced in deep water search and recovery. While the loss was horrific, it provided a focus on ocean engineering in the same manner Sputnik did for aerospace. It also brought into focus the need to consolidate various bureaus into what is now the Sea Systems Command, to ensure greater control and accountability in all matters related to the sea. Thanks in large measure to the Navy's partnering with the marine industrial community we have come a long way to resolving those challenges of a half-century ago.

As a former Sea Systems Commander, Task Force Commander, and Deputy Director of Navy Research and Development, Test and Evaluation, I've seen the impressive array of technology a number of nations, both our friends and others, have developed for defense, science and enterprise.

In this 21st century, new matters for national defense arise. The U.S. Navy remains on the forefront of advocacy for the development and application of those current and future technologies that are in the nation's best interests and in the interests of safety while working in the sea environment.

We appreciate the conference organizers making such effort to be certain our uniformed personnel and federal agencies are able to participate in this intellectual exchange. It demonstrates the heart-felt support the U.S. Navy, and all branches of the service, receive from those it is sworn to serve.

On behalf of the U.S. Navy and the conference organizers, and the great many volunteers, I hope your time at Oceans2013 is enjoyable and rewarding.

**Cathy Constable**
**Honorary Co-Chair**

It is my pleasure to welcome you to San Diego and Oceans '13. Scripps Institution of Oceanography at UC San Diego is proud to be the academic host for this important international conference. This year's theme – An Ocean in Common – is at the heart of Scripps's mission. Committed to working across disciplines for a comprehensive understanding of invaluable resources found in and around the oceans, the Scripps community is dedicated to seeking, teaching, and communicating knowledge of the ocean for the betterment of society.

This week Scripps celebrates its 110th anniversary. We are proud of the long and distinguished history of scientific and academic excellence associated with the name Scripps Institution of Oceanography as we move further into a second century of pushing the boundaries of scientific advancement, applying new theories, techniques, and technologies to the most pressing ocean challenges. This year's conference themes align well with Scripps's initiatives. Students, faculty and staff are advancing deep ocean stewardship, affordable and comprehensive ocean observations, national security through technological innovation, and the understanding of reef ecology.

In addition to celebrating 110 years of science, this month also marks 50 years of Scripps undergraduate teaching for the University of California system. Using this long history as a foundation, Scripps is currently expanding its undergraduate and masters education programs. The expansion allows more students to be involved in world-class research and enables Scripps to contribute meaningfully to the oceans community by training the next generation of scientists, not only in our classrooms and laboratories, but also aboard our fleet of research vessels.

Encouraging innovation is an important element of Scripps's mission. In recent years we have made a concerted effort to promote the transfer of technology from the laboratory into the public realm. Scripps has recently spun out three start-up companies and continues to strengthen ties to industry through sponsored research and peer-to-peer collaborations. Finding ways to bridge the gap between industry and academia is an important goal in the global stewardship of our ocean's resources.

Next month Scripps will welcome its eleventh director – Dr. Margaret Leinen. Dr. Leinen is a highly distinguished oceanographer and recognized leader with extensive experience in ocean and environmental sciences at the national and international levels. Dr. Leinen will bring inspiration and experience to Scripps's efforts to deepen the knowledge and stewardship of our "ocean in common."

I wish you a stimulating week at Oceans '13.

Cathy Constable
Interim Director Scripps Institution of Oceanography
Interim Vice Chancellor for Marine Sciences, UC San Diego

# Useful Information

The OCEANS '13 MTS/IEEE San Diego committee invites you to beautiful San Diego to participate in the world's most diverse and prestigious conference and exposition regarding our most critical resource—the oceans. This will be the 7th time the OCEANS conference has come to San Diego. The team that orchestrated the OCEANS '03 San Diego conference—the largest OCEANS conference to date—has returned to raise the bar even higher. The '03 conference, which was a cornerstone of the Scripps Institution of Oceanography's Centennial, had a total event attendance of 5,400, the exhibition included 301 booths and the technical program exceeded 800 excellent presentations. That international audience, from 46 countries, helped us establish the theme for the OCEANS '13 conference—An Ocean in Common.

The OCEANS conference is jointly sponsored by the IEEE Oceanic Engineering Society (IEEE/OES) and the Marine Technology Society (MTS). This international conference is a major forum for scientists, engineers and those with an interest in the oceans to gather and exchange their knowledge and ideas regarding the future of the world's oceans. In addition, a two night film festival and weekend golf tourney will kick-off the week's activities that will also include a day of tutorials and a banquet on the USS Midway aircraft carrier in San Diego Bay.

## Conference Venue

Located in the Heart of San Diego, America's Finest City, the Town and Country Resort Hotel encompasses the "Best of All Worlds." Just minutes from the vibrant nightlife of Downtown San Diego, the oasis of beautiful Mission Valley, and the thrill of San Diego's beaches and attractions, sits a resort renowned for its legendary service and country feel.

A resort is not a resort unless there are more dining options than there are days in your stay. With five exceptional restaurants, lively lounges, our own bakery and a seasonal pool side snack bar located within the grounds, the Town and Country Resort Hotel does not disappoint.

Visit http://www.towncountry.com/ for additional information on the Town and Country Resort Hotel.

Town and Country Resort Hotel
500 Hotel Circle North
San Diego, CA 32108

## Transportation information

All conference activities are at the Town and Country facilities. Transportation to any conference related offsite venues will be provided.

### Rental Cars

The easiest way to get around San Diego is by car. Car rental service is conveniently located at the airport if you're flying in.

We also provide AVIS car rental service on property for your convenience. Please call 619-291-7131 ext. 3838 for reservations.

### Light Rail Trolley

Just a short stroll from the Town and Country Resort Hotel will take you to the San Diego Trolley pick-up. The trolley is a great way to get around San Diego when you're sightseeing, shopping, or going to specific events. Travel by trolley to the Gaslamp Quarter, Old Town, Downtown San Diego, the Convention Center and Seaport Village. You can also reach San Diego's sporting event venues - Qualcomm Stadium, Petco Park, San Diego State and Viejas Arena by trolley.

### Old Town Trolley

With pick-up and ticket purchase available at the Town and Country Resort Hotel, the Old Town Trolley will show you California's second largest city, exciting attractions and where 70 miles of beaches come together to create a vacationer's paradise.

## GENERAL AREA INFORMATION

**International Calling Code for United States**: 001
**Area Code for San Diego:** 619
**Local Currency**: US Dollar
**Language**: English

# Conference Information

## Onsite Registration

Onsite registration for all Oceans '13 will be available in the Town & Country's Atlas Foyer. Registration hours are:

| Day | Time |
|---|---|
| Monday, September 23 | 7:00 am – 7:00 pm |
| Tuesday, September 24 | 7:00 am – 6:30 pm |
| Wednesday, September 25 | 7:00 am – 5:00 pm |
| Thursday, September 26 | 7:00 am – 12:00 pm |

## Tutorials

| Day | Time |
|---|---|
| Monday, September 23 | 8:00 am – 5:00 pm |

## Exhibit Hall Hours

The Oceans '13 Exhibit Hall will be open during the hours listed below.

| Day | Time |
|---|---|
| Tuesday, September 24 | 10:30 am – 7:00 pm |
| Wednesday, September 25 | 9:00 am – 5:00 pm |
| Thursday, September 26 | 9:00 am – 3:30 pm |

## Plenary Session

Oceans '13 will open with the Plenary Session, highlighted by three keynote presentations. This session will take place on Tuesday, September 24 at 8:30 am, and will end with the official opening of the Oceans '13 Exhibit Hall at 10:30 am.

## Technical Session Hours

Technical Sessions are scheduled for Tuesday, September 24, Wednesday, September 25 and Thursday, September 26 during the following hours:

| Time |
|---|
| 8:20 am – 10:00 am |
| 10:30 am – 11:50 am |
| 1:20 pm – 3:00 pm |
| 3:30 pm – 4:50 pm |

## Student Poster Hours

| Day | Time |
|---|---|
| Tuesday, September 24 | 10:00 am – 7:00 pm |
| Wednesday, September 25 | 9:00 am – 5:00 pm |
| Thursday, September 26 | 9:00 am – 3:30 pm |

## Coffee Breaks

Coffee breaks will be served at 10:00 am and 3:00 pm daily (Tuesday, Wednesday, and Thursday) in the exhibit hall lounges.

## Luncheons

| Luncheon | Day/Time |
|---|---|
| IEEE/OES Awards Luncheon | Tuesday, September 24, 12:00 pm – 1:15 pm |
| MTS Awards Luncheon | Wednesday, September 25, 12:00 pm – 1:15 pm |
| Exhibit Hall Luncheon | Thursday, September 26, 12:00 pm –1:15 pm |

## Social Events

**Ice Breaker Reception**, Town & Country ***(Exclusive Patron: MTS)***
Monday, September 23, 5:00 pm – 7:00 pm

This year the Marine Technology Society celebrates its 50th anniversary. The Society is deeply grateful to the members who created and continue to grow this Society. From its earliest beginnings as the vision of a handful of professionals to today's international membership, MTS has steadily increased in size and authority. The technology we take for granted today — micro chips, fiber optics, ROVs, AUVs, satellites, UAVs, mega data transmission and storage, pressure vessels that can go to full ocean depth plus so much more, not only did not exist, but were not even dreams 50 years ago. The only "data" transmitted from vessels at sea was a few lines of text in the daily report, sent by telex. Today immense quantities of data are streamed real-time around the world.

MTS member-impact on the profession spans the early days of the *Trieste* dive to co-chairing the U.S. Joint Ocean Commission.

MTS will celebrate its anniversary throughout OCEANS'13 MTS/IEEE San Diego. Events include hosting the Ice Breaker Reception, the Annual MTS Awards Luncheon and many assorted activities at our booths, including the premier of the Society's newest publication — *Advances in Marine Technology—1963-2013*.

It is MTS' hope that the Society will continue to serve as an inspiration to future generations.

**Exhibitor's Reception**, Town & Country, Oceans '13 Exhibit Hall (Atlas Ballroom and Grand Exhibit Hall)
Tuesday, October 16, 5:00 pm – 7:00 pm

**Oceans '13 Gala Reception**, USS Midway
Wednesday, September 25, 6:30 pm - 10:00 pm

USS Midway Museum
910 N. Harbor Drive
San Diego, CA 92101

Transportation to and from the Midway will be provided at the Atlas Foyer entrance of the Town & Country. Buses to the Midway will begin loading at 6:15pm, departing the Town & Country at that time and run continuously, with the last bus departing at 10:00pm.

A special invitation has been extended to OCEANS13 registered attendees to visit the largest collection of historic and replica ships in the country starting at 4:30pm on September 25th. There will be a bus departing the Town & Country at 4:15pm and bringing interested attendees to the Museum, which is in walking distance of the USS Midway.

### Internet Access

Wireless is provided throughout the Exhibit Hall (Atlas Ballroom & Grand Exhibit Hall) for your convenience.

Username: oceans13
Passkey: mtsieeeoes

### Unauthorized Audio/Video Recording

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

### Messages

A message board is available near the Registration Desk in the Atlas Foyer.

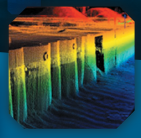
NOTES

Government of Canada | Gouvernement du Canada

Canada

# Canada at OCEANS '13

San Diego, CA
**September 23-26, 2013**



Canada has the world's longest coastline, is bordered by three of the world's five oceans, and has some of the planet's harshest marine environments, including the Arctic Circle and the world's highest tidal range in the Bay of Fundy. Add to this a culture of innovation, strong entrepreneurial spirit and talented people and you will understand why Canada's ocean technology industry has produced world-class companies and institutions, niche products and services, and unique demonstration projects.

The ocean technology sector in Canada comprises more than 250 companies, mostly small to medium-sized high technology firms. These companies provide solutions for stakeholders who do business in strategic markets around the world, from marine transportation to ocean observation and science.

**There will be more than 25 Canadian exhibitors at OCEANS '13!**

**Canada Breakfast**
Tiki Pavilion
Wed Sept 25
7:00 - 8:00 AM

Photo credit: TMQ Technopole Maritime du Québec

## Ocean Technology Alliance Canada OTAC

A network of regional ocean technology associations established to foster, promote and facilitate mutually beneficial ocean technology initiatives from coast-to-coast in Canada.

**For further information on OTAC visit their member websites:**

Ocean Networks Canada – www.onccee.ca
Ocean Initiatives B.C. – www.oceanmarinespace.com
Technopole maritime du Quebec – www.tmq.ca
Ocean Technology Council of Nova Scotia - www.otcns.ca
OceansAdvance Inc. – www.oceansadvance.net

**OCEANS '14**
**St. John's, Newfoundland and Labrador - Canada**
**Oceans: Where Challenge Becomes Opportunity**

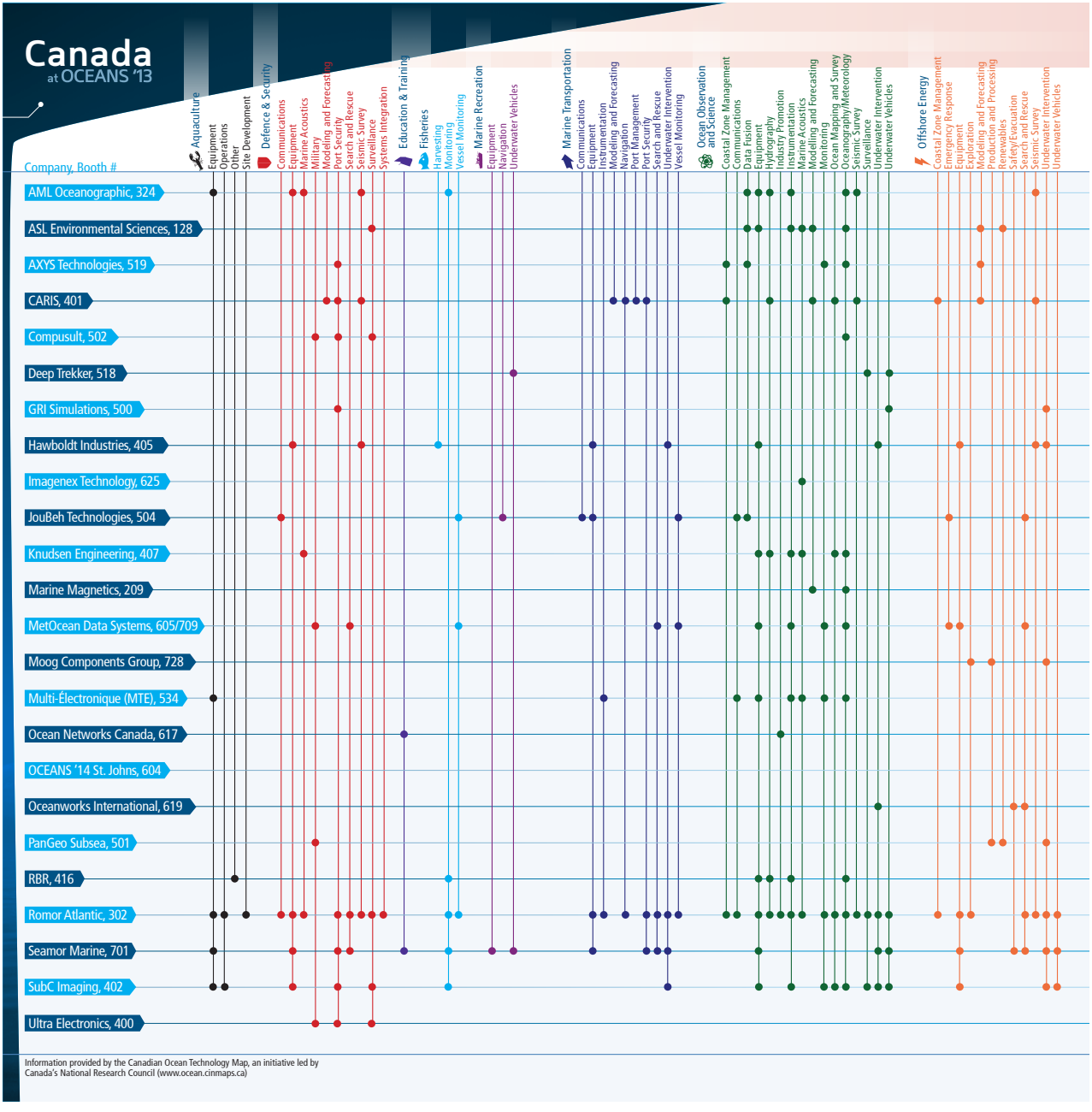
## Want to do business with Canada?

If you are looking for opportunities to invest, trade or partner in Canada, we can help. The Canadian Trade Commissioner Service has more than 150 offices around the world.
**www.tradecommmissioner.gc.ca**

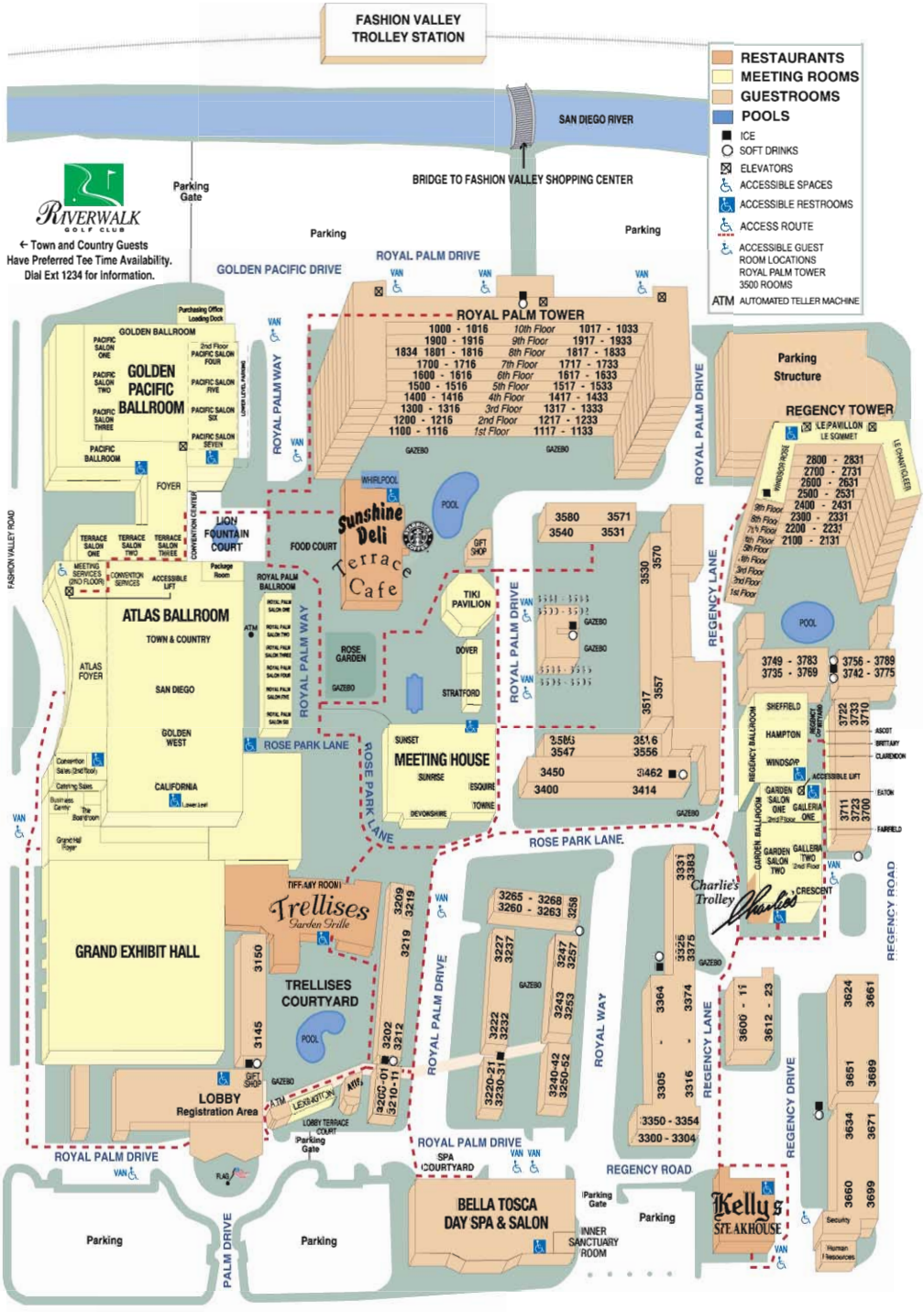
## Need more information on ocean technologies in Canada?

For additional information about the ocean technology industry in Canada, including contact information, capabilities, and other services, visit the Industry Canada Ocean Technologies website at
**www.ic.gc.ca/oceans**

# Canada at OCEANS '13




Information provided by the Canadian Ocean Technology Map, an initiative led by Canada's National Research Council (www.ocean.cinmaps.ca)


FASHION VALLEY TROLLEY STATION
SAN DIEGO RIVER
BRIDGE TO FASHION VALLEY SHOPPING CENTER
RESTAURANTS
MEETING ROOMS
GUESTROOMS
POOLS
ICE
SOFT DRINKS
ELEVATORS
ACCESSIBLE SPACES
ACCESSIBLE RESTROOMS
ACCESS ROUTE
ACCESSIBLE GUEST ROOM LOCATIONS ROYAL PALM TOWER 3500 ROOMS
ATM AUTOMATED TELLER MACHINE
RIVERWALK GOLF CLUB
← Town and Country Guests Have Preferred Tee Time Availability. Dial Ext 1234 for information.
Parking Gate
Parking
GOLDEN PACIFIC DRIVE
ROYAL PALM DRIVE
ROYAL PALM TOWER
1000 - 1016 10th Floor 1017 - 1033
1900 - 1916 9th Floor 1917 - 1933
1834 1801 - 1816 8th Floor 1817 - 1833
1700 - 1716 7th Floor 1717 - 1733
1600 - 1616 6th Floor 1617 - 1633
1500 - 1516 5th Floor 1517 - 1533
1400 - 1416 4th Floor 1417 - 1433
1300 - 1316 3rd Floor 1317 - 1333
1200 - 1216 2nd Floor 1217 - 1233
1100 - 1116 1st Floor 1117 - 1133
GOLDEN BALLROOM
GOLDEN PACIFIC BALLROOM
PACIFIC SALON ONE
PACIFIC SALON TWO
PACIFIC SALON THREE
2nd Floor PACIFIC SALON FOUR
PACIFIC SALON FIVE
PACIFIC SALON SIX
PACIFIC SALON SEVEN
PACIFIC BALLROOM
FOYER
ROYAL PALM WAY
LION FOUNTAIN COURT
CONVENTION CENTER
FOOD COURT
Sunshine Deli
Terrace Cafe
WHIRLPOOL
POOL
GIFT SHOP
TIKI PAVILION
ROSE GARDEN
DOVER
STRATFORD
SUNSET
MEETING HOUSE
SUNRISE
ESQUIRE
TOWNE
DEVONSHIRE
ROYAL PALM BALLROOM
ATLAS BALLROOM
TOWN & COUNTRY
ATLAS FOYER
SAN DIEGO
GOLDEN WEST
CALIFORNIA
ROSE PARK LANE
FASHION VALLEY ROAD
GRAND EXHIBIT HALL
TIFFANY ROOM
Trellises
Garden Grille
TRELLISES COURTYARD
LOBBY
Registration Area
LOBBY TERRACE COURT
SPA COURTYARD
BELLA TOSCA DAY SPA & SALON
INNER SANCTUARY ROOM
PALM DRIVE
Parking Structure
REGENCY TOWER
LE PAVILLON
LE SOMMET
LE CHANTECLEER
WINDSOR ROSE
REGENCY LANE
REGENCY BALLROOM
SHEFFIELD
HAMPTON
WINDSOR
ACCESSIBLE LIFT
GARDEN BALLROOM
GARDEN SALON ONE
GALLERIA ONE
GARDEN SALON TWO
GALLERIA TWO
ASCOT
BRITTANY
CLAIREMONT
EATON
FAIRFIELD
Charlie's
Trolley
CRESCENT
REGENCY ROAD
REGENCY DRIVE
ROYAL WAY
Kelly's
STEAKHOUSE
Security
Human Resources
VAN
ATM
FLAG

## Plenary Speakers

### Plenary Speaker - Dr. Pradeep K. Khosla
### Chancellor, University of California San Diego

Pradeep K. Khosla, an internationally renowned electrical and computer engineer, began his tenure as UC San Diego's eighth Chancellor on August 1, 2012. At UC San Diego, he has initiated a comprehensive, all-inclusive strategic planning process to develop a vision and shared goals for the future of the campus. Khosla previously served as Dean of Engineering at Carnegie Mellon University. There, he set the strategic direction for undergraduate and graduate education and research, and was elected University Professor, the highest distinction a faculty member could achieve.

Chancellor Khosla is an elected member of the National Academy of Engineering and the American Society for Engineering Education. He is a Fellow of the Institute of Electrical and Electronics Engineers, the American Society of Mechanical Engineers, the American Association for Advancement of Science, the American Association of Artificial Intelligence and the Indian Academy of Engineering. He is an Honorary Fellow of the Indian Academy of Science. Khosla is also the recipient of numerous awards for his leadership, teaching, and research, including the 2012 Light of India Award, a Lifetime Achievement Award from the American Society of Mechanical Engineers, and the George Westinghouse Award for contributions to improve engineering teaching. In 2012, he was named as one of the 50 most influential Indian-Americans by SiliconIndia.

He received his bachelor's degree in electrical engineering from the Indian Institute of Technology, and his master's and doctoral degrees in electrical and computer engineering at Carnegie Mellon.

## Plenary Speaker – Craig N. McLean
## Deputy Assistant Administrator for NOAA Research

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 Program, Ocean Exploration and Research, and Weather and Air Quality research.

McLean served NOAA 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 led NOAA's innovation and planning for the Smithsonian Institution's Ocean Hall, and achieved a National Ocean Action Plan goal of securing a permanent, dedicated ship for the national ocean exploration program, the NOAA Ship Okeanos Explorer.* 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. He is the head of the U.S. Delegation to the Intergovernmental Oceanographic Commission, and is Co-Chair of the National Ocean Partnership Program.

A lifelong 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 USS MONITOR and *RMS TITANIC* searching for solutions in historic 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, and the NOAA Corps Commendation Medal. *He is a frequent speaker on ocean related subjects, rooted in his diverse NOAA career experience.* 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.

## Plenary Speaker – Greg Kusinski
## Chevron Senior Advisor, Director of DeepStar®

Greg Kusinski was appointed in 2012 as the Director of DeepStar® and serves as Chevron Senior Advisor to that organization. Since 1998 he has worked in various corporate capacities focusing on technology development, acceleration and commercialization. During a portion of this time he was responsible for technology development at a startup company that commercialized new technology licensed from UC Berkeley and Lawrence Berkeley National Laboratory. Dr. Kusinski received a degree in engineering from AGH University, Krakow, Poland and went on to earn B.S., M.S. and Ph.D. in Materials Science and Mineral Engineering from UC Berkeley where he also completed the Management of Technology program. Dr. Kusinski currently serves on several advisory boards and is pursuing an EMBA from Rice University

## Plenary Speaker – Dr. Sylvia A. Earle

National Geographic Society Explorer-in-Residence Dr. Sylvia A. Earle, called "Her Deepness" by the *New Yorker* and the *New York Times*, "Living Legend" by the Library of Congress, and first "Hero for the Planet" by *Time* magazine, is an oceanographer, explorer, author, and lecturer. She has experience as a field research scientist, government official, and director for corporate and nonprofit organizations, including the Kerr McGee Corporation, Dresser Industries, Oryx Energy, the Aspen Institute, the Conservation Fund, American Rivers, Mote Marine Laboratory, Duke University Marine Laboratory, Rutgers Institute for Marine Science, the Woods Hole Oceanographic Institution, National Marine Sanctuary Foundation, and Ocean Futures.

Formerly chief scientist of NOAA, Earle is the founder of Deep Ocean Exploration and Research, Inc., founder of Mission Blue and SEAlliance, and chair of the Advisory Councils of the Harte Research Institute and the Ocean in Google Earth. She has a B.S. degree from Florida State University, M.S. and PhD. from Duke University, and 22 honorary degrees. She has authored more than 190 scientific, technical, and popular publications; lectured in more than 80 countries; and appeared in hundreds of radio and television productions.

Earle has led more than a hundred expeditions and logged more than 7,000 hours underwater, including leading the first team of women aquanauts during the Tektite Project in 1970; participating in ten saturation dives, most recently in July 2012; and setting a record for solo diving in 1,000-meter depth. Her research concerns marine ecosystems with special reference to exploration, conservation, and the development and use of new technologies for access and effective operations in the deep sea and other remote environments.

Her special focus is on developing a global network of areas on the land and in the ocean to safeguard the living systems that provide the underpinnings of global processes, from maintaining biodiversity and yielding basic life support services to providing stability and resiliency in response to accelerating climate change.

Earle's more than one hundred national and international honors include the 2011 Royal Geographical Society Gold Medal, 2011 Medal of Honor from the Dominican Republic, 2009 TED Prize, Netherlands Order of the Golden Ark, Australia's International Banksia Award, Italy's Artiglio Award, the International Seakeepers Award, the International Women's Forum, the National Women's Hall of Fame, Academy of Achievement, Los Angeles Times Woman of the Year, and medals from the Explorers Club, the Philadelphia Academy of Sciences, Lindbergh Foundation, National Wildlife Federation, Sigma Xi, Barnard College, and the Society of Women Geographers.

# OES Awards

## Distinguished Service Award

The Distinguished Service Award is given to honor an individual IEEE member for outstanding contributions towards furthering the objectives of the Oceanic Engineering Society. Candidates for the Distinguished Service Award are nominated by the OES Awards Committee and must be approved by a majority vote of the Awards Committee.

## Robert T. Bannon

The IEEE Oceanic Engineering Society's 2013 Distinguished Service Award is presented to Robert T. Bannon for establishing and furthering the objectives of the Oceanic Engineering Society (OES) by ensuring the financial security and technical leadership by developing and chairing technical symposia and conferences in accordance with the OES Strategic Plan. As an IEEE Fellow and Distinguished Lecturer, Bob set a standard for program participation, author guidelines, and speaker selection and evaluation.

## Distinguished Technical Achievement Award

The Distinguished Technical Achievement Award is given to honor an outstanding technical contribution to oceanic engineering in either the fundamental or applied areas. The recipient need not be a member of the Oceanic Engineering Society or the IEEE. The award recognizes either a single major invention or scientific contribution or a distinguished series of contributions over a long period of time.

## Gwyn Griffiths

The IEEE Oceanic Engineering Society's 2013 Distinguished Technical Achievement Award is presented to Gwyn Griffiths for his contribution at the highest level in oceanic engineering technology with his work with Doppler current profiling instrumentation and autonomous underwater vehicles.

Each award is presented at the fall conference during the OES luncheon. The awards include a certificate, a plaque, a watch and placement of the persons name on the historical list of past recipients on the OES web site.

## PRESIDENT'S AWARDS

The President recognizes and applauds the service of the following:

- Elizabeth Creed, VP Professional Development
- Diane DiMassa, Treasurer
- Robert Wernli, VP Conference Development
- Robert Bannon, ADCOM 2008-2013
- Edward Gough, ADCOM 2011-2013
- Pamela Hurst, ADCOM 2008-2013

## MTS 2013 Fellows

Each year, MTS bestows the honor of Fellow on those members who have shown outstanding contributions to the advancement of the society's objectives and who have distinguished accomplishments and experience in their professional fields.

Lisa Medeiros
Sumanohar (Suman) Muddusetti

## MTS Awards

Awards are presented to people, companies and MTS groups who have shown exemplary contributions to the Society or to their industries. The Society is especially honored to have the support of Compass Publications, Lockheed Martin, and Ocean News & Technology for sponsoring annual awards.

**Compass Distinguished Achievement Award:**
Captain Dennis (Mike) Egan

**Compass International Award:**
Ocean Technology Branch – Innovation, Business and Rural Development – Province of Newfoundland and Labrador

**Compass Industrial Award:**
Shell

**Lockheed Martin Award for Ocean Science and Engineering:**
Liesl Hotaling

**Ocean News & Technology Young Professional Award:**
Ryan Morton

**MTS Outstanding Service Award:**
Mark H. Bushnell

**MTS Outstanding Section Award:**
Hampton Roads Section

**MTS Outstanding Student Section Award:**
Fisheries and Marine Institute of Memorial University of Newfoundland

## Special Sessions for Technical Program

### Pacific Salon 1

| | Tuesday 24 September | Wednesday 25 September | Thursday 26 September |
|---|---|---|---|
| 0820-1000 | xx | Ultra-Deep Session 1 | |
| 1030-1150 | xx | Ultra Deep Session 2 | |
| 1320-1500 | PacX Challenge | Ultra-Deep Session 3 | |
| 1530-1650 | NOAA Town Hall on Interagency Ocean Exploration | Research and Technology Needs for Stewardship of the Deep Sea | |

### Pacific Salon 2

| | Tuesday 24 September | Wednesday 25 September | Thursday 26 September |
|---|---|---|---|
| 0820-1000 | xx | The Blue Economy | |
| 1030-1150 | xx | The Importance of Maritime Technology Clusters | San Diego Maritime History |
| 1320-1500 | International Business: Improve Your Global Market Position | International Business: Technology Innovation to Operate Effectively in the Arctic | International Business: US Export Control Reform Affecting the Maritime Industry |
| 1530-1650 | Technology Transfer and Commercialization | Building Successful Inter-Sector Partnerships with NOPP | |

## Pacific Salon 3

| | Tuesday 24 September | Wednesday 25 September | Thursday 26 September |
|---|---|---|---|
| 0820-1000 | xx | Analysis, Management, and Distribution of Georeferenced Oceanographic Data | Ocean Exploration 2020: A National Forum Panel Discussion |
| 1030-1150 | xx | Students at Sea | NOAA Town Hall on Systematic Telepresence-Enabled Ocean Exploration |
| 1320-1500 | Marine Spatial Planning | Wet Diving in the Industrial and Scientific Shallows | Everything You Didn't Know to Ask about Ships to Reefs |
| 1530-1650 | Lightning Talks: Marine Technology Innovation in the Pacific | | |

## PacX Challenge: Fostering Scientific Discoveries Across the Pacific –

### Five big ideas for ocean science, one grand prize winner

**Date:** Tuesday 24 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 1

**Chair:** Bill Vass, CEO, Liquid Robotics

Join us for this special technical session that is the culmination of the PacX Challenge, a one-year, Guinness world record setting, scientific adventure across the Pacific Ocean. Learn how two Wave Gliders navigated over 9442 nautical miles, autonomously, through shark attacks and a Category 4 cyclone all while collecting and transmitting unprecedented amounts of ocean surface data on a scale never before continuously collected across the Pacific Ocean. A panel of scientists from industry and academia will discuss the scientific possibilities the PacX data set affords to the scientific community worldwide.

A major component of the PacX Challenge is to foster new scientific exploration, new discoveries, and to ignite interest in science worldwide. Come hear the five finalists in the PacX Challenge competition present their research addressing some of the world's most challenging ocean issues; from measuring the

ocean's health and respiration to studying the ocean's biomass - the most fundamental organisms critical to ocean life. The PacX Challenge grand prize will be awarded during this session with the winner receiving a $50,000 research grant from BP and six months of Wave Glider ocean data services from Liquid Robotics.

## Marine Spatial Planning – Why here? Why now?

**Date:** Tuesday 24 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 3

**Chair:** Michael B. Jones, President, The Maritime Alliance

Understanding bathymetry and hydrography are fundamental to doing almost anything in the ocean. The International Hydrographic Organization (IHO) is the international body responsible "to create a global environment in which States provide adequate and timely hydrographic data, products and services and ensure their widest possible use." The Maritime Alliance has collaborated with the IHO and the UK Hydrographic Office (UKHO) on several meetings to bring together hydrographic service and technology providers with multilateral agencies to (e.g. Inter-American Development Bank, UN Development Program and the World Bank) to discuss an integrated model of Marine Spatial Planning (MSP) and Marine Spatial Management (MSM) based on hydrographic work as the basis for regional economic development.

## International Business Special Session: Improve Your Global Market Position with US Government Resources

**Date:** Tuesday 24 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 2

**Chair:** Julia Rauner Guerrero, Marine Technology Team Leader, U.S. Commercial Service - U.S. Department of Commerce

Consider US Embassy Commercial Service Experts in 72 countries worldwide as your extended international marketing offices. Hear from US Embassy experts from Brazil, India, Norway and Spain / Portugal about marine technology market opportunities in these countries and how they can help position your company for sales with local partners and government. U.S. Export-Import Bank will also present on export financing and insurance resources to help increase your global competitiveness.

The Marine Technology Society and U.S. Commercial Service are Strategic Partners in supporting MTS member companies' export expansion.

## NOAA Town Hall on Interagency Ocean Exploration and Research Technology

**Date:** Tuesday 24 September
**Time:** 3:30-4:50
**Location:** Pacific Salon 1

**Chair:** Craig McLean, Deputy Assistant Administrator, NOAA's Office of Oceanic and Atmospheric Research

This Town Hall will build on the discussions of the Oceans 2012 workshop: "Integrating Autonomous Technologies in Ocean Observations: Identifying Mission Applications", and will introduce the interagency Task Force for Ocean Exploration and Undersea Research Technology and Infrastructure (TFORT), recently established under Public Law 111-11 within the National Ocean Partnership Program's Interagency Working Group for Ocean Operations (IWG-OP). This session will present pending technology funding opportunities and framework concept for bridging ocean exploration and research requirements across agencies.

## "Lightning Talks": Marine Technology Innovation in the Pacific

**Date:** Tuesday 24 September
**Time:** 3:30-4:50
**Location:** Pacific Salon 3

**Chair:** Eric Westreich, Defense C2 Industry Manager, Esri

This series of short "Lightning Talks" will focus on firms and institutions will be a combination of looking back, reviewing where we are today and looking ahead. The year 1963 witnessed a number of important events including the founding of the Marine Technology Society and, in San Diego, the Unified Port of San Diego and the Tidelands Trust. The following year the reverse osmosis membrane was patented by ROGA (Reverse Osmosis General Atomics), and the first ROVs were being piloted in San Diego waters. Over the following 50 years, San Diegans – natives and transplants – have been busy, innovating their ways around the world, into every sector of maritime activity imaginable, often leading the world with their particular expertise or vision.

And across the West Coast and on Hawaii, world-class oceanographic institutions were being created at Oregon State University and University of Hawaii, joining Scripps Institution of Oceanography and the School of Oceanography at University of Washington that had been established decades earlier, and to be followed later by others such as Monterey Bay Aquarium Research Institute.

## Technology Transfer and Commercialization

**Date:** Tuesday 24 September
**Time:** 3:30-4:50
**Location:** Pacific Salon 2

**Chairs:** Dr. James Bellingham, Chief Technologist, Monterey Bay Aquarium Research Institute

There is a wealth of IP and technology produced by the ocean science and engineering research establishments historically and on-going. Our panel of academic and industry experts will explore these questions: How effectively are these opportunities marketed by the existing institutional technology transfer organizations? Do ocean and environmental sciences get sufficient attention? What is the acquisition interest shown by potential developers, and what factors influence a successful transfer? From the perspective of private industry, what barriers inhibit their interest and successful transfer? What can be done to improve the commercialization process?

## Ultra-Deep Ocean Science and Enabling Technology (1) : Overview

**Date:** Wednesday 25 September
**Time:** 8:20-10:00
**Location:** Pacific Salon 1

**Chairs:** Kevin Hardy, OCEANS 13 Conference Co-Chair

Interest and excitement in the exploration of the deepest ocean realm was rekindled with James Cameron's heroic solo manned dive in March 2012. This track examines the fundamental scientific questions and the new enabling technologies, both manned and robotic, which make the present day the right time to go deep. Both regular and invited technical papers provide an overview of the science and technology involved with the ultra-deep ocean.

## Analysis, Management, and Distribution of Georeferenced Oceanographic Data and Bathymetry in a Marine Geographic Information System

**Date:** Wednesday 25 September
**Time:** 8:20-10:00
**Location:** Pacific Salon 3

**Chairs:** Karen Hart, Senior Hydrographic Consultant, CARIS ; Josh Mode, Technical Solutions Provider. CARIS

The workshop will cover how to analyze and manage marine spatial data using CARIS Bathy DataBASE and how to provide data distribution these data via CARIS Spatial Fusion Enterprise. CARIS will demonstrate how to compile and visualize the following spatial

data types: oceanographic data such as temperature, salinity, dissolved oxygen, etc. along with bathymetric and topographic surfaces and point clouds, water column imagery including georeferenced gas seeps and dangers to navigation for mariners, geomorphologic slope analysis surfaces, and/or seafloor sediment analysis maps. Spatial compilation of these water column oceanographic data with georeferenced bathymetry and other maps of the seafloor can provide valuable knowledge of any benthic, pelagic, or littoral environment. These tools coupled with the ability to distribute these products via a custom web interface can allow anyone access to marine spatial data.

## The Blue Economy – The Great Unknown

**Date:** Wednesday 25 September
**Time:** 8:20-10:00
**Location:** Pacific Salon 2

Chair: Michael B. Jones, President, The Maritime Alliance

The Blue Economy is indeed a great unknown as even a consensus definition is elusive. The Maritime Alliance (TMA) takes an expansive view of the Blue Economy – perhaps broader than most others since it covers 14 sectors including desalination & clean water technology. It is hard to "draw a line" between sectors; there is much convergence among sectors; and as most technologies are truly multi-use, they often cut across sectors; they are seen as interwoven.

## Ultra-Deep Ocean Science and Enabling Technology (2): Science Opportunities and Other Missions

**Date:** Wednesday 25 September
**Time:** 10:30-11:50
**Location:** Pacific Salon 1

**Chairs:** Robert Wernli, First Centurion Enterprises, Oceans '13 Conference Chair

In the second Ultra-Deep session, both regular and invited technical papers discuss the science opportunities and other missions focusing on the ultra-deep ocean.

## Students at Sea

**Date:** Wednesday 25 September
**Time:** 10:30-11:50
**Location:** Pacific Salon 3

**Chairs:** Karlina Merkens, Scripps Institution of Oceanography

Historically, fieldwork and time at sea have been an integral part of an oceanographer's training. Current trends show fewer scientists

going to sea as a result of a shrinking science fleet, stagnated budgets, and increasing costs (Kintisch 2013). At-sea training provides a specialized learning environment and valuable at-sea experience in which students can ask their own scientific questions, collect their own data, and apply their own expertise. Current students at Scripps Institution of Oceanography have been participating in a variety of research cruises, including cruises led and executed entirely by students. Cruise locations range from the Gulf of Mexico to Hawaii to waters of the Southern California Bight. Student-led projects on board these cruises concern a wide range of topics from marine mammal and coral reef acoustic studies to environmental impacts on local fishery species. In this session, we highlight research done by students, the value of field-driven oceanographic research today, and the need in the US for highly qualified oceanographers in the future.

## The Importance of Maritime Technology Clusters

**Date:** Wednesday 25 September
**Time:** 10:30-11:50
**Location:** Pacific Salon 2

Chair: Michael B. Jones, President, The Maritime Alliance

The oceans are our last great frontier and maritime technology clusters around the world are needed to organize the companies and technologies needed to address humankind's greatest challenges. Clusters draw advantage from connections of interconnected firms and institutions in geographic concentrations. With their focus on the oceans, maritime clusters do not focus on arbitrary 12- or 200-mile boundaries, rather must have an international orientation. Sustainable development of the oceans is a common responsibility and requires enlightened leadership. International collaboration among maritime technology clusters is needed to help meet the world's challenges.

## Ultra-Deep Ocean Science and Enabling Technology (3): Vehicles and Payloads

**Date:** Wednesday 25 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 1

**Chairs:** Barbara Fletcher, OCEANS 13 Technical Program Chair

In the third Ultra-Deep session, both regular and invited technical papers discuss the vehicle and payload technologies required to reach the ultra-deep ocean.

## International Business Special Session: Technology Innovation to Operate Effectively in the Arctic

**Date:** Wednesday 25 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 2

Chair: Mario Diez, Trade Commissioner, Consulate of Canada

With increased activity levels in the Arctic there are new challenges and demands for technology innovation in this harsh environment. This session focuses on opportunities for companies and researchers to support Canadian efforts in the Arctic marine environmentfrom several perspectives, including situational awareness, emergency response, science, and sustainable development of the Arctic.

## Wet Diving in the Industrial and Scientific Shallows

**Date:** Wednesday 25 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 3

**Chairs:** Michael Max, Chair, Diving Committee, Marine Technology Society

Although the focus of diving has tended to follow industry activity into deeper water where wet diving is no longer practicable, a great deal of demand for wet industrial and scientific diving persists. This is because the upper photic zone, including coral reefs are extremely important to biosystems on which a substantial part of our food chain is dependent and because of the increased industrial activity in shallow water including docks, harbors, pipeline and cable terminations on land, and assisting launch and recovery of a myriad of geophysical and sampling apparatus. The focus of this informal meeting is to allow open discussion of the principle methodologies being used today. Suggestions for technology development will be assessed on a cost - benefit analysis.

## Research and Technology Needs for Stewardship of the Deep Sea

**Date:** Wednesday 25 September
**Time:** 3:30-4:50
**Location:** Pacific Salon 1

**Chairs:** Lisa Levin, Scripps Institution of Oceanography

The deep ocean is the largest habitat on the planet; it is also the least known. The deep ocean is increasingly recognized as a vast repository of energy, mineral, fishery and genetic resources. This creates an urgent need for environmental (ideally ecosystem-based) management in this realm. But its remoteness

offers technological and economic challenges to discovery, exploitation, monitoring and enforcement of law and policy as it applies to the areas within and beyond national jurisdictions. A panel discussion is proposed to highlight the multisectoral needs for new approaches and technologies that enable us to manage and maintain the integrity of deep ocean ecosystems and their resources. Topics will include: What are the ecosystems and services most vulnerable, and in need of management in the deep ocean? What science needs to be done to properly manage deep-sea resources and ecosystems? What tools and strategies are available for ecosystem-based management of the deep sea? What are the regulatory and jurisdictional challenges and gaps? How can technology aid development, management and enforcement of deep-sea policy?

## Building Successful Inter-Sector Partnerships with the National Oceanographic Partnership Program (NOPP)

**Date:** Wednesday 25 September
**Time:** 3:30-4:50
**Location:** Pacific Salon 2

**Chairs:** Nicholas Obolensky, JD, MMA, Special Assistant, Knauss Sea Grant Fellow, NOAA Office of Oceanic and Atmospheric Research

The National Oceanographic Partnership Program (NOPP) was created by Congress in 1997 and was established to promote national goals through improved knowledge of the oceans and to coordinate and strengthen oceanographic efforts in support of those goals by facilitating partnerships among various stakeholders in the community –namely federal agencies, academia, and industry. The NOPP is implemented through the Interagency Working Group on Ocean Partnerships (IWG-OP), which focuses on oceanographic topics that are too big for a single agency to accomplish, cut across multiple missions, and/or require government-private/industry-academic partnership for success.

This special review session will focus on how successful partnerships between members of a variety of sectors within the oceanographic community are created and successfully implemented. It will provide an introduction to the NOPP program and IWG-OP. In the wake of the current state of funding within the scientific community and throughout the United States, the ability to successfully build and implement inter-sector partnerships will be vital to the survival and success of the oceanographic research community. This session is ideal for anyone wanting to learn how to engage additional partners in their work or who want to learn how to reach members of a different sector in the oceanographic community.

## Ocean Exploration 2020: A National Forum Panel Discussion

**Date:** Thursday 26 September
**Time:** 8:20-10:00
**Location:** Pacific Salon 3

**Chair:** John McDonough, Acting Director, NOAA's Office of Ocean Exploration and Research

The Ocean Exploration 2020 panel is a discussion on the results of the first-ever gathering of the ocean exploration community (government agencies, academic institutions, the private sector, and not-for-profit organizations) to design a strategy for a truly national program of ocean exploration. Panelists will discuss Ocean Exploration 2020 recommendations for exploration priorities, technology development, citizen science, and partnerships to achieve national ocean exploration objectives.

## NOAA Town Hall on Systematic Telepresence-Enabled Ocean Exploration

**Date:** Thursday 26 September
**Time:** 10:30-11:50
**Location:** Pacific Salon 3

**Chair:** Craig Russell, Program Manager, NOAA Ship Okeanos Explorer

This town hall will highlight the present and future benefits and applications of systematic telepresence through a recap of NOAA's 2013 ocean exploration missions and discussion of the results of Ocean Exploration 2020.

## San Diego Maritime History

**Date:** Thursday 26 September
**Time:** 10:30-11:50
**Location:** Pacific Salon 2

**Chair:** Kevin Sheehan, Ph.D., Collections Manager / Librarian / Archivist, Maritime Museum of San Diego

San Diego has a rich maritime history, chronicled after the arrival of the first European ship, San Salvador, in 1542. Oceanic exploration and technology are the key legacies that continue today in San Diego research institutions, governmental agencies and high tech maritime industries. As the centrifugal force behind this history, the Maritime Museum of San Diego will present various aspects of San Diego's maritime history – from the building of the sixteenth century galleon to the deepest diving research sub USS Dolphin – the three panelists will provide a unique reference point to San Diego's place in maritime history.

The Museum is offering free admission to conference participants as they venture to the Gala aboard USS Midway on Wed. Sept 25.

## Everything You Didn't Know to Ask About Ships to Reefs

**Date:** Thursday 26 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 3

**Chair:** Dick Long, California Ships to Reefs, Inc.

Experts will discuss history, current state, science, technical aspects, and economics of ships to reefs programs, and what's coming in the near future.

## International Business Special Session: U.S. Export Control Reform Affecting the Marine Industry

**Date:** Thursday 26 September
**Time:** 1:20-3:00
**Location:** Pacific Salon 2

**Chair:** Julia Rauner Guerrero, Marine Technology Team Leader, U.S. Commercial Service - U.S. Department of Commerce

U.S. Export Controls Regulations recent reforms brought numerous U.S. Department of State International Traffic in Arms Regulations (ITAR) controlled products into U.S. Department of Commerce Bureau of Industry and Security (BIS) jurisdiction. Marine products affected include submersible vessels, oceanographic equipment and related articles, as well as surface vessels of war and special naval equipment. This seminar will outline the basics of complying with U.S. export control regulations and highlight reform changes that will improve international marketing and sales opportunities for many U.S. marine industry companies.

# Tutorials

## Monday, September 23

Tutorials are half-day or full-day presentations that are meant to complement the technical program of OCEANS '13 by describing the fundamental elements of a technology and/or rudiments of a subject in a classroom setting.

**T1. Optical Communications Design Principles: Fiber and Free Space**
Instructor: Michael Brininstool
Session: 8:00am – 5:00pm
Location: Royal Palm One

**T2. BioAcoustics : Passive Acoustics Monitoring**
Instructor: BioWaves Staff
Session: 8:00am – 5:00pm
Location: Royal Palm Two

**T3. Fundamentals of Free Vehicle Design and Operation**
Instructor: Kevin Hardy, Craig Higgins, John Head, Larry Herbst
Session: 8:00am – 5:00pm
Location: Royal Palm Three

**T4. Multibeam Imaging SONARS: Fundamentals, Use and Specification**
Instructor: Mark Atherton
Session: 8:00am – 12:00pm
Location: Royal Palm Four

**T5. AUV Technology and Application Basics**
Instructor: Brian Kieft & Brett Hobson
Session: 8:00am – 12:00pm
Location: Royal Palm Five

**T6. Interpreting ADCP Data - Efficiently and Effectively**
Instructor: Pete Spain & Paul Devine
Session: 8:00am – 12:00pm
Location: Royal Palm Six

**T7. Narrowband and Broadband Beamforming**
Instructor: John E. Piper
Session: 8:00am – 12:00pm
Location: Pacific Salon One

**T8. Fundamentals of Additive Manufacturing for Ocean Applications**
Instructor: Dan Searle
Session: 8:00am – 12:00pm
Location: Pacific Salon Two

**T9. Hydroacoustic Methods for Aquatic Habitat Assessment and Mapping**
Instructor: Eric Munday
Session: 8:00am – 12:00pm
Location: Pacific Salon Three

**T10. Underwater Optical Imaging: Theory and Practice**
Instructor: Jules S. Jaffe
Session: 1:00pm – 5:00pm
Location: Pacific Salon Four

**T11. A Primer on Coherent and Coherent-on-Receive Marine Radar Fundamentals and Applications to Remote Sensing of Waves and Currents**
Instructor: Dennis Trinza
Session: 1:00pm – 5:00pm
Location: Pacific Salon Five

**T12. Fixed Position Monitoring using Split-beam Hydroacoustics**
Instructor: Eric Munday
Session: 1:00pm – 5:00pm
Location: Pacific Salon Six

**T13. Unmanned Underwater Vessels (UUV) - Modern Capabilities of Autonomous and Remotely Operated Systems and Sensors**
Instructor: Michael B. Jones, Eric Patten, & John Scanlon
Session: 1:00pm – 5:00pm
Location: Pacific Salon Seven

NOTES

# Student Posters

## Location: Atlas Ballroom

**Resource assessment of large marine current turbine arrays**
**Daniel Coles**, *University of Southampton*
Luke Blunden, *University of Southampton*
AbuBakr Bahaj, *University of Southampton*

**On the Performance of Underwater Communication System in Noise with Gaussian Mixture Statistics**
**Sharbari Banerjee**, *Indian Institute of Technology Delhi*
Monika Agrawal, *Indian Institute of Technology Delhi*

**Brushless DC motor control system based on submarine hybrid transmission technology**
**Wen Liu**, *Hangzhou Dianzi University*
Qiao Zhou, *Hangzhou Dianzi University*
Qing Sheng, *Hangzhou Dianzi University*
Qing Kong, *Hangzhou Dianzi University*

**Localization of a sound source: optimal positioning of sensors carried on autonomous surface vehicles**
**Bruno Ferreira**, *INESC TEC*
Aníbal Matos, *INESC TEC*
Helder Campos, *INESC TEC*
Nuno Cruz, *INESC TEC*

**Reconstructing surface wave profiles from forward scattered acoustic pulses**
**Sean Walstead**, *University of California, San Diego*
Grant Deane, *University of California, San Diego*

**Raspberry PI Based Stereo Vision For Small Size ASVs**
**Ricardo Neves**, *Faculdade de Engenharia da Universidade do Porto*
Aníbal Matos, *INESC TEC*

**Mosaics For Burrow Detection in Underwater Surveillance Video**
**Ken Sooknanan**, *Trinity College*
David Corrigan, *Trinity College*
Anil Kokaram, *Trinity College*
Naomi Harte, *Trinity College*
James Wilson, *Trinity College*
Jennifer Doyle, *Marine Scientist/The Marine Institute Galway*

**Planning Efficient Paths through Dynamic Flow Fields in Real World Domains**
**Christopher Tomaszewski**, *Robotics Institute, Carnegie Mellon University*
Abhinav Valada, *Robotics Institute, Carnegie Mellon University*
Paul Scerri, *Robotics Institute, Carnegie Mellon University*

**Range Limitations on Acoustic Adjoint Inversions**
**Edward Richards**, *University of Rhode Island*
Gopu Potty, *University of Rhode Island*

**Forward-Look 2-D Sonar Image Formation and 3-D Reconstruction**
**Murat Aykin**, *University of Miami*
Shahriar Negahdaripour, *University of Miami*

**Investigation of Long-Pulse Laser-Induced Breakdown Spectroscopy for Analysis of the Composition of Rock and Sediment Samples Submerged in Seawater**
**Tomoko Takahashi**, *University of Tokyo*
Blair Thornton, *University of Tokyo*
Kohichi Ohki, *OK Lab. co., Ltd.*
Tetsuo Sakka, *Kyoto University*
Katsuhiko Suzuki, *JAMSTEC*

**Oil Droplet Fate in the Gulf of Mexico**
**Eric Piper**, *Florida State University*

**A Novel Blending Technique for Two-Dimensional Forward-Looking Sonar Mosaicing**
**Natalia Hurtos**, *University of Girona*
Xavier Cufi, *University of Girona*
Joaquim Salvi, *University of Girona*

**Direct Measurements of Sediment Response to Waves with "Smart Sediment Grains"**
**Donya Frank**, *University of New Hampshire*
Diane Foster, *University of New Hampshire*
Pai Chou, *University of California Irvine*
Yu-Min Kao, *National Tsing Hua University*
Joseph Calantoni, *The Naval Research Laboratory*
In-Mei Sou, *The Naval Research Laboratory*

**An extension of maximal marginal diversity based feature selection applied to underwater acoustic data**
**Samir Ouelha**, *DCNS & IM2NP/Isen*
Philippe Courmontagne, *ISEN*
Fabien Chaillan, *DCNS*
Jean-Rémi Mesquida, *DCNS*

**Development of the three-dimensional visualization method for the inner structure of small size fish using 25 MHz acoustic profile measurement**
**Masaru Nagaso**, *Institute of Industrial Science, University of Tokyo*
Katsunori Mizuno, *Institute of Industrial Science, University of Tokyo*
Akira Asada, *Institute of Industrial Science, University of Tokyo*
Kazuto Kobayashi, *Honda Electronics Co., LTD*
Mami Matsukawa, *Doshisha University*

**Sum-Bottom Synthetic Aperture Sonar in Robust Circumstances**
**Akihisa Fukami**, *University of Tokyo*
Akira Asada, *University of Tokyo*
Seiichi Takanashi, *COSMO OCEAN CO. LTD.*
Toshio Ohyagi, *COSMO OCEAN CO. LTD.*
Takashi Kanamaru, *COSMO OCEAN CO. LTD.*

**The Research on the Coverage Area of Multistatic Sonar under Various Work Modes**
**Jia Lu**, *Harbin Engineering University*
Xueli SHENG, *Harbin Engineering University*
Qing Ling, *Science and Technology on Complex Ship Systems Simulation Laboratory*
Jiang Xu, *Science and Technology on Complex Ship Systems Simulation Laboratory*
Yanyi Yuan, *Science and Technology on Complex Ship Systems Simulation Laboratory*

**A 532 nm Chaotic Lidar Transmitter for High Resolution Underwater Ranging and Imaging**
**Luke Rumbaugh**, *Clarkson University*
Yifei Li, *University of Massachussets Dartmouth*
Erik Bollt, *Clarkson University*
William Jemison, *Clarkson University*

NOTES

# Technical Program

## Tuesday, September 24

**Offshore Structures**
**Location: Royal Palm Salon 1**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Chair:**
**Kwanghoe Jung, Hyundai Engineering & Construction**

**(1:20 PM) Numerical & Experimental Study on the Steel-Concrete Connection for Supporting Structure of Current Power System**
**Kwanghoe Jung**, *Hyundai Engineering & Construction*
Jeseong Yoon, *Hyundai Engineering & Construction*
Kwangoh Ko, *Hyundai Engineering & Construction*
Changboem Park, *Hyundai Engineering & Construction*

**(1:40 PM) Water City as a Solution to the Escalating Sea Level Rise**
**Toshio Nakajima**, *Tokyo Metropolitan University*
Motohiko Umeyama, *Tokyo Metropolitan University*

**(2:00 PM) Comparison of wave characteristic due to hybrid substructures for offshore wind turbines**
**Min-Su Park**, *Korea Institute of Construction Technology*
Youn-Ju Jeong, *Korea Institute of Construction Technology*
Young-Jun You, *Korea Institute of Construction Technology*

**(2:20 PM) Frequency Response Function of a Truss Spar Subjected to Wave Loads**
Eu Shawn Lim, *Universiti Teknologi PETRONAS*
**Guo Zheng Yew**, *Universiti Teknologi PETRONAS*
Mohd Shahir Liew, *Universiti Teknologi PETRONAS*
Cheng Yee Ng, *Universiti Teknologi PETRONAS*

**(2:40 PM) Development of a VIV observation method of rotating drill pipe using accelerometers**
**Zengo Yoshida**, *University of Tokyo*
Tomoya Inoue, *JAMSTEC*
Chang-Kyu Rheem, *University of Tokyo*

**Array Signal Processing and Array Design 1**
**Location: Royal Palm Salon 2**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Cornel Ioana, Grenoble INP**
**Manuel Haide, University of Applied Sciences Ulm**

**(1:20 PM) An Ultrasonic Phased-Array Sensor to Measure the Velocity Profile of Open Channels**
**Manuel Haide**, *University of Applied Sciences Ulm*
Wolfgang Schroer, *University of Applied Sciences Ulm*

**(1:40 PM) The Subarray MVDR Beamformer for Active Littoral Sonar Systems**
**Leverett Bezanson**, *University of California San Diego*
Kevin LePage, *Centre for Maritime Research and Experimentation*
Robert Been, *Centre for Maritime Research and Experimentation*

**(2:00 PM) Distributed Network of Underwater Sensors Based on Local Time-Frequency Coherence Analysis**
Florian Dadouchi, *Grenoble INP*
**Cornel Ioana**, *Grenoble INP*
Cedric Gervaise, *Grenoble INP*
Julien Mallet, *OSEAN*
Olivier Philippe, *OSEAN*
Didier Mauuary, *CYBERIO*
Stephane Jespers, *DGA*
Jerome Mars, *Grenoble INP*

**(2:20 PM) Beamforming for Wireless Communications Between Buoys**
Fengzhong Qu, *Institute of Underwater Technology and Ship Engineering*
**Bin Zhang**, *Institute of Underwater Technology and Ship Engineering*
Ye Cheng, *Institute of Underwater Technology and Ship Engineering*
Fengzhong Qu, *Institute of Underwater Technology and Ship Engineering*
Zhujun Zhang, *Institute of Underwater Technology and Ship Engineering*
Ying Ye, *Institute of Ocean Resources*
Ying Chen, *Institute of Underwater Technology and Ship Engineering*
Liuqing Yang, *Institute of Automation, Chinese Academy of Sciences*

**(2:40 PM) Design of Robust Superdirective Beamformer for Circular Sensor Arrays**
**Yong Wang**, *Northwestern Polytechnical University*
Yixin Yang, *Northwestern Polytechnical University*
Yuanliang Ma, *Northwestern Polytechnical University*
Zhengyao He, *Northwestern Polytechnical University*
Chao Sun, *Northwestern Polytechnical University*

**Sonar Imaging 1**
**Location: Royal Palm Salon 3**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Ellyn Montgomery, USGS**
**Chao Sun, Institute of Acoustic Engineering, Northwestern Polytechnical University**

**(1:20 PM) Application of High Resolution Scanning Sonar with Multi Legged Underwater Robot**
**Hyuk Baek**, *KIOST*
Bong-Huan Jun, *KIOST*
Jin-Yeong Park, *KIOST*
Bo-Ram Kim, *KIOST*
Pan-Mook Lee, *KIOST*

**(1:40 PM) Studying seafloor bedforms using autonomous stationary imaging and profiling sonars.**
**Ellyn Montgomery**, *USGS*
Christopher Sherwood, *U.S. Geological Survey*

**(2:00 PM) Comparison of Feature Detection Techniques for AUV Navigation Along a Trained Route**
Peter King, *Memorial University of Newfoundland*
Benjamin Anstey, *Memorial University of Newfoundland*
**Andrew Vardy**, *Memorial University of Newfoundland*

**(2:20 PM) Underwater 2-D Sector-Scan Imaging Using MIMO Sonar with Narrowband LFM Pulses**
**Chao Sun**, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Xiong-hou Liu, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Jie Zhuo, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Zong-wei Liu, *Northwestern Polytechnical University*

**(2:40 PM) Underwater Acoustic Imaging with Spatial Cross Correlation for Weak Noise Source Identification**
**Hu Yang**, *Northwestern Polytechnical University*
Hang Chen, *Northwestern Polytechnical University*
Zhanlong Yang, *Northwestern Polytechnical University*
Yanni Gou, *Northwestern Polytechnical University*
Jinyan Du, *Shandong Academy of Science*

**Radars**
**Location: Royal Palm Salon 4**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Malcolm Heron, James Cook University**
**David Weissman, Hofstra University**

**(1:20 PM) Interpretation of VHF radar echoes from a complex flow field**
**Malcolm Heron**, *James Cook University*
Michael O'Shea, *Beaufort Research - HMRC*
Jimmy Murphy, *Beaufort Research - HMRC*
Leif Petersen, *Helzel Messtechnik GmbH*
Daran Mollaghan, *Beaufort Research - HMRC*
Arnstein Prytz, *Marine Geophysical Laboratory*

**(1:40 PM) Improvement of Surface Current Measurements with Spectra Reprocessing for 13 MHz SeaSonde Systems**
**Colin Evans**, *Rutgers Institute of Marine and Coastal Sciences*
Hugh Roarty, *Rutgers Institute of Marine and Coastal Sciences*
Michael Smith, *Rutgers Institute of Marine and Coastal Sciences*
John Kerfoot, *Rutgers Institute of Marine and Coastal Sciences*
Scott Glenn, *Rutgers Institute of Marine and Coastal Sciences*

**(2:00 PM) Determination of Phase difference of Backscatter Signals from Coherent-on-Receive Microwave Marine Radar for Wave Measurement**
**Hwa Chien**, *National Central University*
Hao-Yuan Cheng, *National Central University*
Dennis Trizna, *Imaging Science Research*

**(2:20 PM) Coincident, High Resolution Measurements of Ocean Surface Rain in Support of Improved Ascat-Retrieved Winds**
**David Weissman**, *Hofstra University*
Marcos Portabella, *Institut de Ciències del Mar*
Ad Stoffelen, *KNMI Royal Netherlands Meteorological Institute*

**(2:40 PM) Interpolated swell fields from SAR measurements**
Pierre Tandeo, *Telecom Bretagne*
**René Garello**, *Telecom Bretagne*
Romain Husson, *CLS*
Bertrand Chapron, *Ifremer*
Fabrice Collard, *CLS*
Ronan Fablet, *Telecom Bretagne*
Pierre Fabry, *Telecom Bretagne*

**Geoacoustic Inversion**
**Location: Royal Palm Salon 5**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Chair:**
**Angeliki Xenaki, Technical University of Denmark**

**(1:20 PM) Statistical characterization of weak scattering fields with inverse methods**
**Angeliki Xenaki**, *Technical University of Denmark*
Peter Gerstoft, *Scripps Institution of Oceanography*
Olivier Carriere, *Scripps Institution of Oceanography*
Klaus Mosegaard, *Technical University of Denmark*

**(1:40 PM) Passive Fathometry in Australian Water**
**Md Jahangir Alam**, *UNSW Canberra*
Elanor Huntington, *UNSW Canberra*
Michael Frater, *UNSW Canberra*

**(2:00 PM) Validation of an Inversion Scheme for Shear Wave Speed Using Scholte Wave Dispersion**
**Jennifer Giard**, *Marine Acoustics, Inc.*
Gopu Potty, *University of Rhode Island*
James Miller, *University of Rhode Island*
Christopher Baxter, *University of Rhode Island*

**(2:20 PM) Rapid Determination of Seafloor Acoustic Reflectivity by Exploiting Frequency Variability within Striations Data**
**Adrian Jones**, *Defence Science and Technology Organisation*
Paul Clarke, *Defence Science and Technology Organisation*
David Bartel, *Defence Science and Technology Organisation*

**(2:40 PM) Synthetic aperture geoacoustic inversion in the presence of radial velocity and acceleration dynamics**
**Bien Aik Tan**, *Scripps Institution of Oceanography*
Peter Gerstoft, *Scripps Institution of Oceanography*
Caglar Yardim, *Scripps Institution of Oceanography*
William Hodgkiss, *Scripps Institution of Oceanography*

**AUV Design**
**Location: Royal Palm Salon 6**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Andy Bowen, Woods Hole Oceanographic Institution**
**Ricardo Martins, Universidade do Porto**

**(1:20 PM) Development of Hovering Type AUV 'Cyclops' for Precision Observation**
Son-Cheol Yu, *POSTECH*
**Juhyun Pyo**, *POSTECH*
Han-Gil Joe, *POSTECH*
Jin-Hwan Kim, *KAIST*
Armagan Elibol, *KAIST*

**(1:40 PM) An Extensible Networking Architecture for Autonomous Underwater Vehicles**
**Ricardo Martins**, *Universidade do Porto*
João Sousa, *Universidade do Porto*

**(2:00 PM) An Un-Tethered ROV for Routine Access and Intervention in the Deep Sea**
**Andy Bowen**, *Woods Hole Oceanographic Institution*
Michael Jakuba, *Woods Hole Oceanographic Institution*
Norman Farr, *Woods Hole Oceanographic Institution*
Jonathan Ware, *Woods Hole Oceanographic Institution*
Christopher Taylor, *Woods Hole Oceanographic Institution*
Daniel Gomez-Ibanez, *Woods Hole Oceanographic Institution*
Casey Machado, *Woods Hole Oceanographic Institution*
Clifford Pontbriand, *Woods Hole Oceanographic Institution*

**(2:20 PM) Biological Inspired System for Localization and Mapping in Underwater Environments**
Luan Silveira, *Universidade Federal do Rio Grande*
Silvia Botelho, *Federal University of Rio Grande*
Paulo Drews, *Federal University of Rio Grande*
Felipe Guth, *Federal University of Rio Grande*
Diones Fischer, *Federal University of Rio Grande*
**Felipe Moraes**, *Federal University of Rio Grande*

**(2:40 PM) Design of an Autonomous Under-Ice Exploration System**
**Marc Hildebrandt**, *DFKI RIC*
Jan Albiez, *DFKI RIC*
Marius Wirtz, *DFKI RIC*
Philipp Kloss, *DFKI RIC*
Jens Hilljegerdes, *DFKI RIC*
Martin Fritsche, *DFKI RIC*

**AUV Control and Simulation 1**
**Location: Pacific Salon 4**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Douglas Au, Monterey Bay Aquarium Research Institute**
**Dean Edwards, University of Idaho**

**(1:20 PM) Real-Time Dynamic Model Learning and Adaptation for Underwater Vehicles**
Joshua Weiss, *Naval Postgraduate School*
**Noel Du Toit**, *Naval Postgraduate School*

**(1:40 PM) Learned Anticipation Strategy for Speed Control in an AUV Fleet**
Juan Marulanda, *University of Idaho*
**Dean Edwards**, *University of Idaho*
Robert Heckendorn, *University of Idaho*
Terence Soule, *University of Idaho*

**(2:00 PM) A Simulator for Underwater Human-Robot Interaction Scenarios**
**Kevin DeMarco**, *Georgia Institute of Technology*
Michael West, *Georgia Tech Research Institute*
Ayanna Howard, *Georgia Institute of Technology*

**(2:20 PM) Multi-AUVs Formation Control with Acoustic Communication Constraints**
**Hongli Xu**, *Shenyang Institute of Automation*
Guannan Li, *Institute of informa, Shenyang Ligong University*

**(2:40 PM) Underwater Recovery Realization for an AUV Using Positioning-to-Line Strategy**
**Jiajia Zhou**, *Harbin Engineering University*
Wei Zhang, *Harbin Engineering University*
Hongjian Wang, *Harbin Engineering University*
Xinqian Bian, *Harbin Engineering University*

**Marine Life and Ecosystems**
**Location: Pacific Salon 5**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Farley Shane, MBARI**
**Ying Chen, Ocean College, Zhejiang University**

**(1:20 PM) Ocean Sunfish in Canadian Pacific waters: Summer Hotspot for a Jelly-eating Giant?**
**Tlerney Thys**, *Ocean Sunfish Research and Tagging Program*
Rob Williams, *Oceans Initiative*

**(1:40 PM) Development and Sea Trials of a New Camera-Based Assessment Survey System for Reef Fish Stocks Assessment**
**Chad Lembke**, *University of South Florida College of Marine Science*
Steve Murawski, *University of South Florida College of Marine Science*
Xianpeng Shi, *University of South Florida College of Marine Science*
Steve Butcher, *University of South Florida College of Marine Science*
Alex Silverman, *University of South Florida College of Marine Science*
Sarah Grasty, *University of South Florida College of Marine Science*

**(2:00 PM) xFOCE An Open Source Multi-Disciplinary Resource for In-Situ Ocean Acidification Research**
**Farley Shane**, *MBARI*
Kent Headley, *MBARI*
Peter Walz, *MBARI*
James Scholfield, *MBARI*
George Matsumoto, *MBARI*
Karen Salamy, *MBARI*
Bob Herlein, *MBARI*
Edward Peltzer, *MBARI*
Thom Maughan, *MBARI*
Tom O'Reilly, *MBARI*
Chris Lovera, *MBARI*
William Kirkwood, *MBARI*
James Barry, *MBARI*
Peter Brewer, *MBARI*

**(2:20 PM) Secure seafloor container CO2 storage**
**Mark Capron**, *PODenergy, Inc.*
Jim Stewart, *PODenergy, Inc.*
Ronald Rowe, *Queen's University*

**(2:40 PM) Development of air-lifted artificial upwelling powered by wave**
Jiawang Chen, *Ocean College, Zhejiang University*
**Ying Chen**, *Ocean College, Zhejiang University*
Yang Jing, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Naikuang Liang, *National Taiwan University*
Lin Shan, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Fan Wei, *Hangzhou Dianzi University*
Ge Han, *Ocean College, Zhejiang University*
Haocai Huang, *Zhejiang University*

**Current Measurement Technology 1**
**Location: Pacific Salon 6**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Albert Williams, Woods Hole Oceanographic Institution**
**Steven Anderson, Areté Associates**

**(1:20 PM) Adapting to Technology Advances and End of Life Announcements for Current Measurement Technologies**
**Albert Williams**, *Woods Hole Oceanographic Institution*
Archie Morrison, *Nobska Development Inc.*

**(1:40 PM) A new long range current profiler**
**Atle Lohrmann**, *Nortek AS*
Sven Nylund, *Nortek AS*

**(2:00 PM) Airborne optical remote sensing of ocean currents.**
**Steven Anderson**, *Areté Associates*
Seth Zuckerman, *Areté Associates*
Shejun Fan, *Fugro GEOS Inc.*
Jan van Smirren, *Fugro GEOS Inc.*

**(2:20 PM) Turbulence and Drag in a High Reynolds Number Tidal Passage Targeted for In-Stream Tidal Power Development**
**Alex Hay**, *Dalhousie University*
Justine McMillan, *Dalhousie University*
Richard Cheel, *Dalhousie University*
Douglas Schillinger, *Dalhousie University*

**(2:40 PM) An Investigation of the Accuracy of Current Profile Measurements from a Glider-Mounted ADCP Operating in Shallow Water**
**Jerry Mullison**, *Teledyne RD Instruments*
Chris DeCollibus, *Teledyne Webb Research*
Ben Allsup, *Teledyne Webb Research*

**Optical Sensors and Instrumentation**
**Location: Pacific Salon 7**
**Tuesday, September 24 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Clayton Chinn, Areté Associates**
**Xin Zhang, Institute of Oceanology, Chinese Academy of Sciences**

**(1:20 PM) Comparison of Measured and Theoretical Scattering and Polarization Properties of Narrow Size Range Irregular Sediment Particles**
**Wayne Slade**, *Sequoia Scientific, Inc.*
Yogesh Agrawal, *Sequoia Scientific, Inc.*
Ole Mikkelsen, *Sequoia Scientific, Inc.*

**(1:40 PM) New compact wide-area, high-resolution, IR sensor for UAV platforms**
**Clayton Chinn**, *Areté Associates*
Bill Morris, *Areté Associates*
Thomas Reilly, *Areté Associates*
Brett Hooper, *Areté Associates*

**(2:00 PM) The Driftcam: A Buoyancy Controlled Pelagic Camera Trap**
**Eric Berkenpas**, *National Geographic Society*
Bradley Henning, *National Geographic Society*
Charles Shepard, *National Geographic Society*
Alan Turchik, *National Geographic Society*

**(2:20 PM) Characterization of wavefront aberration in laser beam propagating over saline water and sands**
**Songsong Zhu**, *Ocean College, Zhejiang University*
Hong Song, *Ocean College, Zhejiang University*
Ping Yang, *Hangzhou Dianzi University*
Quanquan Mu, *State Key Laboratory of Applied Optics, Changchun Institute of Optics*
Fengzhong Qu, *Ocean College, Zhejiang University*
Haocai Huang, *Ocean College, Zhejiang University*
Han Ge, *Ocean College, Zhejiang University*
Jun Han, *Ocean College, Zhejiang University*
Jianxing Leng, *Ocean College, Zhejiang University*
Yong Cai, *Ocean Research Center of Zhoushan, Zhejiang University*
Ying Chen, *Ocean College, Zhejiang University*

**(2:40 PM) Development of an In Situ Raman Spectrometer for Measurement of Sediment Pore Water Geochemistry in a High-pressure Reaction Cell**
**Xin Zhang**, *Institute of Oceanology, Chinese Academy of Sciences*
Zhendong Luan, *Institute of Oceanology, Chinese Academy of Sciences*
Changan Chen, *Institute of Oceanology, Chinese Academy of Sciences*
Jun Yan, *Institute of Oceanology, Chinese Academy of Sciences*

**Deepwater Development Technology and Seafloor Engineering**
**Location: Royal Palm Salon 1**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Craig Etka, Scorpio Ventures, LLC**
**Michael Max, Hydrate Energy International**

**(3:30 PM) Technical Overview of a Safe, Configurable, Pressure Tolerant, Subsea LI-ION Battery System for Oil and Gas Deepwater Fields**
David White, *Southwest Electronic Energy*
**Leon Adams**, *Southwest Electronic Energy*

**(3:50 PM) Deepwater Technology for Oceanic Natural Gas Hydrate**
Arthur Johnson, *Hydrate Energy International*
**Michael Max**, *Hydrate Energy International*

**(4:10 PM) Safety & Reliability Capabilities of Lithium-Ion Battery Systems for Subsea Applications That Use Autonomous Lithium-Ion Battery Modules**
Leon Adams, *Southwest Electronic Energy*
**David White**, *Southwest Electronic Energy*

**(4:30 PM) Simulating the Environmental Impact of Tidal Turbines on the Seabed**
**Lada Vybulkova**, *University of Glasgow*
Marco Vezza, *University of Glasgow*
Richard Brown, *University of Strathclyde*

**Array Signal Processing and Array Design 2**
**Location: Royal Palm Salon 2**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Ali Massoud, Phoenix Technology**
**YuKang Liu, University of Kentucky**

**(3:30 PM) An Approach to Using Basic Three-Element Arrays in Tetrahedral-Based USBL Systems**
**Mikhail Arkhipov**, *Technological University of the Mixteca*

**(3:50 PM) Direction of Arrival Estimation Using Second Order Differential of Invariant Noise Multiple Signal Classification (SODIN-MUSIC)**
**Ali Massoud**, *Phoenix Technology*
Aboelmagd Noureldin, *Royal Military College*

**(4:10 PM) Robust Mode Space Supergain Beamforming for Circular Array Against Unknown Mismatch**
**YuKang Liu**, *University of Kentucky*
Yong Wang, *Northwestern Polytechnical University*
Jinyan Du, *Institute of Oceanographic Instrumentation, Shandong Academy of Sciences*
Yixin Yang, *Northwestern Polytechnical University*
Zhengyao He, *Northwestern Polytechnical University*

**(4:30 PM) Experimental Study on Robust Supergain Beamforming for Conformal Vector Arrays**
**Yixin Yang**, *Northwestern Polytechnical University*
Yong Wang, *Northwestern Polytechnical University*
Yuanliang Ma, *Northwestern Polytechnical University*
Chao Sun, *Northwestern Polytechnical University*

**Sonar Imaging 2**
**Location: Royal Palm Salon 3**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Chair:**
**Chen Shaohua, Yichang Testing Technique Research Institute**

**(3:30 PM) Guided block matching for sonar image registration using unsupervised Kohonen neural networks**
**Minh Tân Pham**, *Telecom Bretagne*
Didier Guériot, *Telecom Bretagne*

**(3:50 PM) Development of Image Sonar Simulator for Underwater Object Recognition**
Son-Cheol Yu, *POSTECH*
**Jeong-Hwe Gu**, *POSTECH*
Han-Gil Joe, *POSTECH*
Dong-Joong Kang, *Pusan National University*

**(4:10 PM) Real-Time Image Processing and Mapping Algorithm for Forward-looking Obstacle Avoidance Sonar of AUV**
Lei Gao, *Shenyang Institute of Automation*
**Hongli Xu**, *Shenyang Institute of Automation*

**(4:30 PM) An Effective Presentation of Navigation Information for Prevention of Maritime Disaster Using AIS and 3D-GIS**
**Xinjia Gao**, *Kobe University*
Shigeaki Shiotani, *Organization of Advanced Science and Technology, Kobe University*

**Remote Sensing**
**Location: Royal Palm Salon 4**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**William Plant, University of Washington**
**Katharine Woodard, University of Southern Mississippi**

**(3:30 PM) Breaking Waves Effects on Scatterometer and Radiometer Signatures of the Ocean**
**William Plant**, *University of Washington*
Vladimir Irisov, *Zeltech*

**(3:50 PM) Enhanced hybrid lidar-radar ranging technique**
**David Illig**, *Clarkson University*
William Jemison, *Clarkson University*
Luke Rumbaugh, *Clarkson University*
Robert Lee, *Electro-Optics and Special Mission Sensors Division, Naval Air Systems Command*
Alan Laux, *Electro-Optics and Special Mission Sensors Division, Naval Air Systems Command*
Linda Mullen, *Electro-Optics and Special Mission Sensors Division, Naval Air Systems Command*

**(4:10 PM) Impacts of Rainfall on Aquarius Sea Surface Salinity Measurements**
**Hamideh Ebrahimi**, *University of Central Florida*
Shadi Aslebagh, *University of Central Florida*
Andrea Santos-Garcia, *University of Central Florida*
Maria Jacob, *Comisión Nacional de Actividades Espaciales*
Linwood Jones, *University of Central Florida*
william Asher, *University of Washington*

**(4:30 PM) Monitoring bio-physical coupling in the open Gulf of Mexico using an integrated satellite sensor approach**
**Katharine Woodard**, *University of Southern Mississippi*
Jerry Wiggert, *University of Southern Mississippi*

**Marine Archaeology**
**Location: Royal Palm Salon 5**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Stephen Wood, Florida Institute of Technology**
**Douglas Levin, Washington College**

**(3:30 PM) Tools and techniques for underwater archaeological sites documentation**
David Scaradozzi, *Universita` Politecnica delle Marche*
**Laura Sorbi**, *Universita` Politecnica delle Marche*
Francesco Zoppini, *Universita` Politecnica delle Marche*
Pamela Gambogi, *SBAT-MIBAC*

**(3:50 PM) Hybrid Robot Crawler/Flyer for use in Underwater Archaeology**
**Stephen Wood**, *Florida Institute of Technology*
Sean Vandedrinck, *Florida Institute of Technology*
Brian Pugatch, *Florida Institute of Technology*
William Harris, *Florida Institute of Technology*
Jashelle Ojeda, *Florida Institute of Technology*
John Malone, *Florida Institute of Technology*
Mark Nanney, *Florida Institute of Technology*
Tareq Ismail, *Florida Institute of Technology*

**(4:10 PM) A Convenient Testbed for Applying Marine Technology to Shipwreck Investigations and a Tool for Contagious STEM Focused Education in Marine Exploration and Research**
**Douglas Levin**, *Washington College*
John Seidel, *Washington College*
Arthur Trembanis, *University of Delaware*
Michael Gosman, *Washington College*
Matthew Drutjons, *SUNY Plattsburgh*
Jacqueline Buskop, *Awty International School*
Jameson Culp, *The Potomac School*

**(4:30 PM) Investigation and Imaging of Archeological Sites by Manned Submersible**
Erika Montague, *OceanGate Inc.*
**Stockton Rush**, *OceanGate Inc.*
Brad Wells, *OceanGate Inc.*

**AUV Performance**
**Location: Royal Palm Salon 6**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Daxiong Ji, Shenyang Institute of Automation**
**Takeshi Nakatani, JAMSTEC**

**(3:30 PM) Maneuvering Performance of a Four-Fin Bio-Inspired UUV**
**Jason Geder**, *Naval Research Laboratory*
Ravi Ramamurti, *Naval Research Laboratory*
John Palmisano, *NOVA Research, Inc.*
Marius Pruessner, *Naval Research Laboratory*

**(3:50 PM) Dives of cruising-AUV "Jinbei" to methane hydrate area in Joetsu knoll**
**Takeshi Nakatani**, *JAMSTEC*
Hiroshi Yoshida, *JAMSTEC*
Tadahiro Hyakudome, *JAMSTEC*
Shojiro Ishibashi, *JAMSTEC*
Makoto Sugesawa, *JAMSTEC*
Yutaka Ota, *JAMSTEC*
Hiroshi Ochi, *JAMSTEC*
Yoshitaka Watanabe, *JAMSTEC*
Takao Sawa, *JAMSTEC*
Yoshiyuki Nakano, *JAMSTEC*
Hideaki Machiyama, *JAMSTEC*

**(4:10 PM) A tracking control method of ASV following AUV**
**Daxiong Ji**, *Shenyang Institute of Automation*
Shenzhen Ren, *Shenyang Institute of Automation*
Rong Zheng, *Shenyang Institute of Automation*
Ruiwen Yi, *Shenyang Institute of Automation*
Hongyu Zhao, *Shenyang Institute of Automation*
Yang Lin, *Shenyang Institute of Automation*

**AUV Control and Simulation 2**
**Location: Pacific Salon 4**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Karl von Ellenrieder, Florida Atlantic University**
**Tiedong Zhang, National Key Laboratory of Science and Technology on Autonomous Underwater Vehicle**

**(3:30 PM) Trajectory Planning and Following for Industrial Underwater Manipulators**
**Achint Aggarwal**, *DFKI GmbH*
Jan Albiez, *DFKI GmbH*

**(3:50 PM) Modeling and simulation of an AUV-towfish system**
Lea Miller, *Florida Atlantic University*
**Karl von Ellenrieder**, *Florida Atlantic University*

**(4:10 PM) Underwater Pipeline Detection and Following of AUV Based on the Optic Vision**
**Tiedong Zhang**, *National Key Laboratory of Science and Technology on Autonomous Underwater Vehicle*

**(4:30 PM) Sliding Mode Control Under Wave Disturbances for an AUV Using Nonlinear Observer Method**
**Zheping Yan**, *Harbin Engineering University*
Yibo Liu, *Harbin Engineering University*
Jiajia Zhou, *Harbin Engineering University*
Honghan Zhang, *Harbin Engineering University*

**Bioacoustics**
**Location: Pacific Salon 5**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Hannan Lohrasbipeydeh, University of Victoria**
**Harumi Sugimatsu, Institute of Industrial Science, University of Tokyo**

**(3:30 PM) Spectral Changes in Snapping Shrimp Sounds between Dusk and Dawn**
**Tyler Hee Wai**, *University of Hawaii*
John Gebbie, *Portland State University*
Martin Siderius, *Portland State University*
John Allen, *University of Hawaii*

**(3:50 PM) Characterization of Sperm Whale Vocalization Energy Based on Echolocation Signals**
**Hannan Lohrasbipeydeh**, *University of Victoria*
Tom Dakin, *University of Victoria*
Aaron Gulliver, *University of Victoria*
Adam Zielinski, *University of Victoria*

**(4:10 PM) Automatic discrimination and detection of small calf Ganges river dolphin (Platanista gangetica) from other age groups based on bio-sonar inter-click interval characteristics**
**Harumi Sugimatsu**, *Institute of Industrial Science, University of Tokyo*
Junichi Kojima, *KDDI R&D Laboratories Inc.*
Tamaki Ura, *Center for Socio-Robotic Synthesis, Kyushu Institute of Technology*
Rajendar Bahl, *Indian Institute of Technology, Delhi*
Sandeep Behera, *WWF-India*
Vivek Sheel Sagar, *WWF-India*
Hari Singh, *WWF-India*

**(4:30 PM) Signal kurtosis as a predictor of biological impacts from noise exposure**
**Michael Stocker**, *Ocean Conservation Research*

**Current Measurement Technology 2**
**Location: Pacific Salon 6**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Fredrik Thwaites, Woods Hole Oceanographic Institution**
**Mohammad Islam, Clarkson University**

**(3:30 PM) Development of a Second-Generation Ice Tethered Profiler with Velocity Sensor**
**Fredrik Thwaites**, *Woods Hole Oceanographic Institution*
Richard Krishfield, *Woods Hole Oceanographic Institution*

**(3:50 PM) Influence of Turbulent Flow Field on Power Generation**
**Armin Hamta**, *University of Manitoba*
Amir Birjandi, *University of Manitoba*
Eric Bibeau, *University of Manitoba*

**(4:10 PM) Determination of stream discharge, hydrodynamics and sediment transport variation at the estuarine section of the Hudson River and Estuary, NY**
**Mohammad Islam**, *Clarkson University*
James Bonner, *Clarkson University*
Chris Fuller, *Clarkson University*
William Kirkey, *Clarkson University*

**Holography and 3D Imaging**
**Location: Pacific Salon 7**
**Tuesday, September 24 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Steven Lohrenz, University of Massachusetts Dartmouth**
**Adrian Bodenmann, University of Tokyo**

**(3:30 PM) Calibration of an underwater stereoscopic vision system**
**Taufiqur Rahman**, *Memorial University of Newfoundland*

**(3:50 PM) Back Projection Algorithm for Line Structured Light Extraction**
**Alexander Duda**, *DFKI Bremen*
Jan Albiez, *DFKI Bremen*

**(4:10 PM) Wide Area 3D Seafloor Reconstruction and its Application to Sea Fauna Density Mapping**
**Adrian Bodenmann**, *University of Tokyo*
Thornton Blair, *University of Tokyo*
Ryota Nakajima, *JAMSTEC*
Hiroyuki Yamamoto, *JAMSTEC*
Tamaki Ura, *Kyushu Institute of Technology*

**(4:30 PM) Characteristics of 3D structures of ADCP echo intensity anomaly observed over hydrothermal vent fields of the Snail, Archean and Pika in the South Mariana Trough**
**Kanae Komaki**, *The General Environmental Technos Co., Ltd*
Yasuo Furushima, *JAMSTEC*
Hiroyuki Yamamoto, *JAMSTEC*

NOTES

# Technical Program

## Wednesday, September 25

**Buoy Technology 1**
**Location: Royal Palm Salon 1**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Andreas Marouchos, CSIRO**
**John Niedzwecki, Texas A&M University**

**(8:20 AM) A Study of DATA Logging System and the Southern Ocean buoy's Motion**
**Junichiro Tahara**, *JAMSTEC*
Shichiro Baba, *JAMSTEC*
Tatsuya Fukuda, *JAMSTEC*
Ota Yutaka, *JAMSTEC*
Yasuhisa Ishihara, *JAMSTEC*

**(8:40 AM) A System for Correcting ADCP Heading on Moorings at High Latitudes**
**Andreas Marouchos**, *CSIRO*
Matthew Sherlock, *CSIRO*
Steve Rintoul, *CSIRO*
Lindsay Pender, *CSIRO*

**(9:00 AM) Application of Subsea Wireless Technology to Environmental Monitoring**
**Amanda Collins**, *WFS Technology*

**(9:20 AM) Hydrodynamic Response Behavior of Ribbon Fairing in Uniform Flows**
**John Niedzwecki**, *Texas A&M University*
Sam Fang, *Texas A&M University*

**Sonar Signal Processing 1**
**Location: Royal Palm Salon 2**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Philippe Courmontagne, ISEN**
**Shaohua Chen, Yichang Research Institute of Testing Technology**

**(8:20 AM) Homing an Unmanned Underwater Vehicle Equipped with a DUSBL to an Unmanned Surface Platform: A Feasibility Study**
**Mario Miranda**, *Florida Atlantic University*
Pierre-Phillipe Beaujean, *Florida Atlantic University*
Edgar An, *Florida Atlantic University*
Manhar Dhanak, *Florida Atlantic University*

**(8:40 AM) A blind denoising process with applications to underwater acoustic signals**
**Philippe Courmontagne**, *ISEN*
Samir Ouelha, *DCNS/UWS Dpt*
Ugo Moreaud, *DCNS/UWS Dpt*
Fabien Chaillan, *DCNS/UWS Dpt*

**(9:00 AM) Improving coherent tonal detection with phase interpolation and compensation**
**Shaohua Chen**, *Yichang Research Institute of Testing Technology*

**(9:20 AM) An Acoustic Simulation Approach for Testing ADCP**
**Ma Long**, *Institute of Acoustics, Chinese Academy of Sciences*
Zhang Xiangjun, *Institute of Acoustics, Chinese Academy of Sciences*
Deng Kai, *Institute of Acoustics, Chinese Academy of Sciences*
Wu Jianbo, *Institute of Acoustics, Chinese Academy of Sciences*
Wang Changhong, *Institute of Acoustics, Chinese Academy of Sciences*

**Acoustic Imaging and Target Detection**
**Location: Royal Palm Salon 3**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Christian de Moustier, HLS Research, Inc.**
**Gerardo Acosta, UIB - UNCPBA - CONICET**
**Eric Maillard, Teledyne Reson**

**(8:20 AM) Multi-Detect Algorithm for Multibeam Sonar Data**
**Jesper Christoffersen**, *Reson A/S*

**(8:40 AM) Generation of Anaglyph using High Resolution Acoustic Images**
**Jin-Yeong Park**, *KIOST*
Hyuk Baek, *KIOST*
Pan-Mook Lee, *KIOST*
Bong-Huan Jun, *KIOST*

**(9:00 AM) OS-CFAR detection of targets in the water column and on the seafloor with a multibeam echosounder**
**Christian de Moustier**, *HLS Research, Inc.*

**(9:20 AM) Pipeline detection system from acoustic images utilizing CA-CFAR**
Sebastian Villar, *UNCPBA - CONICET*
**Gerardo Acosta**, *UIB - UNCPBA - CONICET*
Andre Sena, *UIB*
Alejandro Rozenfeld, *UIB - UNCPBA - CONICET*

**(9:40 AM) Object Detection with Sector Scanning Sonar**
**Jee Loong Chew**, *Acoustic Research Laboratory, TMSI, National University of Singapore*
Mandar Chitre, *Acoustic Research Laboratory, TMSI, National University of Singapore*

**Systems and Observatories 1**
**Location: Royal Palm Salon 4**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Marie Roch, San Diego State University**
**Chunyang Tan, Tongji University**

**(8:20 AM) Tethys: A workbench and database for passive acoustic metadata**
**Marie Roch**, *San Diego State University*
Simone Baumann-Pickering, *Scripps Institution of Oceanography*
Heidi Batchelor, *Scripps Institution of Oceanography*
Daniel Hwang, *Scripps Institution of Oceanography*
Ana Sirovi, *Scripps Institution of Oceanography*
Catherine Berchok, *NOAA Alaska Fisheries Science Center*
Danielle Cholewiak, *NOAA Northeast Fisheries Science Center*
Lisa Munger, *NOAA*
Erin Oleson, *NOAA Pacific Islands Fisheries Center*
Sofie Van Parijs, *NOAA Northeast Fisheries Science Center*
Denise Risch, *NOAA Northeast Fisheries Science Center*
Melissa Soldevilla, *NOAA Southeast Fisheries Science Center*
John Hildebrand, *Scripps Institution of Oceanography*

**(8:40 AM) Measuring underwater noise with high endurance surface and underwater autonomous vehicles**
António Silva, *University of Algarve*
**Anibal Matos**, *INESC TEC*
Cristiano Soares, *Marsensing*
José Alves, *Faculdade de Engenharia da Universidade do Porto*
José Valente, *Faculdade de Engenharia da Universidade do Porto*
Frederich Zabel, *Marsensing*
Henrique Cabral, *Faculdade de Engenharia da Universidade do Porto*
Nuno Abreu, *INESC TEC*
Nuno Cruz, *INESC TEC*
Rui Almeida, *INESC TEC*
Rui Ferreira, *CINAV*
Salman Ijaz, *University of Algarve*
Victor Lobo, *CINAV*

**(9:00 AM) The Pier Portal - a Web Controlled Underwater Profiling Camera**
**Aaron Jen**, *California Polytechnic State University*
Misha Balingit, *California Polytechnic State University*
Cory Spieler, *California Polytechnic State University*
John Ridgely, *California Polytechnic State University*
Andy Lam, *California Polytechnic State University*
Brian Markwart, *California Polytechnic State University*
Bridget Benson, *California Polytechnic State University*

**(9:20 AM) Deployment of an In-situ pH Calibrator on MARS Cabled Ocean Observatory**
**Chunyang Tan**, *Tongji University*
Kang Ding, *University of Minnesota*
William Seyfried, *University of Minnesota*

**(9:40 AM) A Test System for Cabled Ocean Observatories**
Feng Zhang, *Zhejiang University of China*
**Can-jun Yang**, *Zhejiang University of China*
Bo Jin, *Zhejiang University of China*
De-jun Li, *Zhejiang University of China*
Yu Xie, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Lu Zhang, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*

**Automatic Control**
**Location: Royal Palm Salon 5**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Sean Kragelund, Naval Postgraduate School**
**Michele Giorelli, Scuola Superiore Sant'Anna**

**(8:20 AM) Variable-Structure PID Controller with Anti-windup for autonomous underwater vehicle**
**Minsung Kim**, *POSTECH*
Hangil Joe, *POSTECH*
Juhyun Pyo, *POSTECH*
Jongkyoo Kim, *POSTECH*
Hyosin Kim, *POSTECH*
Son-cheol Yu, *POSTECH*

**(8:40 AM) Adaptive Speed Control for Autonomous Surface Vessels**
**Sean Kragelund**, *Naval Postgraduate School*
Vladimir Dobrokhodov, *Naval Postgraduate School*
Michael Hurban, *Naval Postgraduate School*
Curtis Khol, *U.S. Naval Academy*
Aurelio Monarrez, *Naval Postgraduate School*

**(9:00 AM) Forward Speed Control of a Pulsed-Jet Soft-Bodied Underwater Vehicle**
**Michele Giorelli**, *Scuola Superiore Sant'Anna*
Francesco Giorgio-Serchi, *Scuola Superiore Sant'Anna*
Ceclia Laschi, *Scuola Superiore Sant'Anna*

**(9:20 AM) Controller Design and Simulation of a Waterjet Propelled Unmanned Surface Vehicle with Uncertain Drag and Mass Properties**
**Wilhelm Klinger**, *Florida Atlantic University*
Ivan Bertaska, *Florida Atlantic University*
Jose Alvarez, *Florida Atlantic University*
Karl von Ellenrieder, *Florida Atlantic University*

**(9:40 AM) Nonlinear Model Predictive Control Based Ship Control System for Path Following**
Guoqing Xia, *Harbin Engineering University*
Ju Liu, *Harbin Engineering University*
**Yuanhui Wang**, *Harbin Engineering University*

**AUV Autonomy 1: Pandora**
**Location: Royal Palm Salon 6**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**David Lane, Heriot-Watt University**
**Nawid Jamali, Istituto Italiano di Tecnologia**

**(8:20 AM) Planning Inspection Tasks for AUVs**
Daniele Magazzeni, *London King's College*
Maria Fox, *King's College London*
Derek Long, *London King's College*
**Michael Cashmore**, *King's College London*
Tom Larkworthy, *Heriot-Watt University*

**(8:40 AM) Facilitating Cooperative AUV Missions: Experimental Results with an Acoustic Knowledge-Sharing Framework**
Zeyn Saigol, *Heriot-Watt University*
Gordon Frost, *Heriot-Watt University*
Nikolaos Tsiogkas, *Heriot-Watt University*
Francesco Maurelli, *Heriot-Watt University*
**David Lane**, *Heriot-Watt University*
Alex Bourque, *DRDC*
Bao Nguyen, *DRDC*

**(9:00 AM) Contact State Estimation using Machine Learning**
**Nawid Jamali**, *Istituto Italiano di Tecnologia*
Petar Kormushev, *Istituto Italiano di Tecnologia*
Darwin Caldwell, *Istituto Italiano di Tecnologia*

**(9:20 AM) Pose-based and Velocity-based Approaches to Autonomous Inspection of Subsea Structures**
**Francesco Maurelli**, *Heriot-Watt University*
Tom Larkworthy, *Heriot-Watt University*
David Lane, *Heriot-Watt University*
George Karras, *National Technical University of Athens*
Charalampos Bechlioulis, *National Technical University of Athens*
Kostas Kyriakopoulos, *National Technical University of Athens*

**(9:40 AM) TRIDENT: An European Project Targeted to Increase the Autonomy Levels for Underwater Intervention Missions**
**Pedro J Sanz**, *University of Jaume-I*
Pere Ridao, *Universitat de Girona*
Gabriel Oliver, *Universitat de les Illes Balears*
Giuseppe Casalino, *Universita degli Studi di Genova*
Yvan Petillot, *Heriot-Watt University*
Carlos Silvestre, *Instituto Superior Técnico*
Claudio Melchiorri, *Universita di Bologna*
Alessio Turetta, *Graal Tech SRL*

**Ultra-Deep Ocean Science and Enabling Technology: Overview**
**Location: Pacific Salon 1**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Chair:**
**Robert Wernli, First Centurion Enterprises**

**(8:20 AM) Why Should We Care About the Bottom of the Ocean?**
**Patricia Fryer**, *University of Hawaii, Manoa Campus*

**(8:40 AM) A Look at the History of Deep Ocean Exploration**
**Robert Wernli**, *First Centurion Enterprises*

**(9:00 AM) Underwater Simulator for Robotics Applications in High Depths**
Felipe Guth, *Federal University of Rio Grande*
Silvia Botelho, *Federal University of Rio Grande*
Marcos Amaral, *Federal University of Rio Grande*
**Felipe Moraes**, *Federal University of Rio Grande*

**(9:20 AM) Deep Water Instrument for Microbial Identification, Quantification, and Archiving**
**Douglas Pargett**, *MBARI*
Scott Jensen, *MBARI*
Brent Roman, *MBARI*
Christina Preston, *MBARI*
William Ussler, *MBARI*
Peter Girguis, *Harvard University*
James Birch, *MBARI*
Christopher Scholin, *MBARI*
Roman Marin, *MBARI*

**(9:40 AM) Microbial Life in the Ultra Deep Depths**
**Douglas Bartlett**, *Scripps Institution of Oceanography/UCSD*

**Ocean Energy: Wave Power**
**Location: Pacific Salon 4**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Maggie Merrill, Marine Marketing Services**
**Richard Chwaszczewski, SAIC**

**(8:20 AM) Circular-Slide Wave Energy Converter in Random Waves**
Hsiang Chen, *ChenDel Consulting*
**Donald DelBalzo**, *Marine Resources Information Corp.*

**(8:40 AM) Hybrid Resonant Wave Energy Harvesting Buoy for Sensor Applications**
**Douglas Gemme**, *Electro Standards Laboratories*
H. Greene, *Electro Standards Laboratories*
Travis Tucker, *Electro Standards Laboratories*
Raymond Sepe, *Electro Standards Laboratories*
Steven Bastien, *Electro Standards Laboratories*

**(9:00 AM) Highwave Off-Shore Energy: HOSE 2**
**Gary Ross**, *Highwave Inc.*
Chris O'Connor, *Highwave Inc.*
Michael Weaver, *Highwave Inc.*

**(9:20 AM) Up-wave surface elevation for smooth hydrodynamic control of wave energy conversion in irregular waves**
**Umesh Korde**, *South Dakota School of Mines and Technology*

**(9:40 AM) The Seaspoon: an innovative Wave Energy Converter**
**Lorenzo Di Fresco**, *Università di Genova*
Alberto Traverso, *Università di Genova*

**Information Management and Data Assimilation**
**Location: Pacific Salon 5**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Chair:**
**Benoit Pirenne, Ocean Networks Canada**

**(8:20 AM) SeaScribe: An annotation software for ROV dive operations**
**Reyna Jenkyns**, *Ocean Networks Canada*
Francoise Gervais, *Ocean Networks Canada*
Benoit Pirenne, *Ocean Networks Canada*

**(8:40 AM) OGC Sensor Web Enablement Compliance for Ocean Networks Canada Scalar Data**
**Benoit Pirenne**, *Ocean Networks Canada*
Eric Guillemot, *Ocean Networks Canada*

**(9:00 AM) A Metadata-Driven Management System for Numerical Modeling**
**Christoph Wosniok**, *Federal Waterways Engineering and Research Institute*
Rainer Lehfeldt, *Federal Waterways Engineering and Research Institute*

**(9:20 AM) SPLASSH (Student Programs Like Aquatic Science Sampling Headquarters http://splassh.meteor.com) A Socially Driven Platform About Water.**
**Lisa Adams**, *Kennesaw State University*
Robert Persaud, *Kennesaw State University*
Danielle Adams,
Saleh Hamadeh,

**(9:40 AM) Turbulence modelling using 3DVAR data assimilation in laboratory conditions**
**Agnieszka Olbert**, *National University of Ireland, Galway*
Stephen Nash, *National University of Ireland, Galway*
Emanuele Ragnoli, *IBM Research Ireland*
Michael Hartnett, *National University of Ireland, Galway*

**Oceanographic Instrumentation and Sensors 1**
**Location: Pacific Salon 6**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Wayne Liu, Space and Naval Warfare Systems Center Pacific**
**Paul Schrader, Oregon State University**

**(8:20 AM) Separating and Reattaching Microbial Fuel Cell on Sediment Bottom**
**Wayne Liu**, *Space and Naval Warfare Systems Center Pacific*
Gerald Hong, *Space and Naval Warfare Systems Center Pacific*
Jeff Kagan, *Space and Naval Warfare Systems Center Pacific*
Lewis Hsu, *ASEE*
Mignon Huang, *ASEE*
Beatrice Dea, *ASEE*

**(8:40 AM) Undersea Electronics Powered by Large Surface Area Benthic Microbial Fuel Cells**
**Jeffrey Kagan**, *Space and Naval Warfare Systems Center Pacific*
Andrew Higier, *Space and Naval Warfare Systems Center Pacific*
Lewis Hsu, *Space and Naval Warfare Systems Center Pacific*
Bart Chadwick, *Space and Naval Warfare Systems Center Pacific*

**(9:00 AM) Sensors and Acoustic Modems Powered by Benthic Microbial Fuel Cells at the MARS Observatory**
**Paul Schrader**, *Oregon State University*
Clare Reimers, *Oregon State University*
Cody Doolan, *Oregon State University*
Peter Girguis, *Harvard University*
Michael Wolf, *Teledyne Benthos Inc*
Dale Green, *Teledyne Benthos Inc*

**(9:20 AM) NOAA's Recent Field Testing of Coastal Water Quality Monitoring Systems--Quantifying Impacts of Biofouling and Investigating Chloride Measurement Techniques**
**Grace Gray**, *NOAA / NOS / CO-OPS*
Robert Heitsenrether, *NOAA / NOS / CO-OPS*

**(9:40 AM) Design of Data Fusion Algorithm of 10-DOF MEMS-IMU for Underwater Sensors**
**Yixuan Gao**, *Hangzhou Dianzi University*
Xueting Zhang, *Hangzhou Dianzi University*
Qingpeng Kong, *Hangzhou Dianzi University*
Yucheng Xu, *Hangzhou Dianzi University*

**Imaging and Vision 1**
**Location: Pacific Salon 7**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Tali Treibitz, Scripps Institution of Oceanography**
**Jie Zheng, Hangzhou Dianzi University**

**(8:20 AM) Groundtruth system for underwater benchmarking**
**Alfredo Martins**, *INESC TEC*
André Dias, *INESC TEC*
Hugo Silva, *INESC TEC*
José Almeida, *INESC TEC*
Pedro Gonçalves, *INESC TEC*
Flávio Lopes, *ISEP*
André Faria, *ISEP*
João Ribeiro, *ISEP*
Eduardo Silva, *INESC TEC*

**(8:40 AM) Wide Field-of-View Daytime Fluorescence Imaging of Coral Reefs**
**Tali Treibitz**, *Scripps Institution of Oceanography*
Ben Neal, *Scripps Institution of Oceanography*
David Kline, *Scripps Institution of Oceanography*
Oscar Beijbom, *University of California San Diego*
Paul Roberts, *Scripps Institution of Oceanography*
B. Greg Mitchell, *Scripps Institution of Oceanography*
David Kriegman, *University of California San Diego*

**(9:00 AM) Underwater Augmented Reality: Navigation and Identification**
**Hunter Brown**, *University of Delaware*
Haozhu Wang, *University of Delaware*

**(9:20 AM) Design of stinger video monitoring system on deepwater pipe-laying ship**
**Jie Zheng**, *Hangzhou Dianzi University*
Jing Liu, *Hangzhou Dianzi University*
Qing Sheng, *Hangzhou Dianzi University*

**(9:40 AM) 3D Reconstruction Model of Underwater Environment in Stereo Vision System**
**Rui Nian**, *Ocean University of China*
Yanli Wu, *Ocean University of China*
Bo He, *Ocean University of China*

**Posters 1**
**Location: Town and Country**
**Wednesday, September 25 (8:20AM - 10:00AM)**
**Chair:**
**Vincenzo Franzitta, Palermo University**

**Evaluating the Performance of MODIS FLH Ocean Color Algorithm in Detecting the Harmful Algae Blooms in the Arabian Gulf and the Gulf of Oman**
**Maryam Al Shehhi**, *Masdar Institute*
Imen Gherboudj, *Masdar Institute*
Jun Zhao, *Masdar Institute*
Nahla Mezhoud, *Masdar Institute*
Hosni Ghedira, *Masdar Institute*

**Use of Reference Materials for Nutrients in Seawater and Comparability of Nutrients in the World's Oceans**
**Susan Becker**, *Scripps Institution of Oceanography*
Dan Schuller, *Scripps Institution of Oceanography*
Melissa Miller, *Scripps Institution of Oceanography*
Michio Aoyama, *Meteorological Research Institute*
Kenichro Sato, *Marine Works Japan LTD*
James Swift, *Scripps Institution of Oceanograhpy*

**Structural safety and design requirement of CFMP based offshore wind substructure system**
**Youn-Ju Jeong**, *Korea Institute of Construction Technology*
Young-Jun You, *Korea Institute of Construction Technology*
Min-Su Park, *Korea Institute of Construction Technology*
Du-Ho Lee, *Korea Institute of Construction Technology*
Byeong-Cheol Kim, *Korea Institute of Construction Technology*

**Simulation and Stability Analysis of the 200-ROV in the Absence of One Thruster**
**Junliang Cao**, *Shanghai Jiao Tong University*
Chunhu Liu, *Shanghai Jiao Tong University*
Baoheng Yao, *Shanghai Jiao Tong University*
Lian Lian, *Shanghai Jiao Tong University*

**Time Frequency Analysis of Underwater Ambient Noise in Tropical Littoral Waters**
**Rajveer Shastri**, *VPCOE, PUNE UNIVERSITY*
Yashwant Joshi, *WCE SANGLI*
Arnab Das, *MILIT*

**Experimental results of a low cost weather buoy**
Marco Trapanese, *Palermo University*
Vincenzo Di Dio, *Palermo University*
Alessia Viola, *Palermo University*
**Vincenzo Franzitta**, *Palermo University*
Carlo Giaconia, *Palermo University*
Paolo Ferrara, *Palermo University*

**Cooperation and collision avoidance for multiple DP ships with disturbances**
Mingyu Fu, *Harbin Engineering University*
**Yujie Xu**, *Harbin Engineering University*
Shimin Wang, *Harbin Engineering University*

**Burst mode hybrid spread spectrum technology for covert acoustic communication**
**Feng Zhou**, *Harbin Engineering University*
Yanling Yin, *Harbin Engineering University*
Gang Qiao, *Harbin Engineering University*
Songzuo Liu, *Harbin Engineering University*
Yang Yu, *Harbin Engineering University*

**Buoy Technology 2**
**Location: Royal Palm Salon 1**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Rick Cole, RDSEA International, Inc.**
**Hunter Brown, University of Delaware**

**(10:30 AM) Recovery of an ice buoy at 60 °S in the Southern Ocean**
**Shoichiro Baba**, *JAMSTEC*
Junichiro Tahara, *JAMSTEC*
Tatsuya Fukuda, *JAMSTEC*
Yasuhisa Ishihara, *JAMSTEC*

**(10:50 AM) Developement and Mooring of the Brazilian ATLAS-B Buoy Project**
Edmo Campos, *University of São Paulo*
Carlos Franca, *Instituto Oceanografico University of Sao Paulo*
Leonardo Barreira, *Instituto de Estudos do Mar Almirante Paulo Moreira*
Luis Nonnato, *Instituto Oceanografico University of Sao Paulo*
Fransisco Neto, *Instituto Oceanografico University of Sao Paulo*
**Rick Cole**, *RDSEA International, Inc.*

**(11:10 AM) Wave Buoy Data Analysis in the Delaware Bay**
**Hunter Brown**, *University of Delaware*
Robert Scarborough, *Delaware Dept. of Natural Resources and Environmental Control*

**Sonar Signal Processing 2**
**Location: Royal Palm Salon 2**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Mahmood Azimi-Sadjadi, Colorado State University**
**Zongwei Liu, Institute of Acoustic Engineering, Northwestern Polytechnical University**

**(10:30 AM) Multi-Sonar Adaptive Target Detection using the Sphericity Test**
Nicholas Klausner, *Colorado State University*
**Mahmood Azimi-Sadjadi**, *Colorado State University*

**(10:50 AM) Spectral Estimation of Cavitation Related Narrow-Band Ship Radiated Noise Based on Fractional Lower Order Statistics and Multiple Signal Classification**
**Umut Firat**, *TUBITAK BILGEM*
Tayfun Akgul, *Istanbul Technical University*

**(11:10 AM) Robust source localization using predictable mode subspace in uncertain shallow ocean environment**
**Zongwei Liu**, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Chao Sun, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Jinyn Du, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Yixin Yang, *Institute of Acoustic Engineering, Northwestern Polytechnical University*

**(11:30 AM) Adaptive Filter Design for Suppressing the Moving Surface Interferences in Optic-acoustic Remote Sensing**
Xiaodong Peng, *Zhejiang University*
**Wen Xu**, *Zhejiang University*
Xiaofeng Jin, *Zhejiang University*
Jianhua Shang, *Donghua University*

**Acoustic Telemetry and Communication 1**
**Location: Royal Palm Salon 3**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Chris Murphy, Bluefin Robotics**
**Paul Gendron, University of Massachusetts Dartmouth**

**(10:30 AM) Multi-Octave High-Frequency Hydro-Acoustic Communication**
**Craig Benson**, *UNSW*
James Hislop, *UNSW*
Michael Ryan, *UNSW*
Michael Frater, *UNSW*

**(10:50 AM) Coherent reception of M-ary orthogonal spread spectrum acoustic communications at very low SNR in shallow water environments.**
**Paul Gendron**, *University of Massachusetts Dartmouth*

**(11:10 AM) TOPICS: A Modular Software Architecture for High-Latency Communication Channels**
**Chris Murphy**, *Bluefin Robotics*

**(11:30 AM) Dynamic Joint Network-Channel Coded Cooperation for Underwater Data Collection**
Yougan Chen, *Xiamen University*
Xiaomei Xu, *Xiamen University*
Haixin Sun, *Xiamen University*
Lan Zhang, *Xiamen University*
**Zhaotong Zhu**, *Xiamen University*

**Systems and Observatories 2**
**Location: Royal Palm Salon 4**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Peter Yinger, L-3 MariPro**
**Reyna Jenkyns, Ocean Networks Canada**

**(10:30 AM) Instrument task-driven workflow software for cruise and maintenance operations**
**Reyna Jenkyns**, *Ocean Networks Canada*
Meghan Tomlin, *Ocean Networks Canada*
Benoit Pirenne, *Ocean Networks Canada*

**(10:50 AM) Hovering Type AUV "Tuna-Sand" and Its Surveys on Smith Caldera in Izu-Ogasawara Ocean Area**
**Yuya Nishida**, *Institute of Industrial Science, University of Tokyo*
Ura Tamaki, *Institute of Industrial Science, University of Tokyo*
Takashi Sakamaki, *Institute of Industrial Science, University of Tokyo*
Junichi Kojima, *KDDI R&D Laboratories*
Yuzuru Ito, *Ocean Engineering Research Inc.*
Kangsoo Kim, *Institute of Industrial Science, University of Tokyo*

**(11:10 AM) Commissioning of a System that Terminates on the Seafloor**
**Peter Yinger**, *L-3 MariPro*
Philip Tennant, *L-3 MariPro*
John Reardon, *L-3 MariPro*
Gary Harkins, *University of Washington*
Charles McGuire, *University of Washington*
Michael Harrington, *University of Washington*
Michael Mulvihill, *University of Washington*

**(11:30 AM) The Design Prototype of Shore-side Data Management and Service System of Ocean Observing System in South China Sea**
Xiu Li, *Tsinghua University*
**Xiaogang Ouyang**, *Tsinghua University*
Rongsheng Huang, *Tsinghua University*
Ming Jin, *Tsinghua University*

**Glider Technologies**
**Location: Royal Palm Salon 5**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Lora Van Uffelen, University of Hawaii**
**Elizabeth Creed**

**(10:30 AM) Long-range glider localization using broadband acoustic signals and a linearized model of glider motion**
**Lora Van Uffelen**, *University of Hawaii*
Bruce Howe, *University of Hawaii*
Eva-Marie Nosal, *University of Hawaii*
Glenn Carter, *University of Hawaii*
Peter Worcester, *Scripps Institution of Oceanography*
Matthew Dzieciuch, *Scripps Institution of Oceanography*

**(10:50 AM) Multi-Channel Acoustic Data Acquisition and Telemetry on an Autonomous Vehicle for Marine Mammal Monitoring**
**Harold Cheyne**, *Cornell University*
Charles Key, *SAIC Custom Engineering Division*
Michael Satter, *SAIC Custom Engineering Division*
Michael Ornee, *SAIC Custom Engineering Division*
Christopher Clark, *Cornell University*

**(11:10 AM) Ocean gliders payloads for persistent maritime surveillance and monitoring**
**Alain Maguer**, *NATO Centre for Maritime Research and Experimentation*
Rodney Dymond, *NATO Centre for Maritime Research and Experimentation*
Alberto Grati, *NATO Centre for Maritime Research and Experimentation*
Richard Stoner, *NATO Centre for Maritime Research and Experimentation*
Piero Guerrini, *NATO Centre for Maritime Research and Experimentation*
Alberto Alvarez, *NATO Centre for Maritime Research and Experimentation*

**AUV Autonomy 2**
**Location: Royal Palm Salon 6**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**David Lane, Heriot-Watt University**
**Petar Kormushev, Istituto Italiano di Tecnologia**

**(10:30 AM) GRASPER: HIL Simulation Towards Autonomous Manipulation of an Underwater Panel in a Permanent Observatory**
**Pedro J Sanz**, *University of Jaume-I*
Javier Pérez, *University of Jaume-I*
Antonio Peñalver, *University of Jaume-I*
J. Javier Fernández, *University of Jaume-I*
David Fornas, *University of Jaume-I*
Jorge Sales, *University of Jaume-I*
Raul Marin, *University of Jaume-I*

**(10:50 AM) On-line Learning for Coping with Thruster Failures on Autonomous Underwater Vehicles**
Matteo Leonetti, *Istituto Italiano di Tecnologia*
Seyed Ahmadzadeh, *Istituto Italiano di Tecnologia*
**Petar Kormushev**, *Istituto Italiano di Tecnologia*

**(11:10 AM) Probabilistic Approaches in Ontologies: Joining Semantics and Uncertainty for AUV Persistent Autonomy**
**Francesco Maurelli**, *Heriot-Watt University*
Zeyn Saigol, *Heriot-Watt University*
Georgios Papadimitriou, *Heriot-Watt University*
Tom Larkworthy, *Heriot-Watt University*
Valerio De Carolis, *Heriot-Watt University*
David Lane, *Heriot-Watt University*

**(11:30 AM) Towards Improved AUV Control Through Learning of Periodic Signals**
**Petar Kormushev**, *Istituto Italiano di Tecnologia*
Darwin Caldwell, *Istituto Italiano di Tecnologia*

**Ultra-Deep Ocean Science and Enabling Technology: Science Opportunities**
**Location: Pacific Salon 1**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Chair:**
**Kevin Hardy, Global Ocean Design**

**(10:30 AM) Hadal Landers: the DEEPSEA CHALLENGE Ocean Trench Free Vehicles**
**Kevin Hardy**, *Global Ocean Design*
James Cameron, *Earthship Productions*
Larry Herbst, *Earthlight Communications*
Tim Bulman, *Indepth Marine Ltd*
Steffen Pausch, *Nautilus Marine Service GmbH*

**(10:50 AM) Lander Science, Outside the Ball: the View from the DEEPSEA CHALLENGE Landers and Submersible**
**Natalya Gallo**, *Scripps Institution of Oceanography/UCSD*

**(11:10 AM) Deep Sea Challenger Next Steps**
**Anthony Tarantino**, *Woods Hole Oceanographic Institution*

**(11:30 AM) 7000-m Jiaolong manned submersible and China**
**Xianpeng Shi**, *National Deep Sea Center*

**Ocean Energy: Power Conversion**
**Location: Pacific Salon 4**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Clifford Merz, University of South Florida / College of Marine Science**
**Jason Neely, Sandia National Laboratories**

**(10:30 AM) Characterization of Coupled Coils in Seawater for Wireless Power Transfer**
**Viktor Bana**, *Space and Naval Warfare Systems Center Pacific*
John Rockway, *Space and Naval Warfare Systems Center Pacific*
Alex Phipps, *Space and Naval Warfare Systems Center Pacific*
Lu Xu, *Space and Naval Warfare Systems Center Pacific*
Greg Anderson, *Space and Naval Warfare Systems Center Pacific*
Doeg Rodriguez, *Space and Naval Warfare Systems Center Pacific*

**(10:50 AM) Design and Optimization of a 8kW Linear Generator for a Direct-Drive Point Absorber**
**Jaeseung Kim**, *Yonsei University*
Jin Bae Park, *Yonsei University*
Jung Yoon Kim, *Yonsei University*

**(11:10 AM) Electromechanical Emulation of Hydrokinetic Generators for Renewable Energy Research**
**Jason Neely**, *Sandia National Laboratories*
Kelley Ruehl, *Sandia National Laboratories*
Jesse Roberts, *Sandia National Laboratories*
Steven Glover, *Sandia National Laboratories*
Forest White, *SAIC*
Michael Horry, *Sandia National Laboratories*

**(11:30 AM) Power output from linear generator designed for VIV driven buoy**
**Wayne Liu**, *Space and Naval Warfare Systems Center Pacific*
Jack Dea, *Space and Naval Warfare Systems Center Pacific*
Kyle Wendler, *Space and Naval Warfare Systems Center Pacific*
Brian Dick, *Space and Naval Warfare Systems Center Pacific*
Brian D'Angelo, *ASEE*

**Numerical Modeling and Simulation 1**
**Location: Pacific Salon 5**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Greg Seroka, Rutgers University**
**Mohammad Islam, Clarkson University**

**(10:30 AM) Principal Component Analysis on Horizontal Acoustic Doppler Current Profilers Measurement**
**Tuy Phan**, *Ritsumeikan University*
John Wells, *Ritsumeikan University*
Yusuke Uchiyama, *Kobe University*
James Bonner, *Clarkson University*
Shahidul Islam, *Clarkson University*
William Kirkey, *Clarkson University*

**(10:50 AM) Spatial evaluation of high-resolution modeled offshore winds using estimated winds derived from a network of HF radars**
**Greg Seroka**, *Rutgers University*
Josh Kohut, *Rutgers University*
Laura Palamara, *Rutgers University*
Scott Glenn, *Rutgers University*
Hugh Roarty, *Rutgers University*
Lou Bowers, *Rutgers University*
Rich Dunk, *Rutgers University*

**(11:10 AM) High Performance Regional Ocean Modeling with GPU Acceleration**
Ian Panzer, *California Polytechnic State University*
Spencer Lines, *California Polytechnic State University*
Paul Choboter, *California Polytechnic State University*
Jason Mak, *University of California, Davis*
Jason Mak, *University of California, Davis*

**(11:30 AM) Numerical Simulations of Island Wakes Downstream Green Island, Taiwan Due to Passing of Kuroshio**
**Shin-Jye Liang**, *National Taiwan Ocean University*
Sheng-Lin Lin, *National Taiwan Ocean University*
Li-Te Chang, *National Taiwan Ocean University*

**Oceanographic Instrumentation and Sensors 2**
**Location: Pacific Salon 6**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Paul Wanis, Teledyne RD Instruments**
**Letian Xu, Ocean College, Zhejiang University**

**(10:30 AM) Designing an Underwater Sensor Node for Ocean Monitoring**
**Luiz Vieira**, *Universidade Federal de Minas Gerais*
Sadraque Viana, *Universidade Federal de Minas Gerais*
Marcos Vieira, *Universidade Federal de Minas Gerais*
José Nacif, *Universidade Federal de Viosa*
Alex Vieira, *Universidade Federal de Juiz de Fora*

**(10:50 AM) Design and Applications of a Vertical Beam in Acoustic Doppler Current Profilers**
**Paul Wanis**, *Teledyne RD Instruments*

**(11:10 AM) Profiling from 6000 meter with the Deep Apex Float**
**Ernest Petzrick**, *Teledyne Webb Research*
James Truman, *Teledyne Webb Research*
Hugh Fargher, *Teledyne Webb Research*

**(11:30 AM) A Multi-Channel Data Logger of In-situ Chemical Sensors for Cabled Seafloor Observatories**
**Letian Xu**, *Ocean College, Zhejiang University*
Xiaoping Hu, *National Laboratory of Industrial Control Technology, Zhejiang University*
You Wang, *National Laboratory of Industrial Control Technology, Zhejiang University*
Jiawang Chen, *Ocean College, Zhejiang University*
Ying Chen, *Ocean College, Zhejiang University*

**Imaging and Vision 2**
**Location: Pacific Salon 7**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Alexandra Branzan Albu, University of Victoria**
**Bing Zheng, Ocean University of China**

**(10:30 AM) Field experiments for marine casualty detection with autonomous surface vehicles**
**Alfredo Martins**, *INESC TEC*
André Dias, *INESC TEC*
José Almeida, *INESC TEC*
Hugo Ferreira, *INESC TEC*
Carlos Almeida, *INESC TEC*
Guilherme Amaral, *INESC TEC*
Diogo Machado, *INESC TEC*
João Sousa, *INESC TEC*
Pedro Pereira, *INESC TEC*
Aníbal Matos, *INESC TEC*
Victor Lobo, *CINAV*
Eduardo Silva, *INESC TEC*

**(10:50 AM) Geographical Mosaicking of Seafloor Images Acquired by an AUV**
**Max Woolsey**, *NIUST/USM*
Allison Woolsey, *University of Mississippi*

**(11:10 AM) Detection of Objects and Their Shadows from Acoustic Images of the Sea Floor**
Trevor Beugeling, *University of Victoria*
**Alexandra Branzan Albu**, *University of Victoria*

**(11:30 AM) Underwater image color correct in extremely poor visibility**
Beilei Hu, *Ocean University of China*
**Bing Zheng**, *Ocean University of China*
Yanan Wen, *Academy of Opto-Electronics, Chinese Academy of Sciences*
Yu Yang, *Ocean University of China*

**Posters 2**
**Location: Town and Country**
**Wednesday, September 25 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Michael Smith, Rutgers University**
**Suntaek Oh, Korea Institute of Ocean Science & Technology**

**Rheological Behavior of Flocculated Suspensions of Artificial Marine Cohesive Sediment**
**Priyanthi Amarasinghe**, *Naval Research Laboratory*
Andrei Abelev, *Naval Research Laboratory*

**Robust Control of Oscillating Water Column (OWC) Devices: Power Generation Improvement**
**Aitor Garrido**, *University of the Basque Country*
Izaskun Garrido, *University of the Basque Country*
Mikel Alberdi, *University of the Basque Country*
Modesto Amundarain, *University of the Basque Country*
Oscar Barambones, *University of the Basque Country*
Jesus Romero, *CIEMAT*

**Development a System for Counting Marine Species in Ballast Water**
**Jung-Yeul Jung**, *KIOST*
Yong Seok Park, *Techcross Inc.*
Dong Shon, *Techcross Inc.*
Eun Chan Kim, *KIOST*
Jeong-Hwan Oh, *KIOST*

**SCKF-MEFPDAF for underwater single observer bearings-only target tracking in clutter**
Dengfeng Mei, *Shenyang Institute of Automation*
**Kaizhou Liu**, *Shenyang Institute of Automation*
Yanyan Wang, *Shenyang Institute of Automation*

**Temporal variations of acoustic propagation in the strong tidal zone, Yellow Sea in the Northwest Pacific**
**Suntaek Oh**, *KIOST*
Seok Lee, *KIOST*
Sungho Cho, *KIOST*
Donhyug Kang, *KIOST*
Yongkuk Lee, *KIOST*

**Methods of Associating CODAR SeaSonde Vessel Detection Data into Unique Tracks**
**Michael Smith**, *Rutgers University*
Hugh Roarty, *Rutgers University*
Scott Glenn, *Rutgers University*
Chad Whelan, *CODAR Ocean Sensors*
Donald Barrick, *CODAR Ocean Sensors*
James Isaacson, *CODAR Ocean Sensors*

**Geological Characterization of Co-rich Ferromaganese Crusts over the Northwestern Pacific Seamounts**
**Akira Usui**, *Kochi University*
Keisuke Nishi, *Kochi University*
Hisaaki Sato, *Kochi University*
Ian Graham, *GNS*
Tetsuro Urabe, *University of Tokyo*
Blair Thornton, *University of Tokyo*
Nobuyuki Okamoto, *JOGMEC*

**An Investigation into ROV based Tracking of a Shallow Water Nocturnal Squid**
**Samuel Yim**, *Harvey Mudd College*
Christopher Clark, *Harvey Mudd College*
Timothy Peters, *California Polytechnic State University*
Vladimir Prodanov, *California Polytechnic State University*
Pat Fidopiastis, *California Polytechnic State University*

**The Union of Time Reverse and Turbo Equalization On underwater Acoustic Communication**
Hao Xu, *Institute of Acoustics, Chinese Academy of Sciences*
Min Zhu, *Institute of Acoustics, Chinese Academy of Sciences*
**Yanbo Wu**, *Institute of Acoustics, Chinese Academy of Sciences*

**Cables and Connectors**
**Location: Royal Palm Salon 1**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Chair:**
**David Jenkins, Ametek SCP**

**(1:20 PM) Essential Design and Risk Management for a Next Generation Ocean Dry Mate Connector**
**David Jenkins**, *Ametek SCP*
Matt Christiansen, *Ametek SCP*
Steve Thumbeck, *Ametek SCP*

**(1:40 PM) Non-Contact Wet Mateable Connectors for Power and Data Transmission**
**Rich Granger**, *Battelle Memorial Institute*
Christopher Baer, *Battelle Memorial Institute*
Nathan Gabriel, *Battelle Memorial Institute*
John Labosky, *Battelle Memorial Institute*
Tom Galford, *Battelle Memorial Institute*

**(2:00 PM) Cathodic Debonding of Undersea Electronic Cable Connectors: Delamination Kinetics When Primers and Encapsulants are Bonded Directly to Bare Metal Connector Backshells**
**Thomas Ramotowski**, *Naval Undersea Warfare Center*
Wayne Tucker, *Naval Undersea Warfare Center*
Matthew Rice, *Naval Undersea Warfare Center*

**(2:20 PM) Extending Ethernet Reach for Instruments Used in Subsea Observatories**
**Richard Jones**, *Teledyne Oil & Gas*

**Sonar Signal Processing 3**
**Location: Royal Palm Salon 2**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Chair:**
**Alina Zare, University of Missouri**

**(1:20 PM) Sand Ripple Characterization using an extended Synthetic Aperture Sonar model and MCMC Sampling Methods**
**Alina Zare**, *University of Missouri*
J. Cobb, *Naval Surface Warfare Center*

**(1:40 PM) Velocity Measurement by Symbiotic Combination of Conventional and Coherent Doppler Sonars**
Nobuyoshi Kouguchi, *Kobe University*
**Peng Liu**, *Kobe University*

**(2:00 PM) Research of Interacting Multiple Model Particle Filter Based on Passive Multi-Sonar**
Xueli Sheng, *Harbin Engineering University*
Chunyan Sun, *Harbin Engineering University*
Qing Ling, *Science and Technology on Complex Ship Systems Simulation Laboratory*
**Jia Lu**, *Harbin Engineering University*
Jingwei Yin, *Harbin Engineering University*
Longxiang Guo, *Harbin Engineering University*

**(2:20 PM) Track Analysis and Design for Ultra Short Baseline Installation Error Calibration**
**Zhao Li**, *Harbin Engineering University*
Cuie Zheng, *Harbin Engineering University*
Dajun Sun, *Harbin Engineering University*

**Acoustic Telemetry and Communication 2**
**Location: Royal Palm Salon 3**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Chair:**
**Y. Zheng, Missouri University of Science and Technology**

**(1:20 PM) A Study on Remote Data Retrieval Strategies in Underwater Acoustic Networks**
Federico Favaro, *University of Padova*
Loris Brolo, *University of Padova*
Giovanni Toso, *University of Padova*
**Paolo Casari**, *University of Padova*
Michele Zorzi, *University of Padova*

**(1:40 PM) Modeling the Effect of Bubble Plumes on High Frequency Acoustic Propagation in Shallow Water**
Allan Boyles, *Johns Hopkins University, Applied Physics Laboratory*
Allan Rosenberg, *Johns Hopkins University, Applied Physics Laboratory*
**Qinqing Zhang**, *Johns Hopkins University, Applied Physics Laboratory*

**(2:00 PM) Application of Turbo Equalization in PPC Underwater Acoustic Communication**
**Bo Peng**, *NTNU*
Hefeng Dong, *NTNU*

**(2:20 PM) Synchronization and Doppler scale estimation with dual PN padding TDS-OFDM for underwater acoustic communication**
**Zhenrui Chen**, *Tsinghua University*
Yahong Zheng, *Missouri University of Science & Technology*
Jintao Wang, *Tsinghua University*
Jian Song, *Tsinghua University*

**Systems and Observatories 3**
**Location: Royal Palm Salon 4**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Moninya Roughan, University of New South Wales**
**Michael Mathewson, McLane Research Labs Inc**

**(1:20 PM) Assessing the design of the NSW-IMOS Moored Observation Array from 2008-2013: Recommendations for the future**
**Moninya Roughan**, *University of New South Wales*
Amandine Schaeffer, *University of New South Wales*
Sotiris Kioroglou, *University of New South Wales*

**(1:40 PM) Deep Profiler for the Ocean Observatories Initiative Regional Scale Nodes: Rechargeable, Adaptive, ROV Serviceable**
Tim McGinnis, *APL-UW*
Nick Michel-Hart, *APL-UW*
**Michael Mathewson**, *McLane Research Labs Inc*
Tim Shanahan, *McLane Research Labs Inc*

**(2:00 PM) Long Island Sound Testbed and Experiments**
Li Wei, *University of Connecticut*
Zheng Peng, *University of Connecticut*
Hao Zhou, *University of Connecticut*
**Jun-Hong Cui**, *University of Connecticut*
Shengli Zhou, *University of Connecticut*
Zhijie Shi, *University of Connecticut*
James O'Donnell, *University of Connecticut*

**(2:20 PM) Design of an Undersea Power System for the East China Sea Experimental Cabled Seafloor Observatory**
**Feng Lu**, *Tongji University*
Huaiyang Zhou, *Tongji University*
Jiguang Yue, *Tongji University*
Xiaotong Peng, *Tongji University*
Bin He, *Tongji University*
Zhengwei Wu, *Tongji University*

**Glider Missions**
**Location: Royal Palm Salon 5**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Ruth Mullins-Perry, Gulf of Mexico Coastal Ocean Observing System**
**Elizabeth Creed**

**(1:20 PM) Glider Operations in the Northwestern Gulf of Mexico: The Design and Implementation of a Glider Network at Texas A&M University**
**Ruth Mullins-Perry**, *Gulf of Mexico Coastal Ocean Observing System*
Steven DiMarco, *Texas A&M University*
John Walpert, *Geochemical and Environmental Research Group*
Norman Guinasso, *Geochemical and Environmental Research Group*
Anthony Knap, *Geochemical and Environmental Research Group*

**(1:40 PM) Initial Investigation of the North East Pacific Salmon Feeding Waters with Slocum Gliders**
**John Bird**, *Simon Fraser University*
Peter Gross, *Haida Salmon Restoration Corporation*
William McNea, *Haida Salmon Restoration Corporation*
Heather Judd, *Haida Salmon Restoration Corporation*

**(2:00 PM) The Challenger Glider Mission: A Global Ocean Predictive Skill Assessment**
Collin Dobson, *Rutgers University*
Jeffrey Mart, *Rutgers University*
Nilsen Strandskov, *Rutgers University*
Josh Kohut, *Rutgers University*
Oscar Schofield, *Rutgers University*
**Scott Glenn**, *Rutgers University*
Clayton Jones, *Teledyne Webb Research*
Doug Webb, *Teledyne Webb Research*
Carlos Barrera, *PLOCAN*
Antonio Ramos, *Universidad de Las Palmas de Gran Canaria*

**(2:20 PM) Observations of Hurricane Sandy from a Glider Mounted Aquadopp Current Profiler**
**Travis Miles**, *Rutgers Institute of Marine and Coastal Sciences*
Scott Glenn, *Rutgers Institute of Marine and Coastal Sciences*
Josh Kohut, *Rutgers Institute of Marine and Coastal Sciences*
Oscar Schofield, *Rutgers Institute of Marine and Coastal Sciences*
Greg Seroka, *Rutgers University*
Yi Xu, *Rutgers University*

**(2:40 PM) Gliders in the Gulf of Mexico: Building Towards An Operational and Integrated Observing System in the Gulf of Mexico**
**Ruth Mullins-Perry**, *Gulf of Mexico Coastal Ocean Observing System*
Ann Jochens, *Gulf of Mexico Coastal Ocean Observing System*
Matthew Howard, *Gulf of Mexico Coastal Ocean Observing System*

**AUV Autonomy 3**
**Location: Royal Palm Salon 6**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Carlos Insaurralde, Heriot-Watt University**
**Max Woolsey, NIUST/USM**

**(1:20 PM) Distributed Software System Architecture for Autonomous Launch and Recovery System of Autonomous Underwater Vehicles**
**Sagar Pai**, *Acoustics Research Lab (NUS)*
Shailabh Suman, *ARL NUS*
Wu Yu Song, *ARI NUS*
Bharath Kalyan, *ARL NUS*
Mandar Chitre, *ARL NUS*

**(1:40 PM) Task Consensus among a Team of Heterogeneous AUVs under Intermittent Communication**
Ramprasad Balasubramanian, *University of Massachusetts Dartmouth*
**James Delande**, *University of Massachusetts Dartmouth*
Christiane Duarte, *Naval Undersea Warfare Center*

**(2:00 PM) Intelligent Autonomy for Collaborative Intervention Missions of Unmanned Maritime Vehicles**
**Carlos Insaurralde**, *Heriot-Watt University*
Yvan Petillot, *Heriot-Watt University*

**(2:20 PM) Simultaneous Operation of Heterogeneous AUVs**
**Max Woolsey**, *NIUST/USM*
Arne Diercks, *NIUST/USM*
Roy Jarnagin, *NIUST/USM*
Vernon Asper, *University of Southern Mississippi*

**(2:40 PM) Online Path Planning of Unmanned Surface Vehicles Based on MILP**
Jing Leng, *University Chinese Academy of Sciences*
Jian Liu, *Shenyang Institute of Automation*
**Hongli Xu**, *Shenyang Institute of Automation*

**Ultra-Deep Ocean Science and Enabling Technology: Vehicles and Payloads**
**Location: Pacific Salon 1**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Chair:**
**Barbara Fletcher, OCEANS 13 San Diego Technical Program Chair**

**(1:20 PM) Deep Water MiniROVs and Delivery Systems**
**Cyril Poissonnet**, *SeaBotix*

**(1:40 PM) Operations to 11,000m: Nereus Ceramic Housings Design and Analysis**
**Glenn McDonald**, *Woods Hole Oceanographic Institution*

**(2:00 PM) "Nereus and the 2013 exploration of the Cayman Trench"**
**Andy Bowen**, *Woods Hole Oceanographic Institution*

**(2:20 PM) ALVIN Upgrades/2013 edition**
**Anthony Tarantino**, *Woods Hole Oceanographic Institution*

**Ocean Energy: Tidal Power**
**Location: Pacific Salon 4**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Maggie Merrill, Marine Marketing Services**
**George McBride, PfISH Turbines**

**(1:20 PM) "Backflow Preventer;" Exploiting Patterns of Separated Flow to Increase Power in an Enclosed Hydropower**
**George McBride**, *PfISH Turbines*

**(1:40 PM) Life-Oriented Control of Tidal Power Generation**
**Zhibing Zhao**, *University of Connecticut*
Peng Zhang, *University of Connecticut*
Jun-Hong Cui, *University of Connecticut*
Shengli Zhou, *University of Connecticut*

**(2:00 PM) Motion of Twin type Ocean Current Turbine at the time of startup and accident**
**Takaaki Gonoji**, *University of Tokyo*
Katsutoshi Takeda, *ClassNK Consulting Service Co., Ltd.*
Ken Takagi, *University of Tokyo*

**(2:20 PM) Near Wake Measurements of a Model Horizontal Axis Marine Current Turbine under Steady and Unsteady Inflow Conditions**
**Max Benthem**, *U.S. Naval Academy*
**Max Benthem**, *U.S. Naval Academy*
Karen Flack, *U.S. Naval Academy*
Ethan Lust, *U.S. Naval Academy*

**(2:40 PM) Performance gain of a horizontal axis hydrokinetic turbine using shroud**
**Mohammad Shahsavarifard**, *University of Manitoba*
Eric Bibeau, *University of Manitoba*
Amir Hossein Birjandi, *University of Manitoba*

**Numerical Modeling and Simulation 2**
**Location: Pacific Salon 5**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Mariusz Balaban, MYMIC**
**Joanna Burston, Griffith University**

**(1:20 PM) ROPAX: Exploring the Use of Simulation as Decision Support System**
**Mariusz Balaban**, *MYMIC*
Thomas Mastaglio, *MYMIC*

**(1:40 PM) Options for real-time storm tide forecasting for emergency management in Queensland, Australia**
**Joanna Burston**, *Griffith University*
Takehiko Nose, *Griffith University*
Rodger Tomlinson, *Griffith University*

**(2:00 PM) Application of Numerical Ship Navigation in Coastal Area**
**Chen Chen**, *Kobe University*
Shigeaki Shiotani, *Kobe University*
Kenji Sasa, *Kobe University*

**(2:20 PM) An Advanced Channel Framework for Improved Underwater Acoustic Network Simulations**
**Michael Zuba**, *University of Connecticut*
Zaihan Jiang, *Naval Research Laboratory*
T.C. Yang, *National Sun Yat-sen University*
Yishan Su, *University of Connecticut*
Jun-Hong Cui, *University of Connecticut*

**(2:40 PM) Study Of Electromagnetic Scattering From Sea Surface Contaminated by Oil Using The Forward-Backward Method**
**Helmi Ghanmi**, *ENSTA Bretagne*
Ali Khenchaf, *ENSTA Bretagne*
Fabrice Comblet, *ENSTA Bretagne*

**Oceanographic Instrumentation and Sensors 3**
**Location: Pacific Salon 6**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Bill Kirkwood, MBARI**
**Alain Maguer, NATO Centre for Maritime Research and Experimentation**

**(1:20 PM) Open Source Instrumentation Nodes for the Greater Oceanographic Community**
Chad Kecy, *MBARI*
Ed Peltzer, *MBARI*
Peter Walz, *MBARI*
Kent Headley, *MBARI*
Bob Herlien, *MBARI*
Thom Maughan, *MBARI*
George Matsumoto, *MBARI*
Tom O'Reilly, *MBARI*
Karen Salamy, *MBARI*
Farley Shane, *MBARI*
Chris Lovera, *MBARI*
Jim Scholfield, *MBARI*
**Bill Kirkwood**, *MBARI*
James Barry, *MBARI*
Peter Brewer, *MBARI*

**(1:40 PM) A new approach to real-time acoustic oceanographic measurements: Digital hydrophones integrated with oceanographic sensor**
Alessandra TESEI, *AGUAtech snc*
Alberto Figoli, *AGUAtech snc*
Piero Guerrini, *NATO Centre for Maritime Research and Experimentation*
**Alain Maguer**, *NATO Centre for Maritime Research and Experimentation*

**(2:00 PM) CDIP, Quality Control Challenges**
**Julianna Thomas**, *University of California San Diego*
Corey Olfe, *Scripps Institution of Oceanography*

**(2:20 PM) A System for Remote Access to Deployed Source and Receive Acoustic Arrays**
Jeff Skinner, *Scripps Institution of Oceanography*
**William Hodgkiss**, *Scripps Institution of Oceanography*

**(2:40 PM) An aperture online measuring system of ice shelf hot-drilling based on magnetic induction**
Liang Ma, *Hangzhou Dianzi University*
Hai Yu, *Hangzhou Dianzi University*
Jing Liu, *Hangzhou Dianzi University*
**Jie Zheng**, *Hangzhou Dianzi University*

**Imaging and Vision 3**
**Location: Pacific Salon 7**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**James Broesch, Remote Ocean Systems**
**Alexandra Branzan Albu, University of Victoria**

**(1:20 PM) Thermographic and Visible Spectrum Camera Calibration for Marine Robotic Target Detection**
André Dias, *INESC TEC*
Carlos Brás, *INESC TEC*
**Alfredo Martins**, *INESC TEC*
José Almeida, *INESC TEC*
Eduardo Silva, *INESC TEC*

**(1:40 PM) Detection of Stationary Animals in Deep-Sea Video**
Marzieh Mehrnejad, *University of Victoria*
**Alexandra Branzan Albu**, *University of Victoria*
Maia Hoeberechts, *Ocean Networks Canada*
David Capson, *University of Victoria*

**(2:00 PM) 3-D Object Modeling from Occluding Contours in Opti-Acoustic Stereo Images**
**Shahriar Negahdaripour**, *University of Miami*
Reza Babaee, *Tech. Univ. Munich*

**(2:20 PM) A Link Budget Approach to Specifying Lights and Cameras for Underwater Applications**
**James Broesch**, *Remote Ocean Systems*
Brad Lafferty, *Remote Ocean Systems*

**(2:40 PM) New approach for underwater image denoising combining inhomogeneous illumination and dark channel prior**
Zitao Wang, *Ocean University of China*
**Bing Zheng**, *Ocean University of China*
Weijian Tian, *Qingdao Academy for Opto-Electronics Engineering*
Beilei Hu, *Ocean University of China*
Yu Yang, *Ocean University of China*

**Posters 3**
**Location: Town and Country**
**Wednesday, September 25 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Mikhail Tchernychev, Geometrics**
**Meng Zhou, Arizona State University**

**Experimental assessment of a multiple sequence direct sequence spread spectrum (MS-DSSS) underwater acoustic communication scheme**
Muhammad Asim, *Harbin Engineering University*
Qiao Gang, *Harbin Engineering University*
**Feng Zhou**, *Harbin Engineering University*
Liu Songzuo, *Harbin Engineering University*

**Microradiometers: Hybrid Instrument Building Blocks for Next-Generation Ocean Color Instruments**
**Stanford Hooker**, *NASA*
John Morrow, *Biospherical Innstruments Inc.*

**A Numerical Study on the Wind Effect on the Oil Containment by Boom**
**Kwangu Kang**, *KIOST*
Moonjin Lee, *KIOST*
Jung-Yeul Jung, *KIOST*

**Obtaining shape information of marine microorganisms using polarized-light scattering**
Xiaorui Tian, *Tsinghua University*
Ran Liao, *Tsinghua University*
Yi Tao, *Tsinghua University*
Jianghu Wu, *Tsinghua University*
Jinlei Wang, *Tsinghua University*
Hui Ma, *Tsinghua University*

**An Underwater Acoustic Communication Scheme with Inherent Scale Diversity for Multiple Users**
Antonia Papandreou-Suppappola, *Arizona State University*
**Meng Zhou**, *Arizona State University*
Jason Zhang, *University of Denver*
Tolga Duman, *Bilkent University / Arizona State University*

**Using a Transverse Marine Gradiometer (TVG) as Submarine Pipeline Location Tool**
**Mikhail Tchernychev**, *Geometrics*
Ross Johnson, *Geometrics*
James Kulpa, *Environmental Data Solutions*

**Improved Performance of an Underwater Glider with Passively Rotatable Wings**
**Yu Xie**, *Zhejiang University*
Canjun Yang, *Zhejiang University*
Pinfu Wang, *Zhejiang University*
Shilin Peng, *Zhejiang University*
Shuangshuang Fan, *Zhejiang University*
Shaoyong Zhang, *Zhejiang University*

**Research on Sand Dumping Detection Based on Sound Absorption in Seawater**
Zhe Cen, *Xiamen University*
En Cheng, *Xiamen University*
**Hua-Bin Chen**, *Xiamen University*
Fei Yuan, *Xiamen University*

**Underwater Feature Point Extraction for Man-Made Structures Inspection**
**Felipe Moraes**, *Universidade Federal do Rio Grande*
Silvia Botelho, *Universidade Federal do Rio Grande*
Diones Fischer, *Universidade Federal do Rio Grande*
Paulo Lilles Drews, *Universidade Federal do Rio Grande*
Felipe Guth, *Universidade Federal do Rio Grande*
Luan Silveira, *Universidade Federal do Rio Grande*
Pedro Ballester, *Universidade Federal do Rio Grande*
Nelson Duarte, *Universidade Federal do Rio Grande*

**Ropes and Tension Members**
**Location: Royal Palm Salon 1**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**John Flory, Tension Technology International, LLC**
**Andrew Varney, Whitehill Manufacturing**

**(3:30 PM) Evaluation of Wire-Lay Nylon Mooring Lines in a Wave Energy Device Field Trial**
**Andrew Varney**, *Whitehill Manufacturing*
Robert Taylor, *Sound & Sea Technology, Inc.*
William Seelig, *Sound & Sea Technology, Inc.*

**(3:50 PM) Mooring and Power Cable System for Current-Turbine**
**Masao Shibata**, *University of Tokyo*
Katsutoshi Takeda, *ClassNK Consulting Service Co., Ltd.*
Ken Takagi, *University of Tokyo*

**(4:10 PM) On the Origin of Lifetime Extension for HMPE Ropes in Bending Operations**
**Marcel Meuwissen**, *DSM*

**(4:30 PM) Cordage Institute Guidelines for Marine Grade Nylon and Polyester Rope-Making Yarns**
**John Flory**, *Tension Technology International, LLC*

**Biologically Inspired Processing**
**Location: Royal Palm Salon 2**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Lloyd Huff, LCHUFF CONLULTANCY**
**Songzuo Liu, Harbin Engineering University**

**(3:30 PM) Hypothetical Neurons for the Imaging Sonar of Dolphins and Related Geometric Methods of Computing Source-Points of Echoes**
**Douglas Moreman**,

**(3:50 PM) Calibration Schema for a Long-Range, Fishery-Research Side Scan Sonar**
**Lloyd Huff**, *LCHUFF CONLULTANCY*
Robert McConnaughney, *NOAA Fisheries Service*

**(4:10 PM) A New Signaling Scheme for Underwater Acoustic Communications**
**Ahmad ElMoslimany**, *Arizona State University*
Meng Zhou, *Arizona State University*
Tolga Duman, *Bilkent University / Arizona State University*
Antonia Papandreou-Suppappola, *Arizona State University*

**(4:30 PM) Biologically inspired covert underwater acoustic communication using high frequency dolphin clicks**
**Songzuo Liu**, *Harbin Engineering University*
Gang Qiao, *Harbin Engineering University*
Yang Yu, *Harbin Engineering University*
Luwei Zhang, *Harbin Engineering University*
Tingting Chen, *Harbin Engineering University*

**Acoustic Telemetry and Communication 3**
**Location: Royal Palm Salon 3**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Shengli Zhou, University of Connecticut**
**Ayodeji Coker, Space and Naval Warfare Systems Center Pacific**

**(3:30 PM) Utilizing Kinematics and Selective Sweeping in Reinforcement Learning-Based Routing Algorithms for Underwater Networks**
**Randall Plate**, *Space and Naval Warfare Systems Center Pacific*
Cherry Wakayama, *Space and Naval Warfare Systems Center Pacific*

**(3:50 PM) Maritime Channel Modeling and Simulation for Efficient Wideband Communications between Autonomous Unmanned Vehicles**
**Ayodeji Coker**, *Space and Naval Warfare Systems Center Pacific*
Ted Rogers, *Space and Naval Warfare Systems Center Pacific*
Logan Straatemeier, *Space and Naval Warfare Systems Center Pacific*
Pierre Valdez, *Georgia Institute of Technology*
Daniel Cooksey, *Georgia Institute of Technology*
Kelly Griendling, *Georgia Institute of Technology*

**(4:10 PM) Study of Single-Carrier Coherent High-speed Underwater Acoustic Communication**
**Xiaoyi Hu**, *Xiamen University*
Wei Su, *Xiamen University*
Yurong Lin, *Xiamen University*
Wenhui Liu, *Xiamen University*
Xialin Jiang, *Xiamen University*

**(4:30 PM) Study of Class-D Power Amplifiers for Underwater Acoustic OFDM Transmissions**
Xiaoka Xu, *University of Connecticut*
**Shengli Zhou**, *University of Connecticut*
Kaleel Mahmood, *University of Connecticut*
Li Wei, *University of Connecticut*
Jun-Hong Cui, *University of Connecticut*

**Systems and Observatories 4**
**Location: Royal Palm Salon 4**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Douglas Horner, Naval Postgraduate School**
**James Joslin, Northwest National Marine Renewable Energy Center, University of Washington**

**(3:30 PM) Data Driven Modling for Acoustic Undersea Collaborative Navigation**
**Douglas Horner**, *Naval Postgraduate School*

**(3:50 PM) Data Transmission & Electrical Powering Flexibility for Cabled Ocean Observatories**
**Robert Thomas**, *TE SubCom*
Adnan Akhtar, *TE SubCom*
Bamdad Bakhshi, *TE SubCom*
George Harvey, *TE SubCom*
Maurice Kordahi, *TE SubCom*
Lee Richardson, *TE SubCom*
Michael Sanders, *TE SubCom*
Marsha Spalding, *TE SubCom*

**(4:10 PM) Development of an Adaptable Monitoring Package for Marine Renewable Energy**
**James Joslin**, *Northwest National Marine Renewable Energy Center, University of Washington*
Ed Celkis, *SeaView Systems, Inc.*
Chris Roper, *Saab Seaeye*
Andrew Stewart, *University of Washington Applied Physics Laboratory*
Brian Polagye, *Northwest National Marine Renewable Energy Center, University of Washington*

**(4:30 PM) Efforts on developing the technologies of abyssal cabled observatory in China**
Yanhu Chen, *Zhejiang University*
Canjun Yang, *Zhejiang University*
**Bo Jin**, *Zhejiang University*
Dejun Li, *Zhejiang University*

**Glider Data**
**Location: Royal Palm Salon 5**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Jnaneshwar Das, University of Southern California**
**Alain Maguer, NATO Centre for Maritime Research and Experimentation**

**(3:30 PM) Sparse Glider Datasets: A Case Study for NoSQL Databases**
**Michael Lindemuth**, *University of South Florida College of Marine Science*
Chad Lembke, *University of South Florida College of Marine Science*

**(3:50 PM) Crowd-Sourced Autonomy for Persistent Ocean Monitoring**
Wesam Al-Sabban, *Queensland University of Technology*
**Jnaneshwar Das**, *University of Southern California*
Ryan Smith, *Fort Lewis College*

**(4:10 PM) Performance of pumped and un-pumped CTDs in an underwater glider**
Alberto Alvarez, *NATO Centre for Maritime Research and Experimentation*
Richard Stoner, *NATO Centre for Maritime Research and Experimentation*
**Alain Maguer**, *NATO Centre for Maritime Research and Experimentation*

**(4:30 PM) Motion Simulator for an Underwater Glider for Long-term Virtual Mooring**
**Kenichi Asakawa**, *JAMSTEC*
Masahiko Nakamura, *RIAM Kyushu University*
Junichi Kojima, *KDDI R&D Laboratories*
Keisuke Watari, *JAMSTEC*
Tadahiro Hyakudome, *JAMSTEC*

**AUV Autonomy 4**
**Location: Royal Palm Salon 6**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Douglas Au, Monterey Bay Aquarium Research Institute**
**Zheping Yan, Harbin Engineering University**

**(3:30 PM) A Path Planning System for Autonomous Launch and Recovery System of Autonomous Underwater Vehicles**
**Shailabh Suman**, *Acoustics Research Lab (NUS)*
Sagar Pai, *ARL NUS*
YuSong Wu, *ARL NUS*
Bharath Kalyan, *Acoustics Research Lab (NUS)*
Mandar Chitre, *Acoustics Research Lab (NUS)*

**(3:50 PM) Recovery Motion Control for an AUV Using Fuzzy Decoupling Method**
Wei Zhang, *Harbin Engineering University*
Nannan Wang, *Harbin Engineering University*
**Zheping Yan**, *Harbin Engineering University*
Jiajia Zhou, *Harbin Engineering University*

**(4:10 PM) Mission Control of AUV for Terrain Survey Using Discrete Event System Theory**
Tao Chen, *Harbin Engineering University*
Da Xu, *Harbin Engineering University*
**Zheping Yan**, *Harbin Engineering University*
Yufei Zhao, *Harbin Engineering University*

**(4:30 PM) A high-precision position and attitude measurement sonar for submarine docking**
**Dajun sun**, *Harbin Engineering University*
Cuie Zheng, *Harbin Engineering University*
Dianlun Zhang, *Harbin Engineering University*
Juncheng Zhang, *Harbin Engineering University*

**Coastal Zone Management and Policy**
**Location: Pacific Salon 3**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Taeyun Kim, Korea Environment Institute**
**Chris Scianni, California State Lands Commission**

**(3:30 PM) Evaluation of Coastal Vulnerability with Mobile Laser Scanning from a Vessel**
**Todd Mitchell**, *Fugro*
Bertrand Chazaly, *Fugro*
Gilbert Suarez, *Fugro*

**(3:50 PM) The Use of Geographic Information Systems to Assess the Compliance of Ballast Water Management for Commercial Ships Operating in California**
**Christopher Brown**, *California State Lands Commission*
Chris Scianni, *California State Lands Commission*
Raya Nedelcheva, *California State Lands Commission*
Nicole Dobroski, *California State Lands Commission*

**(4:10 PM) Hull husbandry practices and biofouling management of vessels operating in California**
**Chris Scianni**, *California State Lands Commission*
Christopher Brown, *California State Lands Commission*
Raya Nedelcheva, *California State Lands Commission*
Nicole Dobroski, *California State Lands Commission*

**(4:30 PM) A Study on the Evironmental Impact Assessment of the Garolim Tidal Power Project**
**Taeyun Kim**, *Korea Environment Institute*
Kwangwoo Cho, *Korea Environment Institute*
Junho Maeng, *Korea Environment Institute*

**Ocean Energy: Fuel Cells and More**
**Location: Pacific Salon 4**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Meriah Arias-Thode, Space and Naval Warfare Systems Center Pacific**
**Clifford Merz, University of South Florida / College of Marine Science**

**(3:30 PM) Chitin Enhances Power Production in Sediment Microbial Fuel Cells**
**Meriah Arias-Thode**, *Space and Naval Warfare Systems Center Pacific*
Lewis Hsu, *Space and Naval Warfare Systems Center Pacific*
Adriane Wotawa-Bergen, *Space and Naval Warfare Systems Center Pacific*
Bart Chadwick, *Space and Naval Warfare Systems Center Pacific*

**(3:50 PM) Autonomous, retrievable, deep sea microbial fuel cell**
**Kenneth Richter**, *Space and Naval Warfare Systems Center Pacific*
Robert George, *Space and Naval Warfare Systems Center Pacific*
Jeffrey Kagan, *Space and Naval Warfare Systems Center Pacific*
Joshua Richmond, *Space and Naval Warfare Systems Center Pacific*

**(4:10 PM) Apparatus and Theory of a Submerged Point Absorber using Oscillating Water Column**
**Seung Kwan Song**, *Yonsei University*
Jin Bae Park, *Yonsei University*

**(4:30 PM) Marine Micropile Anchor Systems for Marine Renewable Energy Applications**
**Dallas Meggitt**, *Sound & Sea Technology, Inc.*
Robert Taylor, *Sound & Sea Technology, Inc.*
Jon Machin, *Geomarine Ltd.*
Eric Jackson, *Cellula Robotics Ltd.*

**Numerical Modeling and Simulation 3**
**Location: Pacific Salon 5**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Douglas Dommermuth, SAIC**
**Yuanhui Wang, Harbin Engineering University**

**(3:30 PM) Direct Simulations of Breaking Ocean Waves with Data Assimilation**
**Douglas Dommermuth**, *SAIC*
Lucas Rhymes, *SAIC*
James Rottman, *SAIC*

**(3:50 PM) Application of the Method of Moment and Monte-Carlo Simulation to Extract Oil Spill Areas from Synthetic Aperture Radar Images**
**Tae Ho Kim**, *University of Science and Technology*
Chan Su Yang, *University of Science and Technology*
Kazuo Ouchi, *KIOST*
Yisok Oh, *Hongik University*

**(4:10 PM) Research on six-degree-of-freedom motion modeling and simulation of single point moored ship**
**Yuanhui Wang**, *Harbin Engineering University*
Chuntai Zou, *Harbin Engineering University*
Jiaojiao Gu, *Harbin Engineering University*

**Oceanographic Instrumentation and Sensors 4**
**Location: Pacific Salon 6**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Stephen Wood, Florida Institute of Technology**
**Manhar Dhanak, Florida Atlantic University**

**(3:30 PM) Expendable CTD Sensor**
**Stephen Wood**, *Florida Institute of Technology*
Richard Paradis, *Florida Institute of Technology*

**(3:50 PM) Advances in Moored Upward Looking Sonar Systems for Long Term Measurement of Arctic Ice and Oceanography**
David Fissel, *ASL Environmental Sciences Inc.*
**Rene Chave**, *ASL Environmental Sciences Inc.*
Murray Clarke, *ASL Environmental Sciences Inc.*
Paul Johnston, *ASL Environmental Sciences Inc.*
Keath Borg, *ASL Environmental Sciences Inc.*
John Marko, *ASL Environmental Sciences Inc.*
Ed Ross, *ASL Environmental Sciences Inc.*
Jan Buermans, *ASL Environmental Sciences Inc.*
Matthew Stone, *ASL Environmental Sciences Inc.*

**(4:10 PM) Magnetic Field Surveys of Coastal Waters Using an AUV-towed Magnetometer**
**Manhar Dhanak**, *Florida Atlantic University*
Edgar An, *Florida Atlantic University*
Robert Coulson, *Florida Atlantic University*
John Frankenfield, *Florida Atlantic University*
William Venezia, *South Florida Ocean Measurement Facility*
Karl von Ellenrieder, *Florida Atlantic University*

**(4:30 PM) A deep-sea drilling rig MEMS gyroscope random drift error correction method**
Hong Huo, *Hangzhou Dianzi University*
Jing Liu, *Hangzhou Dianzi University*
Wen Cai, *Hangzhou Dianzi University*
**Yi Gao**, *Hangzhou Dianzi University*

**Sound Propagation and Scattering**
**Location: Pacific Salon 7**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Chair:**
**Steve Stanic, Naval Research Laboratory**

**(3:30 PM) Bubble number densities in the wake of a propeller and a pump jet ship**
**Steve Stanic**, *Naval Research Laboratory*
Russell Dahlburg, *Naval Research Laboratory*
Jerald Caruthers, *University of Southern Mississippi*

**(3:50 PM) Accurate FDTD Analysis of Underwater Acoustic Modal Equation Using Transparent Source**
**Yongjune Kim**, *Yonsei University*
Il-Suek Koh, *Inha University*
Yongshik Lee, *Yonsei University*

**(4:10 PM) Computationally Efficient Simulation of Underwater Acoustic Communication Systems**
**Parastoo Qarabaqi**, *Northeastern University*
Yashar Aval, *Northeastern University*
Milica Stojanovic, *Northeastern University*

**(4:30 PM) Localization of underwater tone noise sources using instantaneous frequency rate estimate**
**Lingji Xu**, *Northwestern Polytechnical University*
Yixin Yang, *Northwestern Polytechnical University*
Long Yang, *Northwestern Polytechnical University*

**Posters 4**
**Location: Town and Country**
**Wednesday, September 25 (3:30PM - 4:50PM)**
**Co-Chairs:**
**Pingfan Meng, University of California, San Diego**
**Edoardo Sarda, Florida Atlantic University**

**Channel as seen by an Argo Float: Study from Arabian Sea**
Muhammad Asim, *Harbin Engineering University*
Qiao Gang, *Harbin Engineering University*
**Feng Zhou**, *Harbin Engineering University*
Liu Songzuo, *Harbin Engineering University*

**An Agile Single Board Quadrotor Providing "Eye in the Sky" Capabilities for Marine Environments**
**Mohammed Raju Hossain**, *Memorial University of Newfoundland*
Taufiqur Rahman, *Memorial University of Newfoundland*
Nicholas Krouglicof, *Memorial University of Newfoundland*

**Monitoring Dissolved Oxygen in New Jersey Coastal Waters Using Autonomous Gliders: Multi-year Trends and Event Response**
**Josh Kohut**, *Rutgers University*
Clinton Haldeman, *Rutgers University*
John Kerfoot, *Rutgers University*
Darvene Adams, *Environmental Protection Agency*
Bruce Friedman, *New Jersey Department of Environmental Protection*
Robert Schuster, *New Jersey Department of Environmental Protection*
Michael Borst, *Environmental Protection Agency*

**GPU Accelerated Post-Processing for Multifrequency Biplanar Interferometric Imaging**
**Pingfan Meng**, *University of California, San Diego*
George Cutter, *NOAA Southwest Fisheries Science Center*
David Demer, *NOAA Southwest Fisheries Science Center*
Ryan Kastner, *University of California, San Diego*

**Unmanned Recovery of an AUV from a Surface Platform**
**Edoardo Sarda**, *Florida Atlantic University*
Manhar Dhanak, *Florida Atlantic University*

**Design and implementation of a new low-cost subsurface mooring system for efficient data recovery**
Chuan Tian, *Institute of Oceanology, Chinese Academy of Sciences*
Daniel Deng, *Pacific Northwest National Laboratory*
Jiwei Tian, *Ocean University of China*
Wei Zhao, *Ocean University of China*
Ming Xu, *Ocean University of China*
**Xiaoyang Xu**, *Ocean University of China*
Jun Lu, *Pacific Northwest National Laboratory*

**A Fast SAS Image Simulator Based on HPR algorithm**
**Zhaotong Zhu**, *Xiamen University*
Shibao Peng, *Tsinghua University*
Jia Xu, *Beijing Institute of Technology*
Xiaomei Xu, *Xiamen University*

**Feature extraction based on vector hydrophone in the waveguide environment**
**Lanyue Zhang**, *Harbin Engineering University*
Xiaoying Yao, *Harbin Engineering University*

NOTES

# Technical Program

## Thursday, September 26

**Remotely Operated Vehicle Design**
**Location: Royal Palm Salon 1**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Sheldon Rubin, SeaBotix**
**Francesco Giorgio Serchi, Scuola Superiore Sant'Anna**

**(8:20 AM) A Soft Unmanned Underwater Vehicle with augmented thrust capability**
**Francesco Giorgio Serchi**, *Scuola Superiore Sant'Anna*
Andrea Arienti, *Scuola Superiore Sant'Anna*
Cecilia Laschi, *Scuola Superiore Sant'Anna*

**(8:40 AM) Mini-ROVs, Going Where No ROV Has Gone Before**
**Sheldon Rubin**, *SeaBotix*

**(9:00 AM) PoseiDRONE: design of a soft-bodied ROV with crawling, swimming and manipulation ability**
Andrea Arienti, *Scuola Superiore Sant'Anna*
Marcello Calisti, *Scuola Superiore Sant'Anna*
**Francesco Giorgio Serchi**, *Scuola Superiore Sant'Anna*
Cecilia Laschi, *Scuola Superiore Sant'Anna*

**(9:20 AM) Design of Modular Camera Tool for Mini Underwater ROVs**
**Michael Poretti**, *California Polytechnic State University*
Bridget Benson, *California Polytechnic State University*
Chris Rauch, *Rauch Engineering*

**(9:40 AM) Development of a Large Flow-rate High Speed On/Off Valve for Underwater Hydraulic Ejection System**
**Linyi Gu**, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Xinran Wu, *Hangzhou Universal Control Mechanical Electronic Engineering Ltd.*
Lin Li, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Jiawang Chen, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Qingmiao Zhang, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Junyi Yang, *Second Institute of Oceanography, State Oceanic Administration*
Minhui Zheng, *Second Institute of Oceanography, State Oceanic Administration*

**Classification and Pattern Recognition 1**
**Location: Royal Palm Salon 2**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Chair:**
**Shyam Kumar Madhusudhana, Curtin University**

**(8:20 AM) Feature Extraction and Classification of Clouds in High Resolution Panchromatic Satellite Imagery**
**Elan Sharghi**, *Space and Naval Warfare Systems Center Pacific*
Truong Nguyen, *University of California San Diego*

**(8:40 AM) Marine Object Detection in UAV Full Motion Video**
**Shibin Parameswaran**, *Space and Naval Warfare Systems Center Pacific*
Corey Lane, *Space and Naval Warfare Systems Center Pacific*
Bryan Bagnall, *Space and Naval Warfare Systems Center Pacific*
Heidi Buck, *Space and Naval Warfare Systems Center Pacific*

**(9:00 AM) Spectrogram-based Detection of Signal Contour Tracks in Underwater Audio Recordings**
**Shyam Kumar Madhusudhana**, *Curtin University*
Christine Erbe, *Curtin University*
Alexander Gavrilov, *Curtin University*

**(9:20 AM) Study of feature vector differentiation optimization for classification based on PAC and LDA**
**Xiangdong Jiang**, *Harbin Engineering University*
Jiansheng Tang, *Science and Technology on Underwater Acoustic Antagonizing Laboratory*

**(9:40 AM) Experimental Results on Target Characters of Divers**
**Zongxin Sun**, *Harbin Engineering University*
Jiarong Zhang, *Harbin Engineering University*
Gang Qiao, *Harbin Engineering University*
Donghu Nie, *National Key Laboratory for Underwater Acoustic Technology*
Jialing Liao, *Harbin Engineering University*
Songzuo Liu, *Harbin Engineering University*

**Acoustic Telemetry and Communication 4**
**Location: Royal Palm Salon 3**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Gang Qiao, Harbin Engineering University**
**Dean Edwards, University of Idaho**

**(8:20 AM) Non-linear Doppler Scaling Correction in Underwater Acoustic Channels: Analysis and Simulation**
**Chung Him (George) Yuen**, *University of Utah*
Behrouz Farhang-Boroujeny, *University of Utah*

**(8:40 AM) Natural Language-Based Correction Method for Autonomous Underwater Vehicle Communications**
**Dean Edwards**, *University of Idaho*
Bryce Gill, *University of Idaho*
Terry Soule, *University of Idaho*
Juan Arais, *University of Idaho*

**(9:00 AM) A Mobile Communications Gateway for AUV Telemetry**
**Matthew Grund**, *Hydroid, Inc.*
Keenan Ball, *Woods Hole Oceanographic Institution*

**(9:20 AM) Low-frequency source for very long-range underwater communication**
Frédéric Mosca, *IXBLUE*
Guillaume Matte, *IXBLUE*
Vincent Mignard, *IXBLUE*
Vincent Mignard, *IXBLUE*

**(9:40 AM) Full-duplex, multi-user and parameter reconfigurable underwater acoustic communication modem**
**Gang Qiao**, *Harbin Engineering University*
Songzuo Liu, *Harbin Engineering University*
Zongxin Sun, *Harbin Engineering University*
Feng Zhou, *Harbin Engineering University*

**Systems and Observatories 5**
**Location: Royal Palm Salon 4**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Eric Munday, BioSonics**
**Fengzhong Qu, Institute of Underwater Technology and Ship Engineering**

**(8:20 AM) Development of Specialized Tools for Biological Assessment Using Split Beam Hydroacoustics**
**Eric Munday**, *BioSonics*

**(8:40 AM) Cabled Observing Stations for Remote Locations**
**Martin Hofmann**, *Ocean Networks Canada*
Ryan Flagg, *Ocean Networks Canada*
Ryan Key, *Ocean Networks Canada*
Kate Moran, *Ocean Networks Canada*
Scott McLean, *Ocean Networks Canada*
Kim Juniper, *Ocean Networks Canada*
Benoit Pirenne, *Ocean Networks Canada*

**(9:00 AM) Development of a scientific instrument interface module for cabled seafloor observatories based on industrial control technology**
Hong Song, *Institute of Underwater Technology and Ship Engineering*
Rui Lan, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Qing Yue, *Institute of Underwater Technology and Ship Engineering*
**Fengzhong Qu**, *Institute of Underwater Technology and Ship Engineering*
Dan Song, *Institute of Physical Oceanography, Zhejiang University*
Jun Xie, *Institute of Underwater Technology and Ship Engineering*
Ying Chen, *Institute of Underwater Technology and Ship Engineering*

**(9:20 AM) Hardware-in-the-loop Simulation with Acoustic Coupling for Underwater Acoustic Detection System**
**Zhanlong Yang**, *Northwestern Polytechnical University*
Hang Chen, *Northwestern Polytechnical University*
Hu Yang, *Northwestern Polytechnical University*
Lingji Xu, *Northwestern Polytechnical University*

**Vehicle Performance**
**Location: Royal Palm Salon 5**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Mathieu Kemp, Bluefin Robotics**
**Gwyneth Packard, Woods Hole Oceanographic Institution**

**(8:20 AM) Why long UUVs can't dive - and how to get them to**
**Mathieu Kemp**, *Bluefin Robotics*

**(8:40 AM) Kinematic Walking and Posture Control of CR200 for Subsea Exploration in Tidal Current**
**Gyeong-mok Lee**, *KIOST*
Seongyeol Yoo, *KIOST*
Hyungwon Shim, *KIOST*
Bong-Huan Jun, *KIOST*
Hangoo Kang, *KIOST*
Pan-Mook Lee, *KIOST*

**(9:00 AM) Investigation of Non-uniform Waterjet Pump Inflow for a Range of Ship Speeds**
**Phillip Duerr**, *Florida Atlantic University*
Karl von Ellenrieder, *Florida Atlantic University*

**(9:20 AM) Continuous Autonomous Tracking and Imaging of White Sharks and Basking Sharks Using a REMUS-100 AUV**
**Gwyneth Packard**, *Woods Hole Oceanographic Institution*
Amy Kukulya, *Woods Hole Oceanographic Institution*
Tom Austin, *Woods Hole Oceanographic Institution*
Mark Dennett, *Woods Hole Oceanographic Institution*
Robin Littlefield, *Woods Hole Oceanographic Institution*
Gregory Packard, *Woods Hole Oceanographic Institution*
Michael Purcell, *Woods Hole Oceanographic Institution*
Gregory Skomal, *MA Marine Fisheries*
Roger Stokey, *Woods Hole Oceanographic Institution*

**(9:40 AM) A Viscous Flow Solver for Time-Dependent Free Surface Calculations**
**Geoffrey Cowles**, *University of Massachusetts Dartmouth*
Luigi Martinelli, *Princeton University*

**AUV Operations 1**
**Location: Royal Palm Salon 6**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Arne Diercks, University of Southern Mississippi**
**Eric Wolbrecht, University of Idaho**

**(8:20 AM) Diver Relative UUV Navigation for Joint Human-Robot Operations**
**Andrew Streenan**, *Naval Postgraduate School*
Noel Du Toit, *Naval Postgraduate School*

**(8:40 AM) Two-Dimensional Mapping and Tracking of a Coastal Upwelling Front by an Autonomous Underwater Vehicle**
**Yanwu Zhang**, *MBARI*
James Bellingham, *MBARI*
John Ryan, *MBARI*
Brian Kieft, *MBARI*
Michael Stanway, *MBARI*

**(9:00 AM) Integration of a Polarity-Preserving Chirp Subbottom Profiler into the NIUST AUV Eagle Ray**
**Max Woolsey**, *NIUST/USM*
Roy Jarnagin, *NIUST/USM*
Ken Sleeper, *University of Mississippi*
Leonardo Macelloni, *University of Mississippi*
Marco D'Emidio, *University of Mississippi*
Arne Diercks, *NIUST/USM*
Vernon Asper, *University of Southern Mississippi*

**(9:20 AM) Using AUV-Acquired Survey Data to Derive a Magnetic Model for a Surface Vessel**
David Schipf, *University of Idaho*
John Feusi, *University of Idaho*
Michael Anderson, *University of Idaho*
**Eric Wolbrecht**, *University of Idaho*
John Canning, *University of Idaho*
Dean Edwards, *University of Idaho*

**(9:40 AM) Site Reconnaissance Surveys for Oil Spill Research using Deep-Sea AUVs.**
**Arne Diercks**, *University of Southern Mississippi*
Vernon Asper, *University of Southern Mississippi*
Max Woolsey, *University of Southern Mississippi*
Roy Jarnagin, *University of Southern Mississippi*
Marco d'Emidio, *University of Mississippi*
Clayton Dike, *University of Southern Mississippi*
Steven Tidwell, *University of Mississippi*
Alessandra Conti, *University of Mississippi*

**Dynamic Positioning**
**Location: Pacific Salon 2**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Yuanhui Wang, Harbin Engineering University**
**Mingyu Fu, College of Automation, Harbin Engineering University**

**(8:20 AM) Thrust Allocation for Dynamic Positioning Vessel based on Particle Swarm Optimization Algorithm**
**Yuanhui Wang**, *Harbin Engineering University*
Jiaojiao GU, *Harbin Engineering University*
Chuntai Zou, *Harbin Engineering University*

**(8:40 AM) A MDS-based localization algorithm for underwater wireless sensor network**
**Hua-bin Chen**, *Xiamen University*
De-qing Wang, *Xiamen University*
Fei Yuan, *Xiamen University*
Ru Xu, *Xiamen University*

**(9:00 AM) Robust Adaptive Dynamic Surface Path Tracking Control for Dynamic Positioning Vessel with Big Plough**
**Mingyu Fu**, *College of Automation, Harbin Engineering University*
Aihua Zhang, *College of Automation, Harbin Engineering University*
Jinlong Xu, *Harbin Engineering University*
Lingling Yu, *Harbin Engineering University*

**Vehicle Navigation 1**
**Location: Pacific Salon 4**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Ji-Hong Li, Korea Institute of Robot & Convergence**
**Anibal Matos, INESC TEC**

**(8:20 AM) Optimized path planning for marine vehicle considering uncertainty**
Margarida Correia, *Faculdade de Engenharia da Universidade do Porto*
**Aníbal Matos**, *Faculdade de Engenharia da Universidade do Porto*

**(8:40 AM) Real time autonomous navigation of P-SURO II AUV in a partially known environment**
**Ji-Hong Li**, *Korea Institute of Robot & Convergence*
Mun-Jik Lee, *Korea Institute of Robot & Convergence*
Jung-Tae Kim, *Korea Institute of Robot & Convergence*
Sang-Hyun Park, *Korea Institute of Robot & Convergence*
Jong-Geol Kim, *Korea Institute of Robot & Convergence*
Jin-Ho Suh, *Korea Institute of Robot & Convergence*

**(9:00 AM) Rao-blackwellised Particle Filter SLAM with Consistent Mapping for AUVs**
Bo He, *Ocean University of China*
Xiaoyan Jiang, *Ocean University of China*
**Rui Nian**, *Ocean University of China*
Tianhong Yan, *China Jiliang University*

**(9:20 AM) Study on the calibration method of USBL system based on ray tracing**
Cuie Zheng, *Harbin Engineering University*
**Zhao Li**, *Harbin Engineering University*
Dajun Sun, *Harbin Engineering University*

**(9:40 AM) The HUGIN AUV Terrain Navigation Module**
**Kjetil Anonsen**, *Norwegian Defence Research Establishment*
Ove Kent Hagen, *Norwegian Defence Research Establishment*
Oyvind Hegrenas, *Kongsberg Maritime*
Per Espen Hagen, *Kongsberg Maritime*

**Data Visualization 1**
**Location: Pacific Salon 5**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Dandan Miao, University of New Hampshire**
**Christopher Englert, University of New Hampshire**

**(8:20 AM) Designing Improved Sediment Transport Visualizations**
**Christopher Englert**, *University of New Hampshire*
Thomas Butkiewicz, *University of New Hampshire*
Larry Mayer, *University of New Hampshire*
Arthur Trembanis, *University of Delaware*
Jonathan Beaudoin, *University of New Hampshire*
Val Schmidt, *University of New Hampshire*
Carter DuVal, *University of Delaware*

**(8:40 AM) Navigational chart linear feature generalization with B-Spline Snakes**
**Dandan Miao**, *University of New Hampshire*
Brian Calder, *University of New Hampshire*

**(9:00 AM) Human Use Characterization and Visualization in Marine Spatial Planning Efforts in the Northeast**
**Kate Longley**, *SeaPlan*
Andy Lipsky, *SeaPlan*

**(9:20 AM) Developing Satellite-based Tool for Water Turbidity Mapping in the Arabian Gulf: Abu Dhabi Case Study**
**Muna Al Kaabi**, *Masdar Institute*
Jun Zhao, *Masdar Institute*
Christian Charron, *Masdar Institute*
Imen Gherboudj, *Masdar Institute*
Michele Lazzarini, *Masdar Institute*
Hosni Ghedira, *Masdar Institute*

**Oceanographic Instrumentation and Sensors 5**
**Location: Pacific Salon 6**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Hélène Tonchia, CGG**
**Cody Youngbull, Arizona State University**

**(8:20 AM) TRIAXYS Next Wave II - The Evolution of Wave Measurements**
**Chad MacIsaac**, *AXYS Technologies Inc*
Stephen Naeth, *AXYS Technologies Inc*

**(8:40 AM) A Rigging of a USBL Transceiver for Use on a Seismic Vessel**
Anne Vesin, *CGG*
**Hélène Tonchia**, *CGG*

**(9:00 AM) Ad-Hoc Multi-hop Underwater Optical Network for Deep Ocean Monitoring**
**Cody Youngbull**, *Arizona State University*
Andres Mora, *Arizona State University*
David Ganger, *Arizona State University*
Greg Wells, *Arizona State University*
Jin Zhang, *Arizona State University*
Xinhui Hu, *Arizona State University*
Chenyang Zhou, *Arizona State University*
Andrea Richa, *Arizona State University*

**(9:20 AM) Mapping of Seafloor Radionuclides off Miyagi using a Towed Gamma Ray Spectrometer**
**Blair Thornton**, *Institute of Industrial Science, University of Tokyo*
Seiki Ohnishi, *National Maritime Research Institute*
Tamaki Ura, *Center for Socio-Robotic Synthesis, Kyushu Institute of Technology*
Naoteru Odano, *National Maritime Research Institute*

**Acoustical Oceanography**
**Location: Pacific Salon 7**
**Thursday, September 26 (8:20AM - 10:00AM)**
**Co-Chairs:**
**Hisashi Shiba, NEC Corporation**
**Yishan Su, University of Connecticut**

**(8:20 AM) Sound Speed Profile Estimation by Multi-static Configuration**
**Hisashi Shiba**, *NEC Corporation*

**(8:40 AM) Versatile Lab Testbed for Underwater Sensor Networks**
**Yishan Su**, *University of Connecticut*
Yuzhi Zhang, *University of Connecticut*
Son Le, *University of Connecticut*
Haining Mo, *University of Connecticut*
Yi Huang, *University of Connecticut*
Zheng Peng, *University of Connecticut*
Jun-Hong Cui, *University of Connecticut*

**(9:00 AM) Depth-Dependency of Bulb Implosions as a Low-Frequency Sound Source**
Sungho Cho, *KIOST*
Donhyug Kang, *KIOST*
**Suntaek Oh**, *Korea Institute of Ocean Science & Technology*
Seom-Kyu Jung, *KIOST*
Jee Woong Choi, *Hanyang University*

**(9:20 AM) Simulation Study on Cross-Layer Design for Energy Conservation in Underwater Acoustic Networks**
Yangze Dong, *Norwegian University of Science and Technology*
**Hefeng Dong**, *Norwegian University of Science and Technology*

**(9:40 AM) Path Planning of Autonomous Underwater Vehicle for Optimal Acoustic Tomography**
**Ming Zhang**, *Zhejiang University*
Yuanxin Xu, *Zhejiang University*
Wen Xu, *Zhejiang University*

**Remotely Operated Vehicle Manipulators**
**Location: Royal Palm Salon 1**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Linyi Gu, State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University**
**Fredrik Ryden, University of Washington**

**(10:30 AM) Advanced Telerobotic Underwater Manipulation Using Virtual Fixtures and Haptic Rendering**
**Fredrik Ryden**, *University of Washington*
Andrew Stewart, *University of Washington Applied Physics Laboratory*
Howard Chizeck, *University of Washington*

**(10:50 AM) A method of inverse kinematics of a 7-Function underwater Hydraulic manipulator**
**Liangqing Huo**, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*
Qifeng Zhang, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*
Zhuying Zhang, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*
Qingmei Wang, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*

**(11:10 AM) Development of a Hollow Axis Swing Cylinder for the Elbow Joint of 7 Function Hydraulic Manipulator**
Gaosheng Luo, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
**Linyi Gu**, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Feng Zhou, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Jiawang Chen, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Wenyou Song, *Hangzhou Universal Control Mechanical Electronic Engineering Ltd.*
Jianming Pan, *Second Institute of Oceanography, State Oceanic Administration*
Runying Zeng, *Third Institute of Oceanography, State Oceanic Administration*

**(11:30 AM) Design and Experiments of a Deep-sea Hydraulic Manipulator System**
Qifeng Zhang, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*
**Jun Chen**, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*
Liangqin Huo, *Robotics Laboratory of Shenyang Institute of Automation, Chinese Academy of Sciences*

**Classification and Pattern Recognition 2**
**Location: Royal Palm Salon 2**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Luis Mejias Alvarez, Queensland University of Technology**
**Oliver Daniell, SeeByte UK**

**(10:30 AM) Sonar Indpendent ATR**
**Oliver Daniell**, *SeeByte UK*
Yvan Petillot, *Heriot-Watt University*
Scott Reed, *SeeByte UK*

**(10:50 AM) Automated Marine Mammal Detection From Aerial Imagery**
**Luis Mejias Alvarez**, *Queensland University of Technology*
Gwenael Duclos, *Wildlife Image Processing Solutions for Environmental Assessments*
Amanda Hodgson, *Murdoch Cetacean Research Unit.*
Frederic Maire, *Queensland University of Technology*

**(11:10 AM) Target maneuver onset time detection using acoustic features**
**Jiansheng Tang**, *Science and Technology on Underwater Acoustic Antagonizing Laboratory*
Xiangdong Jiang, *Science and Technology on Underwater Acoustic Antagonizing Laboratory*

**Acoustic Telemetry and Communication 5**
**Location: Royal Palm Salon 3**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Xuefei Ma, Harbin Engineering University**
**Y. Zheng, Missouri University of Science and Technology**

**(10:30 AM) MIMO-OFDM acoustic communications in shallow water**
**Lan Zhang**, *Scripps Institution of Oceanography*
Taehyuk Kang, *Qualcomm*
Hee-chun Song, *Scripps Institution of Oceanography*
Xiaomei Xu, *Tianjin University*

**(10:50 AM) Hardware Implementation of Underwater Acoustic Localization System for Bridge Scour Monitoring**
Yahong Zheng, *Missouri University of Science & Technology*
**Zengli Yang**, *Missouri University of Science & Technology*
Jinxing Hao, *Tsinghua University*
Peng Han, *Northwestern Polytechnical University*

**(11:10 AM) Underwater Acoustic Channel Characterization at 6kHz and 12kHz in a Shallow Water Near Jeju Island**
**Sea-Moon Kim**, *KIOST*
Sung-Hoon Byun, *KIOST*
Seung-Geun Kim, *KIOST*
Dug-Jin Kim, *KIOST*
Seonjeong Kim, *KIOST*
Yong-Kon Lim, *KIOST*

**(11:30 AM) A Full duplex based protocol for underwater acoustic communication network**
Jiarong Zhang, *Harbin Engineering University*
**Xuefei Ma**, *Harbin Engineering University*
Gang Qiao, *Harbin Engineering University*
Can Wang, *Harbin Engineering University*

**Marine Education and Outreach 1**
**Location: Royal Palm Salon 4**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Deidre Sullivan, MATE Center**
**Liesl Hotaling, Eidos Education**

**(10:30 AM) Robotics Competitions and Professional Societies: How do we improve the workforce readiness of our students?**
**Deidre Sullivan**, *MATE Center*
Jill Zande, *MATE Center*

**(10:50 AM) D.E.E.P. Learning: Promoting Informal STEM Learning through Ocean Research Video Games**
**Cheryl Peach**, *Scripps Institution of Oceanography*
Daniel Rorhlick, *Scripps Institution of Oceanography*
Debi Kilb, *Scripps Institution of Oceanography*
John Orcutt, *Scripps Institution of Oceanography*
John Driscoll, *San Pasqual High School*

**(11:10 AM) SENSE IT - Student created water quality sensors**
**Liesl Hotaling**, *Eidos Education*
Rustam Stolkin, *University of Birmingham*
Susan Lowes, *Columbia University*
Peiyi Lin, *Columbia University*
James Bonner, *Clarkson University*
William Kirkey, *Clarkson University*
Temitope Ojo, *Clarkson University*

**(11:30 AM) Using Real-World Data to Increase Students' Scientific Literacy**
**James Brey**, *American Meteorological Society*
Ira Geer, *American Meteorological Society*
Elizabeth Mills, *American Meteorological Society*
Kira Nugnes, *American Meteorological Society*

**Vehicle Design 1**
**Location: Royal Palm Salon 5**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Jon Crowell, OceanServer Technology, Inc**
**Douglas Pargett, MBARI**

**(10:30 AM) Design Challenges of a next generation Lightweight AUV**
**Jon Crowell**, *OceanServer Technology, Inc*

**(10:50 AM) The Development of a Robust Autonomous Surface Craft for Deployment in Harsh Ocean Environment**
**Zhi Li**, *Memorial University of Newfoundland*
Ralf Bachmayer, *Memorial University of Newfoundland*

**(11:10 AM) Design and Fabrication of a 1m Titanium Sphere for 4000m Ocean Depth**
**Douglas Pargett**, *MBARI*

**(11:30 AM) Maneuverability Design and Analysis of an Autonomous Underwater Vehicle for Deep-sea Hydrothermal Plume Survey**
**Ruiwen YI**, *Shenyang Institute of Automation*
Zhiqiang Hu, *Shenyang Institute of Automation*
Yang Lin, *Shenyang Institute of Automation*
Haitao Gu, *Shenyang Institute of Automation*
Chao Wang, *Shenyang Institute of Automation*
Daxiong Ji, *Shenyang Institute of Automation*
Jian Liu, *Shenyang Institute of Automation*

**AUV Operations 2**
**Location: Royal Palm Salon 6**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Duane Thompson, MBARI**
**João Sousa, Faculdade de Engenharia da Universidade do Porto**

**(10:30 AM) MBARI Dorado AUV's Scientific Results**
**Duane Thompson**, *MBARI*
Hans Thomas, *MBARI*
Yanwu Zhang, *MBARI*
Julio Harvey, *MBARI*
John Ryan, *MBARI*
David Clague, *MBARI*
David Caress, *MBARI*
Charlie Paull, *MBARI*
Jenny Paduan, *MBARI*
Doug Conlin, *MBARI*
Eric Martin, *MBARI*

**(10:50 AM) Chasing Fish: Tracking and control in a autonomous multi-vehicle real-world experiment**
Jose Pinto, *Faculdade de Engenharia da Universidade do Porto*
Margarida Faria, *Faculdade de Engenharia da Universidade do Porto*
João Fortuna, *Faculdade de Engenharia da Universidade do Porto*
Ricardo Martins, *Faculdade de Engenharia da Universidade do Porto*
**João Sousa**, *Faculdade de Engenharia da Universidade do Porto*
Nuno Queiroz, *Research Center in Biodiversity and Genetic Resources*
Frederic Py, *MBARI*
Kanna Rajan, *MBARI*

**(11:10 AM) Recharging autonomous underwater vehicles from ambient wave induced motions**
**Nicholas Townsend**, *University of Southampton*
Ajit Shenoi, *University of Southampton*

**(11:30 AM) Passive AUV Tracking using Sound Produced by Shrimps**
**Md Jahangir Alam**, *UNSW Canberra*
Elanor Huntington, *UNSW Canberra*
Michael Frater, *UNSW Canberra*

**Vehicle Navigation 2**
**Location: Pacific Salon 4**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Chair:**
**Bruno Ferreira, INESC TEC**

**(10:30 AM) Spline Navigation and Reactive Collision Avoidance with COLREGs for ASVs**
Miguel Pinto, *INESC TEC*
**Bruno Ferreira**, *INESC TEC*
Heber Sobreira, *INESC TEC*
Aníbal Matos, *INESC TEC*
Nuno Cruz, *INESC TEC*

**(10:50 AM) Adaptive Cleaning of Oil Spills by Autonomous Vehicles under Partial Information**
**Junnan Song**, *University of Connecticut*
Shalabh Gupta, *University of Connecticut*
James Hare, *University of Connecticut*
Shengli Zhou, *University of Connecticut*

**(11:10 AM) Deliberative Optimization of Reactive Agents (DORA) for Autonomous Navigation**
**Anthony Jones**, *Florida Institute of Technology*

**(11:30 AM) SLAM and a Novel Loop Closure Detection for Autonomous Underwater Vehicles**
Shujing Zhang, *Ocean University of China*
Bo He, *Ocean University of China*
**Rui Nian**, *Ocean University of China*
Tianhong Yan, *China Jiliang University*
Yan Liang, *Ocean University of China*

**Data Visualization 2**
**Location: Pacific Salon 5**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Chair:**
**Michael Max, Hydrate Energy International**

**(10:30 AM) Marine Observation Framework Using ICT for Mariculture in Indonesia**
**Masaaki Wada**, *Future University Hakodate*
Katsumori Hatanaka, *Tokyo University of Agriculture*
Ramadhona Saville, *Tokyo University of Agriculture*
Nyoman Radiarta, *Central for Aquaculture Research and Development*
Ketut Sugama, *Central for Aquaculture Research and Development*

**(10:50 AM) Using Tablets for Increasing Data Collection to Improve Dive Efficiency**
**Michael Max**, *Hydrate Energy International*

**Marine Security and Defense 1**
**Location: Pacific Salon 6**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Dan Suchman, Tech Associates, LLC**
**Pam Hurst**

**(10:30 AM) Mobile Adhoc Network of Waterborne Sensors for Enhanced Maritime Security**
**Nathan Whittenton**, *L-3 PHOTONICS*
Thomas Berger, *L-3 PHOTONICS*

**(10:50 AM) Threat Modeling for Sensor Optimization**
**David Krout**, *APL-UW*
Gregory Anderson, *APL-UW*
Evan Hanusa, *APL-UW*
Billy Jones, *APL-UW*

**(11:10 AM) Monostatic Vessel Detection Statistics from the CODAR SeaSonde**
**Collin Dobson**, *Rutgers University*
Hugh Roarty, *Rutgers University*
Kristen Holenstein, *Rutgers University*
Michael Smith, *Rutgers University*
Scott Glenn, *Rutgers University*
Donald Barrick, *CODAR Ocean Sensors*

**(11:30 AM) Underwater Target Tracking with Autonomous Underwater Vehicle**
**Hongjian Wang**, *Harbin Engineering University*
Feng Li, *Harbin Engineering University*
Juan Li, *Harbin Engineering University*
Xinghua Chen, *Harbin Engineering University*

**Oceanography 1**
**Location: Pacific Salon 7**
**Thursday, September 26 (10:30AM - 11:50AM)**
**Co-Chairs:**
**Peter Chu, Naval Postgraduate School**
**Yury Stepanyants, University of Southern Queensland**

**(10:30 AM) A Modern Coastal Erosion Investigation: Kapa'a Beach, Kaua'i**
**Christopher Goody**, *Sea Engineering, Inc.*

**(10:50 AM) Oceanography on Saturn's Moon, Titan**
**Ralph Lorenz**, *JHU Applied Physics Lab*

**(11:10 AM) Nonlinear spectra of shallow water waves**
**Yury Stepanyants**, *University of Southern Queensland*
Jean-Paul Giovanangeli, *IRPHE-IOA*
Christain Kharif, *IRPHE-IOA*
Nawin Raj, *University of Southern Queensland*

**(11:30 AM) Weibull Statistics in Ocean Analysis and Prediction**
**Peter Chu**, *Naval Postgraduate School*

**Remotely Operated Vehicle Controls**
**Location: Royal Palm Salon 1**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Gerrit Meinecke, MARUM, Center for Marine Environmental Sciences**
**Banghyun Kim, KIOST**

**(1:20 PM) Automated visual servoing for close inspection using low cost, man-portable vehicles**
**Scott Reed**, *SeeByte Ltd*
Jonathan Evans, *SeeByte Ltd*
Benjamin Privat, *SeeByte Ltd*
Jon Wood, *SeeByte Ltd*

**(1:40 PM) Control Architecture for Stable Gait of a Six-legged Subsea Robot CR200**
**Banghyun Kim**, *KIOST*
Hyungwon Shim, *KIOST*
Seong-yeol Yoo, *KIOST*
Gyeong-mok Lee, *KIOST*
Bong-Huan Jun, *KIOST*
Pan-Mook Lee, *KIOST*

**(2:00 PM) OROCOS based control software of the new developed MARUM HybridROV for under ice applications**
**Gerrit Meinecke**, *MARUM, Center for Marine Environmental Sciences*
Jan Albiez, *DFKI Bremen*
Sylvain Joyeux, *DFKI Bremen*
Volker Ratmeyer, *MARUM, Center for Marine Environmental Sciences*
Jens Renken, *MARUM, Center for Marine Environmental Sciences*

**(2:20 PM) Development of a Hydraulic Propulsion System Controlled by Proportional Pressure Valves for the 4500m Work-class ROV**
**Feng Zhou**, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Linyi Gu, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Gaosheng Luo, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Jiawang Chen, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Mengjun Zheng, *Hangzhou YuKong Ltd.*
Zongze Shao, *Third Institute of Oceanography, State Oceanic Administration*
Chunming Dong, *Third Institute of Oceanography, State Oceanic Administration*

**(2:40 PM) Depth Control of Remotely Operated Vehicles Using Nonsingular Fast Terminal Sliding Mode Control Method**
Yaoyao Wang, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
**Linyi Gu**, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Ming Gao, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Xianjun Jia, *State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University*
Jiayin Zhou, *Zhejiang University*
Donghui Zhou, *Hangzhou Dianzi University*
Jun Liu, *Hangzhou Dianzi University*

**Model Based Signal Processing**
**Location: Royal Palm Salon 2**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**James Candy, University of California Santa Barbara**
**Yue Zhou, Zhejiang University**

**(1:20 PM) Parametrically Adaptive Wavenumber Processing for Mode Tracking in a Shallow Ocean Experiment**
**James Candy**, *University of California Santa Barbara*

**(1:40 PM) Matched-field Source Localization via Statistical Covariance Matching**
**Yue Zhou**, *Zhejiang University*
Wen Xu, *Zhejiang University*

**(2:00 PM) Second Order Divided Difference Filter applied in Underwater Bearing Only Target Tracking**
**Hongjian Wang**, *Harbin Engineering University*
Jinlong Xu, *Harbin Engineering University*
Xinqian Bian, *Harbin Engineering University*
Aihua Zhang, *Harbin Engineering University*

**(2:20 PM) Tracking high-speed source based on moving source acoustic field model in shallow ocean environment**
**Jinyan Du**, *Institute of Oceanographic Instrumentation, Shandong Academy of Sciences*
Chao Sun, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Zongwei Liu, *Institute of Acoustic Engineering, Northwestern Polytechnical University*
Yi Zheng, *Institute of Oceanographic Instrumentation, Shandong Academy of Sciences*
Yixin Yang, *Institute of Acoustic Engineering, Northwestern Polytechnical University*

**Acoustic Telemetry and Communication 6**
**Location: Royal Palm Salon 3**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Sharbari Banerjee, Indian Institute of Technology Delhi**
**Rameez Ahmed, Northeastern University**

**(1:20 PM) Random Linear Packet Coding for Fading Channels**
**Rameez Ahmed**, *Northeastern University*
Milica Stojanovic, *Northeastern University*

**(1:40 PM) Nonbinary LDPC Code for Noncoherent Underwater Acoustic Communication and Its Experiment Results**
**Yanbo Wu**, *Institute of Acoustics, Chinese Academy of Sciences*
Min Zhu, *Institute of Acoustics, Chinese Academy of Sciences*
Weiqing Zhu, *Institute of Acoustics, Chinese Academy of Sciences*
Zeping Xing, *Institute of Acoustics, Chinese Academy of Sciences*
Lijun Xu, *Institute of Acoustics, Chinese Academy of Sciences*
Bo Yang, *Institute of Acoustics, Chinese Academy of Sciences*

**Marine Education and Outreach 2**
**Location: Royal Palm Salon 4**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Steven Lohrenz, University of Massachusetts Dartmouth**
**Liesl Hotaling, Eidos Education**

**(1:20 PM) Visualizing Oceans of Data: Educational Interface Design**
Cheryl Peach, *Scripps Institution of Oceanography*
**Ruth Krumhansl**, *Education Development Center, Inc.*
Amy Busey, *Education Development Center, Inc.*
June Foster, *Education Development Center, Inc.*
Kira Krumhansl, *Education Development Center, Inc.*

**(1:40 PM) COSEE Engagement of Ocean Research Community**
**Liesl Hotaling**, *Eidos Education*
Gail Scowcroft, *University of Rhode Island*
Jan Hodder, *Oregon Institute of Marine Biology*
Cheryl Peach, *Scripps Institution of Oceanography*

**(2:00 PM) PSM-COAST: A Master's Program for Professionals in Marine Science and Technology**
**Steven Lohrenz**, *University of Massachusetts Dartmouth*
Louis Goodman, *University of Massachusetts Dartmouth*
James Bisagni, *University of Massachusetts Dartmouth*

**Vehicle Design 2**
**Location: Royal Palm Salon 5**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Max Woolsey, NIUST/USM**
**Philippe Courmontagne, ISEN**

**(1:20 PM) Development of I-SPIDER: a towed platform for video survey and instrument placement**
Matt Lowe, *University of Mississippi*
**Max Woolsey**, *NIUST/USM*
Roy Jarnagin, *NIUST/USM*
Carol Lutken, *University of Mississippi*
Brian Noakes, *University of Mississippi*
Larry Overstreet, *University of Mississippi*
Steven Tidwell, *University of Mississippi*

**(1:40 PM) MARIUS Project: Design of a sail robot for oceanographic missions**
Maximilien Naveau, *SUPMECA*
Cedric Anthierens, *SUPMECA*
Elodie Pauly, *ISEN*
**Philippe Courmontagne**, *ISEN*

**(2:00 PM) Folding Propeller Design and Analysis for A Hybrid Driven Underwater Glider**
**Zhier Chen**, *Shenyang Insitute of Automation*
Jiancheng Yu, *Shenyang Insitute of Automation*
Aiqun Zhang, *Shenyang Insitute of Automation*
Ruiwen Yi, *Shenyang Insitute of Automation*
Qifeng Zhang, *Shenyang Insitute of Automation*

**(2:20 PM) A Hybrid Underwater Glider for Underwater Docking**
**Shilin Peng**, *Zhejiang University*
Canjun Yang, *Zhejiang University*
Shuangshuang Fan, *Zhejiang University*
Shaoyong Zhang, *Zhejiang University*
Pinfu Wang, *Zhejiang University*
Yu Xie, *Zhejiang University*
Ying Chen, *Zhejiang University*

**(2:40 PM) First Field-Test of Seabed Walking Robot CR200**
**Bong Huan Jun**, *KIOST*
Hyungwon Shim, *KIOST*
Banghyun Kim, *KIOST*
Jin-Yeong Park, *KIOST*
Hyuk Baek, *KIOST*
Seongyeol Yoo, *KIOST*
Hangoo Kang, *KIOST*
Gyeong-mok Lee, *KIOST*
Pan-Mook Lee, *KIOST*

**AUV Operations 3**
**Location: Royal Palm Salon 6**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Dan McLeod, Lockheed Martin**
**Norman Farr, Woods Hole Oceanographic Institution**

**(1:20 PM) Autonomous Inspection using an Underwater 3D Lidar**
**Dan McLeod**, *Lockheed Martin*
Mark Hardy, *3D at Depth LLC*
John Jacobson, *Lockheed Martin*

**(1:40 PM) Applications of Autonomous Underwater Vehicles (AUVs) to Ocean Mining Exploration**
**William Senke**, *Lockheed Martin*

**(2:00 PM) Demonstration of Wireless Data Harvesting from a Subsea Node Using a ?Ship of Opportunity?**
**Norman Farr**, *Woods Hole Oceanographic Institution*
Jonathan Ware, *Woods Hole Oceanographic Institution*
Clifford Pontbriand, *Woods Hole Oceanographic Institution*
Maurice Tivey, *Woods Hole Oceanographic Institution*

**(2:20 PM) Positioning and Control of an AUV inside a water pipeline for non-contact in-service Inspection**
**Unnikrishnan Painumgal**, *Institute of Industrial Science, University of Tokyo*
Blair Thornton, *Institute of Industrial Science, University of Tokyo*
Tamaki Ura, *Kyushu Institute of Technology*
Yoshiaki Nose, *Institute of Industrial Science, University of Tokyo*

**(2:40 PM) The General Design and Field Trial of a Seafloor Surveying AUV System**
Hongwei Zhang, *Tianjin University*
**Liang Hao**, *Tianjin University*
Yanhui Wang, *Tianjin University*
Yuhong Liu, *Tianjin University*
Zhiliang Wu, *Tianjin University*
Shuxin Wang, *Tianjin University*
Shuai Shao, *Tianjin University*
Dongjie Wei, *Tianjin University*
Wei Hou, *Tianjin Navigation Instruments Research Institute*

**Vehicle Navigation 3**
**Location: Pacific Salon 4**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Anthony Spears, Georgia Institute of Technology**
**Alexander Scherbatyuk, IMTP FEB RAS, FEFU**

**(1:20 PM) Autonomous Control and Simulation of the VideoRay Pro III Vehicle Using MOOS and IvP Helm**
**Anthony Spears**, *Georgia Institute of Technology*
Michael West, *Georgia Tech Research Institute*
Thomas Collins, *Georgia Tech Research Institute*

**(1:40 PM) Hybrid Baseline Localization for Portable AUV Navigation**
Bryce Gill, *University of Idaho*
David Schipf, *University of Idaho*
Ryan Borth, *University of Idaho*
John Canning, *University of Idaho*
**Eric Wolbrecht**, *University of Idaho*
Michael Anderson, *University of Idaho*
Dean Edwards, *University of Idaho*

**(2:00 PM) Using integro-differential operators on low cost underwater autonomous vehicles**
**Paulo Oliveira**, *CINAV*
Victor Lobo, *CINAV and ISEGI*

**(2:20 PM) Improving terrain navigation by concurrent tidal and sound speed error estimation**
**Ove Hagen**, *Norwegian Defence Research Establishment*
Kjetil Ånonsen, *Norwegian Defence Research Establishment*

**(2:40 PM) Some Algorithms of Cooperative AUV Navigation with Mobile Surface Beacon**
**Alexander Scherbatyuk**, *IMTP FEB RAS, FEFU*
Fedor Dubrovin, *Far Eastern Federal University*
Nikolay Sergeenko, *IMTP FEB RAS*

**Marine Geology and Geodesy**
**Location: Pacific Salon 5**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Nicholas Chotiros, University of Texas Austin**
**Todd Mitchell, Fugro**

**(1:20 PM) A Geometric Approach of Passive Shrimp Estimation**
**Md Jahangir Alam**, *UNSW Canberra*
Elanor Huntington, *UNSW Canberra*
Michael Frater, *UNSW Canberra*

**(1:40 PM) Investigations of Marine Geohazards in Coastal Zones**
**Todd Mitchell**, *Fugro*
Kevin Smith, *Fugro*
Daniel Ebuna, *Fugro*

**(2:00 PM) Hydroacoustic mapping system for quantitative identification of aquatic macrophytes, substrate composition, and shallow water bathymetric surveying**
**Eric Munday**, *BioSonics*
Brian Moore, *BioSonics*
Janusz Burczynski, *BioSonics*

**(2:20 PM) Seabed characterization by a thin-line towed array using acoustic communication signals**
**Nicholas Chotiros**, *University of Texas Austin*
Venugopalan Pallayil, *National University of Singapore*

**(2:40 PM) Dynamical simulation and analysis of the tidal current field in Yellow Sea during Younger Dryas Period**
Xibin Han, *Second Institute of Oceanography, State Oceanic Administration*
Jinghao Shi, *Ocean University of China*
**Minhui Zheng**, *Second Institute of Oceanography, State Oceanic Administration*
Fengyou Chu, *Second Institute of Oceanography, State Oceanic Administration*
Lijiao Li, *Second Institute of Oceanography, State Oceanic Administration*
Dong Xu, *Second Institute of Oceanography, State Oceanic Administration*
Yeping Bian, *Second Institute of Oceanography, State Oceanic Administration*

**Marine Security and Defense 2**
**Location: Pacific Salon 6**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**William Mildon, AMETEK HCC Industries Inc.**
**Pam Hurst**

**(1:20 PM) Safety and Security Applications for Micro-Unmanned Surface Vessels**
**Fernando Boiteux**, *Los Angeles County Fire Department*
Mark Patterson, *Hydronalix*
Anthony Mulligan, *Hydronalix*

**(1:40 PM) Bistatic Vessel Detection with the CODAR SeaSonde**
**Hugh Roarty**, *Rutgers University*
Kristen Holenstein, *Rutgers University*
Collin Dobson, *Rutgers University*
Michael Smith, *Rutgers University*
Scott Glenn, *Rutgers University*
Donald Barrick, *CODAR Ocean Sensors*

**(2:00 PM) A Multistage Tracker for Distributed Sensor Fields**
**Evan Hanusa**, *University of Washington*
David Krout, *University of Washington*

**(2:20 PM) Development of an Unmanned Capsule for Large-Scale Maritime Search and Rescue**
Miguel Pinto, *INESC TEC*
Eduardo Silva, *INESC TEC*
Aníbal Matos, *INESC TEC*
**Nuno Cruz**, *INESC TEC*
José Alves, *INESC TEC*
Duarte Almeida, *INESC TEC*
Alfredo Martins, *INESC TEC*
José Almeida, *INESC TEC*
Diogo Machado, *INESC TEC*

**Oceanography 2**
**Location: Pacific Salon 7**
**Thursday, September 26 (1:20PM - 3:00PM)**
**Co-Chairs:**
**Kenneth Foote, Woods Hole Oceanographic Institution**
**JoongWoo Lee, Korea Maritime University**

**(1:20 PM) Hypoxic Intrusions to Puget Sound from the Ocean**
**R. Deppe**, *University of Washington*
Jim Thomson, *University of Washington Applied Physics Laboratory*
Brian Polagye, *University of Washington*
Christopher Krembs, *Washington State Department of Ecology*

**(1:40 PM) OES Standards Initiative**
**Kenneth Foote**, *Woods Hole Oceanographic Institution*
Stephen Holt, *Caelum Research Corporation*
Albert Williams, *Woods Hole Oceanographic Institution*

**(2:00 PM) Multidisciplinary approach to assess potential risk of mortality of benthic ecosystems facing climate change in the NW Mediterranean Sea**
Nathaniel Bensoussan, *IPSO-FACTO*
**Ivane Pairaud**, *IFREMER LERPAC*
Pierre Garreau, *IFREMER DYNECO-PHYSED*
Samuel Somot, *CNRM GAME*
Joaquim Garrabou, *ICM*

**(2:20 PM) Design of Eco Blocks for Protection of Submerged Pipeline**
**JoongWoo Lee**, *Korea Maritime University*
Jeong Seok Kim, *Korea Maritime University*
YongHoon Lee, *Korea Maritime University*

**(2:40 PM) Short Term Forecast of the Evaporation Duct for the West Pacific Ocean**
**Yang Shi**, *Northwestern Polytechnical University*
Kunde Yang, *Northwestern Polytechnical University*
Yuanliang Ma, *Northwestern Polytechnical University*
Yang Yixin, *Northwestern Polytechnical University*
Sun Chao, *Northwestern Polytechnical University*

# Oceans '13 Exhibitors

| Company | Booth # |
|---|---|
| Advanced Fiber Products | 608 |
| Airmar Technology | 418 |
| AK Industries | 817, 818 |
| American Meteorological Society | 426 |
| AML Oceanographic Ltd. | 324 |
| Aquatic Sensor Network Technology | 831 |
| ASL Environmental Sciences | 128 |
| AUVSI San Diego | 821 |
| AXYS Technologies, Inc. | 519 |
| Bellamare | 314, 415 |
| BioSonics, Inc. | 836 |
| Biospherical Instruments Inc. | 236 |
| BIRNS, Inc. | 101 |
| Bluefin Robotics Corp. | 525 |
| Bokam Engineering Inc. | 801 |
| Bowtech Products Ltd. | 235 |
| Bureau of Ocean Energy Management (BOEM) | 843 |
| California Ships to Reefs, Inc. | 810 |
| Campbell Scientific | 529 |
| CARIS | 401 |
| Channel Technologies Group | 327 |
| Chukar Water Jet, Inc. | 704 |
| CICESE | 844 |
| ClearSignal | 314, 415 |
| CLS America, Inc. | 615 |
| CODAR Ocean Sensors | 109 |
| Compusult Ltd | 502 |
| Consortium for Ocean Leadership | 814 |
| Datawell BV | 526, 528 |
| Deep Sea Submersible Pilots Assoc | 808 |
| Deep Trekker Inc. | 518 |
| DeepSea Power & Light | 318 |
| Diving Unlimited International, Inc/ | 335 |
| DOE Inc. | 517 |
| DOER Marine | 319 |
| Edgetech | 606 |
| Elsevier Limited | 803 |
| EMO Marine Technologies | 505 |
| Energy Sales | 424 |
| Engineered Syntactic System | 627 |
| Environmental Systems Research Institute (ESRI) | 827 |
| Exelis Acoustic Systems | 417 |
| Exocetus Development LLC | 219 |
| Falmat Cable | 315, 317 |
| Falmouth Scientific, Inc. | 435 |
| Florida Atlantic University | 853 |
| Furuno USA, Inc. | 729 |
| Genesis Group Inc. | 700 |
| Geometrics | 515 |
| Global Dynamix, Inc | 730 |
| Greensea Systems, Inc. | 830 |
| GRI Simulations Inc. | 500 |
| Guatek | 314, 415 |
| Hawboldt Industries | 405 |
| Hydracon Company | 628 |
| Hydro Group plc | 820 |
| Hydro International | 434 |
| IEEE Oceanic Engineering Society (OES) | L6 |
| Imagenex Technology Corp. | 625 |
| International Ocean Systems | 735 |
| InterOcean Systems, Inc. | 227 |
| Inuktun US, LLC | 727 |
| IXBlue, Inc. | 316 |
| Japan Agency for Marine-Earth Science & Technology | 719 |

## OCEANS '13 Exhibitor Profiles

**Advanced Fiber Products**
**Booths: 608**
200 East Howard Ave, Ste. 204
Des Plaines IL 60018
United States of America
Website: http://www.afpgco.com
Email: istouklov@afpgco.com
Phone: 909 576 5854

Advanced Fiber Products (AFP), headquartered in UK, is the world leader in fiber optics subsea, submarine and oil-and-gas hermetic solutions - penetrators, feedthroughs, connector and cable assemblies. In addition to that AFP US division is a major supplier of electro-optical media converters, modules and systems for ROV, UUV, observatories and submarines.

**Airmar Technology**
**Booths: 418**
35 Meadowbrook Drive
Milford NH 03055
United States of America
Website: www.airmar.com
Email: jpiper@airmar.com
Phone: 603 673 9570

AIRMAR Technology Corporation is a world leader in the design and manufacture of ultrasonic sensor technology for marine and industrial applications. The Company's product line includes advanced ultrasonic transducers, flow sensors, WeatherStation® instruments, and electronic compasses used for a wide variety of applications including fishing, navigation, meteorology, survey, level measurement, process control, and proximity sensing. Established in 1982, AIRMAR?s headquarters are located in Milford, New Hampshire, with distribution offices in Lake City, South Carolina; and Saint Malo, France. Visit the Company's web site at www.airmar.com.

**AK Industries**
**Booths: 817, 818**
3115 E. Las Hermanas St.
East Rancho Dominguez CA 90221
United States of America
Website: www.ak-ind.com
Email: loni@ak-ind.com
Phone: 310 762 1600

AK Industries is an agile high tech manufacturer of rugged low cost underwater electrical connectors. The HydroVolt line of connectors is the most rugged and reliable low cost connector available. AK Industries is also ideally suited to provide unique solutions engineered to customer requirements.

**American Meteorological Society**
**Booths: 426**
1200 New York Ave. NW
Ste 500
Washington DC 20005
United States of America
Website: www.ametsoc.org/amsedu
Email: knugnes@ametsoc.org
Phone: 202-737-1043

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Canada
Website: www.amloceanographic.com
Email: erin.caskey@amloceanographic.com
Phone: 250 656 0771

AML Oceanographic (formerly Applied Microsystems) manufactures oceanographic instrumentation including CTDs and sound velocimeters. Our X Series instruments utilize field-swappable sensor heads with significant benefits, including: Greater flexibility - Each instrument can multi-task as a CTD or SVTP, Reduction in shipping costs, Small sensor heads are recalibrated and shipped instead of heavy instruments, Elimination of instrument downtime - Spare, calibrated sensor-heads can be shipped to the instrument. All of these benefits equal greater Return on Investment.

**Aquatic Sensor Network Technology**
**Booths: 831**
1244 Storrs Rd Suite B-E
Storrs Commons
Storrs CT 06268
United States of America
Website: www.aquasent.com
Email: john.hanson@aquasent.com
Phone: 860294303

Aquatic Sensor Network Technology (AquaSeNT) has advanced the state of the art in underwater acoustic telemetry. The firm has pioneered the use of OFDM modulation techniques that allow high spectral efficiency with outstanding multipath performance. Onboard processing capacity and networking protocols optimized for subsea communication, along with built-in data logging capacity, allows AquaSeNT to offer both point-to-point and networked versions of its acoustic modems. Researchers and oceanographers can take advantage of reliable communication in the most challenging environments, and can now benefit from multi-node networks to wirelessly communicate over long ranges or with redundant communication channels.

**ASL Environmental Sciences**
**Booths: 128**
#1-6703 Rajpur Place
Victoria BC V8M1Z5
Canada
Website: www.aslenv.com
Email: cmcquade@aslenv.com
Phone: 250 656 0177

ASL provides a full range of physical oceanographic consulting services, from project design and planning, deployment and recovery, to data analysis and scientific interpretation. Services include flow measurement, ice studies, wave measurement and analysis, numerical modeling, and remote sensing. Products include: the Ice Profiler- measures ice-keel depths; and the WERA Northern Radar- shore based HF radar system; and the IRIS - data logger for Imagenex 881A Sonar. ASL has North America's largest lease pool of oceanographic instruments.

**AUVSI San Diego**
**Booths: 821**
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San Diego CA 92172
United States of America
Website: ww.auvsisandiego.com
Email: monica@auvsisandiego.com
Phone: 858 518 3809

Educational Programs

**AXYS Technologies, Inc.**
**Booths: 519**
2045 Mills Road
Sidney BC V8L 5X2
Canada
Website: www.axystechnologies.com
Email: rthomsen@axys.com
Phone: 250 655 5860

AXYS Technologies Inc. (AXYS) is an ISO 9001-2008 registered Canadian company, located in Sidney, British Columbia. AXYS commenced operations in 1974 as an oceanographic consulting company. Over the past 38 years, AXYS has evolved into a world leader in the provision of turnkey environmental monitoring systems, providing over 500 systems to clients in 50 countries. AXYS main product lines include, TRIAXYS directional wave buoys, meteorological ocean buoys, WindSentinel wind resource assessment buoys, water quality buoys, and port and vessel traffic management solutions. AXYS Field Service Specialists offer training and continued support to customers in the operation and maintenance of all products.

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8540 Production Avenue, Ste. B
San Diego, CA 92121
United States of America
Website: www.bellamare-us.com
Phone: 858 578 8108

Bellamare designs and builds tow bodies for data acquisition, plankton imaging systems, and custom instrument housings.

**BioSonics, Inc.**
**Booths: 836**
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Seattle WA 98107
United States of America
Website: www.biosonicsinc.com
Email: emunday@biosonicsinc.com
Phone: 206- 782 2211

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**Biospherical Instruments Inc.**
**Booths: 236**
5340 Riley Street
San Diego CA 92110
United States of America
Website: www.biospherical.com
Email: sales@biospherical.com
Phone: 619 686 1888

Biospherical Instruments Inc. (BSI) is a research-oriented company founded in 1977 to design and manufacture scientific instrumentation for environmental monitoring. Since its inception, BSI has broadened its product line and established an international reputation as a leading manufacturer of high quality optical instruments for the oceanographic, atmospheric, water quality, and biological sciences communities. BSI has been part of the National Science Foundation (NSF) Ultraviolet Monitoring Network since installing the first instruments in 1988 and operated the network until 2009 when it was split into two networks: one under NOAA, and the other remaining at Biospherical. BSI's products include terrestrial and oceanographic global UV monitoring systems, water quality monitoring systems for municipal reservoirs, and a wide variety of UV and visible wavelength radiometers for use in oceanographic and atmospheric research.

**BIRNS, Inc.**
**Booths: 101**
1720 Fiske Place
Oxnard CA 93033
United States of America
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Email: abrown@birns.com
Phone: 805 830 5876

Founded in 1954, BIRNS, Inc. is an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connectors, custom cable assemblies and lighting systems. With its NAVSEA PRO-020 certified molding facility, the company leads the industry with sophisticated connector lines, including exceptional electrical, electromechanical, coaxial, electro-coax, optical, electro-optical and EOM hybrid options. BIRNS provides the industry's highest volume of cost-effective hydrostatic and helium pressure testing, and has a wide range of ABS Product Design Assessment (PDA) certified penetrators. BIRNS also delivers brilliant LED, LEP and tungsten-halogen marine, chamber, security and commercial diving lights trusted in the world's most extreme environments.

**Bluefin Robotics Corp.**
**Booths: 525**
553 South St.
Quincy MA 02169
United States of America
Website: www.bluefinrobotics.com
Email: dtalbot@bluefinrobotics.com
Phone: 617 715 7000

Bluefin Robotics designs, manufactures and operates Autonomous Underwater Vehicle (AUV) systems and related technology. Founded in 1997, the company has grown to become a world leader in AUV products designed for defense, commercial, and scientific applications. Bluefin Robotics is a wholly-owned subsidiary of Battelle. For more information, please send your inquires to sales@bluefinrobotics.com or visit www.bluefinrobotics.com.

**Bokam Engineering Inc.**
**Booths: 801**
2720 S. Shannon St.
Santa Ana CA 92704
United States of America
Website: www.bokam.com
Email: admin@bokam.com
Phone: 714 513 2200

**Bowtech Products Ltd.**
**Booths: 235**
Howe Moss Crescent
Dyce
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Website: www.bowtech.co.uk
Email: johnm@bowtech.co.uk
Phone: +44 1224772345

Bowtech Products Ltd (Est. 1989) specialises in the design, manufacture and supply of underwater harsh environment vision systems, which includes video inspection systems, underwater cameras, underwater LED lights, xenon underwater emergency relocation strobes, custom moulded cable assemblies, pan and tilts, underwater electrical and fibre-optic connectors, fibre-optic multiplexers and slip rings for use in hazardous areas or subsea, at any ocean depth.

Bowtech Products? underwater vision systems are deployed in the harshest environments within the ROV AUV, oil and gas, defence, oceanographic, nuclear, leisure and marine science industries. Bowtech Products prides itself on listening to its customers to ascertain their requirements. Its fully trained team of Electrical and Mechanical Engineers and Technicians provide technical support to the entire product range and innovative design solutions.

**Bureau of Ocean Energy Management (BOEM)**
**Booths: 843**
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2nd. floor
Camarillo CA 93010
United States of America
Website: www.boem.gov
Email: douglas.boren@boem.gov
Phone: 805 389 7815

**California Ships to Reefs, Inc.**
**Booths: 810**
69A Lincoln Blvd. Ste 215
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California Ships to Reefs' vision is to establish a regional system of artificial reefs along the California coast to improve and enhance the California fish, plant and marine ecosystem, and to enhance the tourism industry centered on fishing and diving.

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Ocean Leadership is a Washington, D.C.-based nonprofit organization that represents 93 of the leading public and private ocean research education institutions, aquaria and industry with the mission to advance research, education and sound ocean policy. The organization also manages, coordinates and facilitates ocean research and education programs in areas of scientific ocean drilling, ocean observing, ocean exploration and ocean partnerships.

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Our ROVs are completely and meticulously assembled and tested in Canada by our team of skilled engineers and technologists. Every submersible undergoes a rigorous product delivery inspection and in-water pressure testing before we ship it out to our customers. Based in southern Ontario, Canada, Deep Trekker is within close proximity to world class universities and colleges, as well as a vast array of supporting industry.

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DeepSea Power & Light is a U.S. company with over 30 years experience manufacturing high quality, innovative products to the oceanographic community. Our wide range of our products include underwater lights, video cameras, batteries, and buoyancy ceramic spheres for deep diving submersibles, offshore oil, and commercial divers.

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International Ocean Systems is a European-based Diver Group magazine with a bi-monthly circulation in excess of 10,000 worldwide. It serves the commercial oceanography market covering the fields of ocean data gathering, underwater surveying, and instrumentation. Readers are predominantly upper management, designers/engineers and scientists.

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Inuktun was founded in 1989 to design and manufacture Remotely Operated Vehicles (ROVs) and modular robotic systems for use in confined spaces and hazardous environments. Since then, the company has built a reputation as the expert in remote controlled robotic transport and delivery of visual inspection equipment and instrumentation tooling. Inuktun's innovative technology is used extensively by the marine industry, institutions and governments in security, defence, education, research and management applications.

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Japan Agency for Marine-Earth Science and Technology (JAMSTEC) is a comprehensive research institution in Japan which specializes in marine science and technology. Through its research and development activities, JAMSTEC has taken on challenges to elucidate complicated phenomena on the earth, promote ocean exploration, and investigate possibilities of marine resource utilization.

**JFE Advantech Co., Ltd.**
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Japan
Website: www.jfe-advantech.co.jp
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JFE Advantech is an oceanographic instruments manufacturer locates in Japan. We produce various type of sensors including CTDs, Chlorophyll, Turbidity, Dissolved oxygen, Current, Wave height, etc.

**JouBeh Technologies**
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Canada
Website: www.joubeh.com
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JouBeh Technologies is a leading Iridium satellite Value Added Reseller specializing in OEM sales of data modems, handsets, data/ voice airtime and data processing.

**Knudsen Engineering Limited**
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10 Industrial Road
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Recognized for innovation, high performance products and dedicated customer support, Knudsen manufactures single beam echosounders used in numerous diverse applications including survey, navigation, dredging, sub-bottom profiling and ocean research. Visit Booth 407 to learn more on SOUNDER and CHIRP series echosounders and our Shallow Water Sub Bottom Profiler Pinger

**Kongsberg Underwater Technology, Inc.**
**Booths: 614, 616, 618**
19210 33rd Ave. W.
Lynnwood WA 98036
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Phone: 425 712 1107

Kongsberg Underwater Technology, Inc. is a world-leading supplier of advanced underwater acoustic systems, subsea systems and instrumentation for ocean research, homeland security and the offshore oil & gas industry. We offer multibeam echo sounders (from 12k Hz to 400 kHz), a variety of single beam echo sounders, sub-bottom profilers, scientific echo sounders, acoustic positioning systems, motion reference sensors, underwater cameras, HUGIN, REMUS and Seaglider AUVs and a wide selection of other products.

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L-3 PHOTONICS specializes in niche market optical communications systems, including Secure Comms, Fiber Optic Networks, Free Space Optics, RF over Fiber and multi-protocol optical networks for mobile platforms. Located in Carlsbad, California, PHOTONICS is a member of L-3 Communications Systems Group.

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Manufactures high-speed, power efficient and highly robust underwater acoustic modems and TrackLink USBL acoustic tracking systems. Manufactures NavQuest Doppler Velocity Logs, FlowQuest acoustic current profilers and FlowScout acoustic flow meters. Also manufactures PinPoint LBL acoustic positioning systems and Precision Marine Geodetic Systems used for tsunami and earthquake monitoring and prediction.

**Liquid Robotics**
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Liquid Robotics is an ocean data services provider and developer of the Wave Glider®, the world's first autonomous ocean robot to use only the ocean's endless supply of wave and solar energy for propulsion (no manpower, no emissions, no refueling). The Wave Glider enables cost-effective collection and transmittal of data gathered during missions lasting multiple months to years over distances of thousands of miles, or while holding station. Able to operate 24x7, through all weather conditions, this long endurance autonomous surface vehicle provides a continuous presence ideal for METOC, Fisheries, hydrographic surveys and maritime domain security at a fraction of the cost of today's approaches. For more information visit www.liquidr.com.

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Headquartered in Bethesda, Md., Lockheed Martin is a global security and aerospace company that employs about 120,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products, and services. The Corporation's net sales for 2012 were $47.2 billion.

**Loggerhead Instruments**
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Loggerhead Instruments pioneered long-term underwater acoustic recordings for monitoring underwater noise and animal sounds. Loggerhead has just released OpenTag, the first in a line of open source datalogging oceanographic sensors. OpenTag integrates a depth and temperature sensor with a 3D accelerometer, magnetometer, and gyroscope to fully characterize underwater 3D motion. OpenTag is available as circuit boards or potted in an underwater device with rechargeable battery. Loggerhead will preview Medusa, an open-source low-cost buoyancy engine that can act as a platform for passive acoustics and other sensors.

**MacArtney Inc.**
**Booths: 406**
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The MacArtney Underwater Technology Group is a global supplier of underwater technology specialising in design, manufacture, sales and service of a wide range of systems to offshore operators, surveyors, the renewable energy sector, ocean sciences, security forces and navies across the world.

We offer a range of advanced and reliable systems from proven components, cables and connectors, to state-of-the-art integrated packages, including fibre optic telemetry systems and remotely operated towed vehicle systems. All the products we supply are designed and tested to supply high quality, reliable performance in the challenging underwater environment.

**Marine Magnetics**
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Marine Magnetics Company Profile Designs and manufactures total field magnetometers and gradiometers using advanced Overhauser technology for high sensitivity, unmatched absolute accuracy, ultra low power consumption, worldwide operation without restrictions, maintenance free sensors (no realignment or consumable parts), and sensors that are free of time and temperature drift and display no heading error. Our products include:

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**Marine Sonic Technology, Ltd.**
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United States of America
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Marine Sonic Technology, Ltd. was established as a Virginia corporation in 1990 to design, manufacture and market underwater imaging and positioning systems using wideband, short-pulse technology that was originally developed by the company's founder for use in medical ultrasound imaging systems. This technology greatly improves across-track resolution and reduced power consumption for side-scan sonar systems

MSTL sells its sonar products worldwide to military, the ocean technology industry, government agencies, the search and rescue community, universities and private individuals.

MSTL is deeply committed to providing in-depth training and technical support to all of its customers, from engineers building sophisticated autonomous underwater vehicles to search and rescue workers locating drowning victims. By being available whenever it is needed, MSTL has established an enviable reputation for helping its customers succeed.

MSTL is located in southern tidewater Virginia close to the Chesapeake Bay, the many rivers and several military bases in the Hampton Roads area. This area provides many diversified training areas and a supply of potential employees trained in sonar applications.

MSTL owns a 6500 square foot facility situated on seven acres in Gloucester County. In addition MSTL has a 36 foot twin-diesel workboat, the ?Sonic Boom? which is used for product testing and customer training. All engineering, manufacturing, testing, marketing and sales is done at this facility in White Marsh, Virginia. Currently MSTL has eighteen employees who bring nearly 80 years of experience in sonar imaging and ocean technology to the corporation.

Marine Sonic Technology, Ltd. P. O. Box 730 5508 George Washington Memorial Highway White Marsh, VA 23183 Phone: 804-693-9602 Fax: 804-693-6785

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Phone: 619 318 5078

The Maritime Museum of San Diego contains one of the largest collections of historic and replica ships in the U.S. Ranked the third Best Maritime Museum in the World by the maritime industry's international news source, Maritime Insight, the Museum is constituted entirely of its floating vessels, many of which operate and some of which also contain temporary and permanent exhibits on their history and the maritime history of San Diego and the region. The Maritime Museum invites OCEANS 13 attendees to tour the Maritime Museum on Wed. Sept 25, while enroute to the USS MIDWAY. The workboat, PILOT, tours the Bay daily and the state of California's tall ship, CALIFORNIAN offers weekend sailing adventures.

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The Marine Advanced Technology Education (MATE) Center is a national partnership of educators, employers, and professionals working to improve technical education and meet marine workforce needs.

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Phone: 902 468 2505

MetOcean Data Systems designs and produces state-of-the-art data acquisition and telemetry systems. Established in 1985, MetOcean has been a global leader in integrated systems used for real-time monitoring and have developed niche markets to support a wide array of commercial and scientific applications. These markets include Oil and Gas, Search and Rescue, Oceanographic, Meteorological, Military, Asset Tracking and Polar. MetOcean has recently acquired the NOVATECH product line adding Satellite and Radio Beacons, as well Xenon Flashers to our product line.

**MetOcean Data Systems**
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MetOcean designs and manufactures various drifting buoys, environmental platforms, and the world renowned NOVATECH location and recovery, satellite, RF, and strobe locator beacons. MetOcean's drifting buoy family consists of the following environmental monitoring, oil spill response, and search and rescue drifters: NOVA profiling float, Iridium SVP (iSVP), iSPHERE, Argosphere, SLDMB, and iSLDMB.

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Mooring Systems, Inc designs and manufactures oceanographic buoy systems including MET buoys ranging from 3 meter discus to 1 meter guard buoys, instrument frames, syntactic sub-surface flotation, steel flotation, (3x19) jacketed wire rope, and all interconnecting mooring components. Mooring Systems, Inc. recently develop a new Tsunami Warning System with unique features and benefits to help in the early warning efforts. Mooring Systems has 20 years of experience designing and building Trawl Resistant Bottom Mounts and offers configurations to suit any combinations of instruments and environmental requirements. In addition to instrumentation deployment systems, Mooring Systems manufactures a full line of sediment coring devices for ocean and lake bottom sampling.

**MTS (Marine Technology Society)**
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Celebrating 50 years, the international Marine Technology Society offers extraordinary resources and networking opportunities to ocean engineers, technologists, government, industry and academia. MTS's passion for the advancement and application of marine technology assists members through 28 specialized committees (seafloor technologies, ocean observing, underwater vehicles, marine security, and more), conferences, workshops, a professional journal, and newsletters. MTS maintains a website with news for and about the maritime community.

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The Marine Technology Society is celebrating its 50th year and everyone is invited to be a part of our celebration. From its humble beginning to today's global membership, MTS has provided members and the industry with a forum for information exchange, technology updates, networking opportunities and outstanding educational offerings. Let us show you how MTS membership can enhance your professional life. Stop by booth 207 and learn more. At MTS: Opportunity Runs Deep.

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AURAL-M2 autonomous underwater recorder

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Echoview is an advanced hydroacoustic data-processing application for fisheries scientists and environmental managers who need to monitor and understand aquatic environments.

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New England Marine Renewable Energy Center located at UMass Dartmouth is an organization dedicated to assisting the emergence and growth of the ocean energy industry in the United States. We do this through industry outreach, cooperative research with our research partners at UMass Dartmouth, University of New Hampshire, University of Rhode Island, Massachusetts Maritime Academy, Woods Hole Oceanographic Institution and others. Connecting industry partners to the research program is achieved via a membership program. Bringing the latest technical developments in the field of ocean energy generation has been facilitated through the series of 4 Annual Marine Renewable Energy Technical Conferences which can be viewed at www.mrec.umassd.edu. This year New England MREC has joined forces with MTS and IEEE/OES to bring more energy to the Marine Renewable Energy tracks at Oceans 13 MTS/IEEE San Diego. Representatives of MREC and UMass Dartmouth will be on site at our booth. Stop by to see what we are up to and how you can join us. www.mrec.umassd.edu; maggielmerrill@gmail.com; 617 306 2764

**NiGK Corporation**
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NiGK Corporation was fully financed and established by NOF CORPORATION in December 1980. Our company has promoted research and development in various fields in parallel with manufacturing of pyrotechnics and temperature indicating materials, sterilization bags/indicators and other products. "NiGK Ocean" represents the ocean biz group in our company. Since 1980, we have been engaged in development of new observatory system, with our company's catch phrase: "From the Ocean to Outer Space". Recently, we are involved in some cable network projects, and survey systems for offshore resources. Besides we are making a great effort for development of Vertical Profiling System as new platform for long time monitoring. Our typical products and services are; underwater winches (Seabed type and Mooring type), releasers for OBS, acoustic releasers, structural design of key equipment for cable network projects (e.g. NODE, JB and Battery Pack), and so on. These days, our products get chances of success to overseas. Please drop by the NiGK Ocean's booth. We are glad if we can serve for your research work.

**NIUST National Institute of Undersea Science & Technology**
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NIUST utilizes autonomous undersea vehicles to study the seafloor. The Eagle Ray produces high-resolution seafloor maps to depth of 2200m. In addition to mapping applications, it is also designed to carry wet and dry payloads for instrument and sensor development projects. We do seafloor photomosaics with a companion AUV.

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Norbit Group is an international corporation with headquarters in Norway and offices in Denmark, Australia and the United States along with a global network of distributors. Established in 1995, NORBIT has grown steadily and is now one of the leading companies in the field of underwater acoustics. NORBIT designs, manufactures, and support integrated multibeam sonar solutions. NORBIT multibeam sonar's has been used worldwide for more than 7 years. NORBIT has assembled a team of highly skilled engineers committed to advanced engineering and design of sonar and acoustic systems. In addition, NORBIT employs a team of more than 100 professionals dedicated to such disciplines as Program Management, Quality Assurance, Manufacturing, Software Development, Security, and Administration. The resulting corporation, NORBIT, is renowned for providing innovative solutions in many different markets.

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**Ocean Networks Canada**
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OCEAN NETWORKS CANADA Ocean Networks Canada (ONC) is a world-leading organization supporting ocean discovery and technological innovation. ONC is a not-for-profit society, established in 2007 by the University of Victoria under the BC Society Act. Under a Management Agreement with the University, the purpose of ONC is to govern, manage and develop: the Ocean Networks Canada Observatory (comprised of the VENUS and NEPTUNE Canada networks) as a national research platform; and the ONC Centre for Enterprise and Engagement as a federal centre of excellence for commercialization and research. Our mission: to enable transformative ocean research for the advancement of science and technology and for the benefit of Canada.

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ECO/Environment Coastal & Offshore Magazine provides comprehensive coverage and analysis of issues affecting the coastal and offshore environment fields. Published six times a year in print, digital, and APP formats, each issue presents insight through a mix of in-depth articles, analytics, and news on the latest projects, trends, technology and policy. www.eco-tsc.com

**Ocean Sonics**
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Ocean Sonics is a company that specializes in gathering ocean sounds. If you are looking for a reliable and accurate, broadband digital hydrophone with Ethernet connectivity, low power, and can be externally synchronized to form arrays, then visit Ocean Sonics at booth #404 in the Atlantic Canada Pavilion. The icListen Smart Hydrophone streams waveform, spectral, and event data over a data link in real-time. These low power hydrophones are calibrated with a wide dynamic range and very low noise floor.

**Oceanic Consulting Corp.**
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Oceanic Consulting Corporation is an ocean engineering firm that provides services in marine performance, design evaluation, and consulting services to the international marketplace.
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**Oceanic Imaging Consultants, Inc.**
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Oceanic Imaging Consultants, Inc. develops seafloor mapping software and systems for the acquisition and processing of sidescan, sub-bottom, multibeam, and interferometric data. Our acquisition products support full survey planning and execution dovetailing seamlessly with our processing and analysis software packages. OIC also provides survey management/consulting, data processing services, and equipment rentals.

**Oceanology International 2014**
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Oceanology International is the global forum where industry, academia and government share knowledge and connect with the marine technology and ocean science community, improving their strategies for measuring, exploiting, protecting and operating in the world's oceans. Established in 1969, Oceanology International features the world's largest exhibition for marine science and technology, multiple agenda-setting technical conferences, and a visiting vessels and waterside demonstrations programme.

**OCEANS 14 Taipei/IEEE/OES Taipei Chapter**
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Taiwan
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IEEE Oceanic Engineering Society (OES) and Marine Technology Society (MTS) will host the OCEANS'14 MTS/IEEE Conference on April 7-10, 2014, in Taipei, Taiwan. The OCEANS Conferences in Asia are a unique series of international conferences with the goals of bridging the distance between scientists and engineers and advancing the interdisciplinary fields of ocean science and technology. The OCEANS'14 Conference in Taipei will be a memorable event, allowing for colleagues and friends worldwide to establish friendships, thereby promoting academic exchange at an international and interdisciplinary level. The conference theme of OCEANS REGENERATION speaks to the need to promote scientific methods and research to address environmental concerns about the preservation and betterment of our living Oceans. Our vision for this conference is to develop new ocean research paradigms based on work by experts in all areas of the OCEANS conferences. On behalf of the Organizing Committee, it gives us great pleasure to invite you and your colleagues to attend this conference.

**OCEANS'15 Washington, DC**
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"Oceans 2015" will be held at the National Harbor of our nation's Capital, Washington, DC. Mark your calendars now for the week October 16-23, 2015 with the event's luxurious venue The Gaylord Resort. This international symposium sponsored by IEEE and MTS is expected to draw in excess of 2000 participants. The concept of "Change" and "diving into opportunities" in order adapt to rapid systemic changes in our ocean environment, will be the focus.

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OCEANS'14 ST JOHN'S NEWFOUNDLAND AND LABRADOR ~CANADA ~ YYT ~ Where Challenge Becomes Opportunity ~

With a thought provoking and stimulating agenda, a well organized exhibit program, good participation in the post secondary student competition and an exciting guest program we promise this will be one of THE most exhilarating OCEANS ever. As well we have world class research facilities to tour during the Conference and there will be opportunities to meet and mingle with many of the international companies located in our Fair City ~ where better to discuss oceans than in the most easterly point in North America, where the Gulf Stream meets the Labrador Current, on the edge of the Grand Banks? Make sure you drop by our booth #604 to chat with one of our Team14 members to discuss Newfoundland and Labrador and all it has to offer!

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Email: ssearing@oceanscience.com
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The Oceanscience Group is a world leader in development of oceanographic, hydrographic, and hydrologic deployment equipment designed to save survey time and improve data quality. Our major products are remotely-controlled and tethered instrumentation deployment boats for acoustic Doppler current profilers, the UnderwayCTD and UnderwaySV that introduced the possibility of affordable and compact profiling from a moving vessel, and the popular Sea Spider and Barnacle seafloor platforms. We supply turnkey remote hydrographic survey boat systems to individual project specifications, typically including environmental monitoring or bathymetry equipment, GPS positioning and data telemetry. Our experienced ocean engineers can design customized equipment deployment buoys, and we are the supplier of the Clamparatus ADCP frame to NOAA for the PORTS Aid to Navigation (ATON) system.

**OceanServer Technology, Inc.**
**Booths: 629**
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Email: kirk@ocean-server.com
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OceanServer Technology, Inc. is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs), three axis digital compasses and high efficiency Lithium Ion battery solutions. The Iver AUV is an affordable, commercial vehicle used by customers around the globe for sensor development, water quality surveys, sub-surface security and general research.

**Oceanworks International**
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OceanWorks International is an internationally recognized subsea technology company specializing in the design and manufacture of manned / unmanned subsea systems and specialized equipment for military, oil and gas, scientific, and other marine markets. Offering a full range of subsea system engineering, design and analysis, fabrication, testing, and project management services, OceanWorks has been at the cutting edge of deep submergence and diving technology, operations, and support for over 20 years.

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Open Seas manufacturers streamlined buoys for instrument moorings, ADCP mooring buoys, trawl resistant bottom mounts for ADCPs, zooplankton multiple net systems and oceanographic swivels. We have an acknowleged expertise in low vibration, low noise and high current moorings and bottom-mounts. We stock Viny Floats for our own use and resale. We build and supply coated wire mooring cable, terminated in stainless or galvanized fittings. Our BIONESS data logger is ideal for research net systems. It includes a stepper motor driver and windows deck software with real-time sensor displays and CTD graphing.

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PanGeo Subsea is a survey technology delivery company specializing in unique 3D sub-bottom acoustic imaging solutions that mitigate risk and create value for oil and gas, renewables and other energy industries.

**Penn State Applied Research Lab**
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The Applied Research Laboratory at Penn State has a 70 year history of technology development and deployment for marine systems, mostly associated with work for the US Navy. Our Organization's focus has been on identification of promising technologies, reduction to practice of those technologies, operational demonstration, and implementation. Many of the Lab's capabilities are relevant to Oil and Gas Industry issues. For example, the Lab has been developing coatings for erosion, corrosion, cavitation, & non-skid applications, lightweight, corrosion resistant structures, NDI techniques for remote detection of structural defects, and systems health monitoring technologies. We also have interesting testing capabilities, like our high pressure test lab, in which we can test coupons to systems under realistic ocean conditions. The Lab is a recognized leader in the development and fielding of large unmanned underwater systems which have been used in ocean floor mapping. We also have strong capabilities in the development of information management systems for handling large volumes of sensitive information.

**Phoenix International**
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Phoenix International is an experienced marine services contractor providing underwater engineering and operational solutions to customer requirements worldwide. We are committed to ensuring the safety of our personnel at all times; our excellent safety record is a testimonial to the success of this commitment.

Operating from support facilities on the East, Gulf, and West Coasts, Phoenix provides a full range of manned and unmanned diving capabilities to accomplish complex operations from the surface to water depths of 6,000 meters. Phoenix engineers specialize in the design and build of underwater systems and tooling to assist our employees and our customers in accomplishing projects in the marine environment.

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PNI Sensor Corporation is the leader in the exacting science of producing pinpoint heading and orientation technology and algorithms for the consumer, military, scientific and oceanography communities. Building on decades of patented sensor development, PNI offers highly accurate magneto inductive sensor systems and 9-axis sensor fusion technology. Its products are used in consumer electronics, robotics, surveying, navigation and automotive applications across the globe. To learn more, please visit www.pnicorp.com.

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Polymer Marine specializes in manufacturing low-volume, difficult to manufacture plastic parts for surface and underwater marine applications. We supply parts to some of the leading underwater innovators in the marine industry. With 35 years of experience innovatively tackling a wide range of marine applications, we have the design, materials and processing expertise to meet the needs of the marine industry. We do it right, we do it fast, and we do it cost effectively.

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**Port & Airport Research Institute, Japan**
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Port and Airport Research Institute (PARI) aims to improve technology for effective and efficient construction of port and airport by achieving investigation, research and development about structure design, geotechnical engineering, observation and estimation of ocean phenomena, environment field, sensing device, and robotics. In this exhibition, we introduce mainly 4 equipments listed below by posters and movies. 1. Remote Control Underwater Backhoe 2. Underwater Acoustic Video Camera attached on Deep-Sea Robot for Next-Generation Ocean Resource Exploitation 3. A New Spilled Oil and Gas Tracking Autonomous Buoy System and Application to Marine Disaster Prevention System 4. Non-contact Thickness Gauging Equipment for Underwater Steel Structure

**Precision Measurement Engineering, Inc.**
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Precision Measurement Engineering, Inc. (PME) is dedicated to the design and manufacture of reliable and accurate water monitoring systems and sensors for oceanographic and limnologic use. PME products can be found throughout the international scientific community and are used for high resolution measurement of electrical conductivity, temperature, dissolved oxygen, pressure, fluorescence, PAR concentration and various other parameters in water. PME instruments are being used to perform a variety of observations from real-time monitoring of coastal water column temperatures to monitoring biological dynamics within fine scale turbulent mixing.

Precision Measurement Engineering, Inc. is a family business that began in 1982 and is located in San Diego, California. PME values the environment and strives to provide the global scientific community with reliable, durable and accurate products.

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We are a subsea engineering consultancy, specializing in submersible pressure vessels, instrumentation housings, junction boxes, underwater camera housings, underwater housings, subsea housings pressure relief valves and other subsea enclosures and accessories. Our leak-proof submarine pressure housings can be air-filled or pressure compensated. Underwater enclosures are often used for containing batteries, hydrophones, data-loggers and other data recording and monitoring equipment. Our cans/bottles have connector interfaces and are used extensively with Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles (AUVs) and for many other applications in the Oil and Gas Industry, Defense, Research, Environmental Monitoring and Offshore Renewables

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Prime Technology, LLC is a proprietary manufacturer of precision instruments, systems, and sensors serving critical oceanographic, commercial, and military applications.

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RBR designs and manufactures submersible data loggers, recorders, sondes, controllers and sensors for water quality measurement. Our standard data logging instruments range from one to 24 channels, configured as a CTD, conductivity, temperature, depth (pressure) or multi-parameter (sensor) recorders. Specialty loggers are available with specific sensors for harsh environments or unique applications like measuring tides and waves. We offer accurate temperature, depth, and conductivity sensors as well as a multitude of specialized sensors for oceanographic, freshwater, cryospheric, estuarine and coastal monitoring.

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Remote Ocean Systems (ROS) has been an industry leader in the design and manufacture of reliable, high-tech equipment and systems for the most severe oceanographic, industrial, commercial and military environments since 1975. ROS offers standard products and custom solutions in our ISO-9001 certified, 28,000 sq. ft. San Diego facility.

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RJE is a worldwide supplier of subsea acoustic relocation products, diver sonars, navigation platforms and communication systems.

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ROMOR Ocean Solutions is a distributor, integrator and solutions provider for the oceanographic, geophysical, defence and energy industries. With 30 years of experience, ROMOR has grown from a single product line sales company into a solutions providing distributor and integrator, representing world leading manufacturers from across the globe. ROMOR is recognized for our mooring design capabilities, deployment expertise, and technology consultation. Current products include a line of mooring flotation products that are sold around the world and benthic camera systems. When you're looking to purchase, lease or integrate, ROMOR has the solution for you.

**Rowe Technologies**
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With over 190 man-years of acoustic Doppler experience, Rowe Technologies, Inc., is developing the most advanced Doppler profilers in the industry. Our state of the art electronics design is combined with advanced acoustic transducer technology to provide ADCPs that are powerful, compact, and extremely flexible. In addition, our new and innovative Doppler Array designs offer up to 9 acoustic beams in a compact package that uses 50% less area than an ADCP using a traditional 4 beam Janus configuration. These core technologies, combined with multiple frequency and packaging options, provide for a very cost effective and capable platform to handle a variety of acoustic Doppler applications.

The SeaWATCH ADCP product line are self-contained (SC) units that operate on battery power and are meant to be deployed for extended durations, while the SeaPROFILER ADCPs are direct-reading (DR) units used for real-time, tethered applications. Both products come with a full complement of waveform generation and broadband/narrowband signal processing functions that allow them to not only collect current profiling data, but also track the bottom to measure platform velocity. Both systems come in a range of frequencies from 75KHz to 1200KHz and are available in shallow-water and deep-water packages. RTI also offers dual-frequency variants of these products in combinations of 300KHz, 600KHz and 1200KHz frequencies - effectively providing two instruments in one.

The SeaTRAK vessel-mount family of products consists of a low-frequency Doppler Array (150KHz, 75KHz or 38KHz) with integrated sonar electronics, interface cable, and rack-mount power interface unit. Installation of the system is relatively simple because the sonar electronics is integrated into the transducer assembly, requiring a small number of conductors in the cable assembly.

The SeaPILOT family of Doppler Velocity Logs (DVLs) uses the same core electronics and transducer technologies as described above, to provide a versatile platform capable of producing precise bottom-referenced velocity measurements for ROVs, AUVs and other manned/unmanned submersibles. The SeaPILOT family comes in 300KHz, 600KHz and 1200KHz frequencies, in shallow or deep packaging options. RTI also offers OEM packages for custom AUVs and ROVs.

For more information, please contact us at: sales@rowetechinc.com
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Saab Seaeye is a wholly owned subsidiary of Saab Underwater Systems AB. The company was formed in 1986 and specializes in the manufacture of electrically powered Remotely Operated Vehicles, ROVs, for the offshore oil and gas industry.

Seaeye has led the way in many breakthrough ROV innovations, in particular: - Brushless DC motor technology for ROV thrusters - Polypropylene ROV chassis - Carbon fibre electronics pods (on Panther Plus) - Distributed intelligence and modular ROV control systems - New power distribution concept for deep water applications Saab Seaeye has delivered 500 ROVs to date and has become the benchmark by which all electric powered ROVs are compared today.

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For more than 109 years, Scripps Institution of Oceanography at UC San Diego has been the world leader in ocean, earth, and climate sciences. Today, Scripps has hundreds of research projects covering a wide range of scientific areas under way in more than 60 nations, on every continent, and in every ocean.

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Published monthly for 50 years and circulated in 110+ countries, Sea Technology magazine is the worldwide information leader for marine business, science, and engineering for commercial and military applications. Now offering Sea Tech e-news, our bi-weekly e-newsletter. www.sea-technology.com

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Sea-Bird Electronics, WET Labs & Satlantic have combined to form Sea-Bird Scientific. Our focus, to provide reliable data through world-class oceanographic & water quality instruments on integrated platforms enabling the advancement of science worldwide. Parameters: Temp,Salinity,Oxygen,pH,Fluorescence, Nutrients,Turbidity,IOP/AOP,Irradiance.

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SeaBotix® is a world leading manufacturer of underwater MiniROVs that perform a multitude of tasks including maritime security, search and recovery, hull and pipeline inspection, hazardous environment intervention, aquaculture and beyond dive-restriction oceanographic research. SeaBotix continues to deliver revolutionary advancements to a diverse suite of MiniROV systems that are responsive to demanding professional applications.

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The SEA CON® Group are world leaders in underwater connector technology and provide an extensive and diverse range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the Oceanographic, Defense, Oil and Gas and Environmental markets. With locations in California, Texas and Rhode Island in the USA, Mexico, Brazil, the United Kingdom and Norway and a worldwide network of agencies and representatives, SEA CON® is able to supply very quick solutions to any requirements across the globe.

**Seamor Marine Ltd.**
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SEAMOR Marine Ltd is the progressive manufacturer of SEAMOR subsea Observation and Inspection-class Remotely Operated Vehicles (ROVs) and a range of modular accessories and related devices. With facilities situated on Vancouver Island, on Canada's west coast, the company's focus is on the design, manufacture and distribution of SEAMOR ROV systems.

The company distributes Seamor ROVs directly in Canada and enlists the services of its growing international dealer network to facilitate the sale of products on a global scale. After sales service and custom system sales are dealt with directly through the company's head office. SEAMOR Marine Ltd. also offers standard and customizable client training packages for repair and maintenance of their products. SEAMOR ROV systems are designed with the end-user in mind. The modular, open-frame layout allows for ease of access into the "guts" of the vehicle, which also aids in the integration of equipment such as the SEAMOR 7 function manipulator system and 3rd party tools and sensors. The result is the ability to easily assemble a completely customized underwater system.

SEAMOR users count on the reliability and the minimal maintenance required to keep their ROV operational. One of the unique elements of SEAMOR ROV ownership is a fully transferrable, 2 year warranty. It is our hope that clients will always have a use for their ROV, but if not, we know that our commitment to supporting the equipment we manufacture, no matter who owns them, where they are, or what they are doing, is a true commitment to the end user.

**SEATECHRIM**
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SEATECHRIM specializes in manufacture of oceanography equipment and carrying out marine research works. We design and produce: autonomous underwater moored buoys for long-term monitoring of radioactivity and toxicity levels of marine environment; autonomous modules for radioactivity and pollution monitoring for using by underwater vehicles; marine magnetometer recording data in initial memory (completely autonomous mode) or transmitting them to towing vessel (usual mode), marine electric winches. SEATECHRIM manufactures specialized oceanography equipment and its components for operations on the depths up to 6000m, such as, for example, underwater TV-grab. We offer agency services (marine equipment, research vessel etc).

**Seismic Asia Pacific**
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Seismic Asia Pacific Pty Ltd (www.seismic.com.au) is a leading provider of Hydrographic, Oceanographic and Geophysical system solutions to Government, Defence and Resource areas within Australia and throughout South East Asia. In Brisbane, Australia, and Cotabato, Philippines, the company operates and maintains electronics workshop maintenance facilities staffed by highly qualified specialist electronic hardware and software engineers. SAP has sales and maintenance offices in Beijing, Shanghai and Hong Kong, as well as throughout SE Asia and the Pacific Rim. SAP is a subsidiary of Mitcham Industries Inc. and is a proven supplier, integrator and supporter of complete hydrographic systems. SAP is ISO9001 2008 accredited

**SGK SystemGiken Co.,Ltd.**
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SGK is a leading manufacturer of underwater acoustic systems for oceanographic research and underwater vehicle in Japan. SGK has developed and manufactured many kinds of acoustic systems for a wide range of application. Our products have been used in oceanographic survey, underwater communication, navigation, and marine mammal research etc. Head office is located in Chigasaki-city, Kanagawa, beside Sagami Bay. Our experienced engineers will work collaboratively with customers and supply our technology.

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SIDUS Solutions designs and manufactures cutting-edge subsea video cameras, lighting and robotic positioning devices for extreme environments.

SIDUS also specializes in custom, end-to-end underwater systems including customized controllers and cabling. Their world-class engineering staff provides seamless system integration, design, installation and commissioning of all remote video surveillance systems. From ocean observation platforms on the sea floor, to anchor bolster surveillance systems for offshore rigs, to thru-hull sonar deployment systems - SIDUS has a field proven solution.

SIDUS is a single-source, full-service provider, serving the oil & gas, nuclear, scientific research, military and petrochemical industries.

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**Sonardyne**
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Sonardyne is a market leader in the design and manufacture of systems for acoustic positioning, inertial navigation, wireless communications and sonar imaging.

The company's expertise ranges from high accuracy positioning for offshore survey and deep water construction; autonomous undersea networks of wirelessly controlled seabed sensors; monitoring safety critical positioning and control systems around offshore platforms and submerged structures; through to the early detection of deadly Tsunami waves.

Sonardyne's acoustically-aided inertial navigation systems provide uninterrupted positioning for vessels and underwater vehicles, enabling them to operate reliably in any water depth. With less equipment to be deployed on the seabed, subsea operations are faster and time is saved.

With a proven track record in reliable, long range acoustic communications, Sonardyne's capabilities have been recently supplemented with wireless optical communications technologies. This unique technology is ideal for short range applications where high bandwidth is required or the risk of signal interference precludes the use of traditional acoustic technologies.

**Sonic Corporation**
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Our company established in 1948. In those days, Company name was KAIJO DENKI CO. We became independent from a kaijo group in 2006 .only the measurement department.

We provide many instruments, applying ultrasonic technologies. Measurement fields is the atmosphere, oceans, industry, fishery etc.

For example The atmosphere field is a ultrasonic anemometer,snow depth meter etc .

The oceans field is a wave height meter, wave flow meter etc.
The Industry field is a flow meter(liquid or gas) etc.
The Fishery field is a sonar etc.
Our measurement field is from ocean to sky. We respond to customer's needs, using ultrasonic technologies.

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Based in Bellevue, Washington, Sound Metrics is a leading manufacturer of imaging sonars that capture the clearest and most detailed video images in their class. Sound Metrics Corp. is one of the first manufacturers of high resolution imaging sonars. In addition to being the technological leader in image quality, Sound Metrics has built a reputation for support and for innovating solutions around their customer's applications. The next generation of DIDSON is called ARIS and offers lower power consumption, smaller size and unprecedented clarity and resolution among other benefits.

**Sound Ocean Systems, Inc.**
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Sound Ocean Systems, Inc. (SOSI) provides a wide range of standard and custom designed products for shipboard, in-water and underwater use. Our major product focus includes large and small instrumentation and umbilical winches, launch & recovery systems, real-time integrated oceanographic and environmental observing systems (data buoys, moorings and ocean data platforms), towed bodies, self-propelled and towed seafloor vehicles for cable burial, ocean mining, and environmental impact assessment. SOSI also provides engineering, design and project management services for marine projects, equipment and systems.

SOSI's standard products include a growing line of small electric instrumentation winches, and small but sophisticated real-time buoy systems for water quality monitoring and oceanographic research in shallow waters. Semi-custom products are based on existing designs with custom modifications made to suit the unique application needs of individual customers. When the best solutions call for innovative new designs, SOSI is especially well qualified and experienced. For more than 35 years, our design and manufacturing expertise has focused primarily on deck equipment (winches, launch and recovery systems, linear cable traction machines), in-water systems (towed bodies, variable ballast systems, ocean mining & cable embedment equipment) and moored ocean observation systems (buoys and moorings).

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Established in 1957, we design, test and build the most demanding Electro Optical Mechanical Cables. Our cables support a wide range of Military, Oceanographic, Seismic, Geophysical and Exploration applications. Cable types we manufacture include; Surface, Sub-Surface Towed Arrays, Dipping and Side Scan Sonar?s, Weapon Control, Shipboard, Buoyant Antenna and Floating Buoy, ROV Tethers and Umbilicals, Seismic Lead-in?s, BOP-MUX Control, Acoustic Range and Telemetry.

**Southwest Electronic Energy Corp**
**Booths: 734**
823 Buffalo Run
Missouri City TX 77489
United States of America
Website: www.swe.com
Email: pdaniel@swe.com
Phone: 2812403586

Since 1964 SWE has been a quality supplier of battery solutions to the Oil and Gas industry including 20 years of ruggedized Lithium battery products and 13 years of Lithium-Ion battery products. SWE is headquartered near Houston with over 55,000 square feet of state of the art battery technology R&D and ISO 9001 certified manufacturing. At SWE our focus is on quality, customer service and reliability in every facet of our business.

SWE SeaSafe, our new line of Li-Ion subsea battery solutions is designed to safely power underwater vehicles and offshore oil and gas infrastructure with 4X energy and 8X cycle life compared to sealed lead acid. SeaSafe incorporates a SWE patented battery management system (BMS) to deliver breakthrough safety, reliability and configure to order flexibility. SeaSafe comes in two new subsea ready battery products: SeaSafe Smart Modules and SeaSafe Battery Systems.

**SubC Imaging**
**Booths: 402**
317 Memorial Drive
Clarneville NF A5A 1R7
Canada
Website: www.subcimaging.com
Email: rtc@subccontrol.com
Phone: 709 864 7805

SubC specializes in providing imaging solutions for the subsea market with a focus on innovative technology and reliability in harsh environments. Products include cameras, lighting and batteries for video and stills acquisition and topside units for recording, overlaying and streaming of video.

SubC's products are designed for use with ROVs, AUVs,cabled ocean observatories, stationary platforms or by divers.

SubC personnel are available to provide their experience and expertise to clients during all phases of a project; from planning to mobilization to execution.

**Subsea Technologies, Inc.**
**Booths: 724**
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Phone: 281 398 5600

Sales, service and rental of equipment for the offshore industry including GPS receivers, sonars, oceanographic sensors, USBL acoustic positioning systems, acoustic releases and subbottom profilers. U.S. Distributor and Service Center for Hemisphere GPS, Applied Acoustic Engineering, AML Oceanographic and Tritech International and Gulf Coast Representative for L3 Klein Associates.

**Sutron Corporation**
**Booths: 116**
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Phone: 8018248230

Tidal/ Coastal Monitoring & Warning
The US National Ocean Service Trusts Sutron to Build Their Tide Gages. So Should You. We design, manufacture, test and integrate turn-key systems built around our 100% NOAA-compliant Tide Stations, customized for you, surveyed to exacting standards & installed to last a decade or more. Our NOS-compliant communication packages add advanced telemetry & data handling via Irridium Global Satellite (long & short-burst modes), Geostationary Satellites, IP Modems, Spread Spectrum Ethernet on LAN or WAN, Land-Line & Cellular phones. No one, aside from NOAA's own field staff, has more in-depth knowledge of Tide Gages & ancillary weather/tides instrumentation than Sutron.

**Techno-Ocean Network & Kobe CVB**
**Booths: 722**
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Kobe City 650-0062
Japan
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Email: yukiko_nakajima@kcva.or.jp
Phone: 81-78-303-0029

Techno-Ocean Network Kobe Convention & Visitors Association
WHO WE ARE: The Techno-Ocean Network was established in 1986 with an aim to build an association of people involved in organizations, institutes, universities, and governments related to the field of marine science and technology.

WHAT WE DO (OUR ACTIVITIES): Information Service: We provide a website, seminars, newsletters, business matching International Project: We organize the biennial "Techno-Ocean" International Convention. (In 2004 and 2008 this was co-organized with "Oceans" in Kobe) Educational Program: We provide activities targeting the younger generation and for promoting the better understanding of our oceans.

Basic Kobe City Facts: Location: Mid-West Japan Population: 1.54 million Climate: 16.6 °C (av. temp. annual)

Kobe History in Brief: The modern city developed around the Port of Kobe which opened up to international trade in 1868. Major heavy industries, including steel and shipbuilding, flourished as a result and these were soon supported by a great number of small-to-medium enterprises and specialized trades.

Kobe Convention Center (KCC): Port island is home to KCC, Japan's first multi-complex of convention facilities, including the International Conference Center, International Exhibition Halls, Portopia Hotel and World Hall (arena). KCC is just 10 minutes from downtown Kobe and 8 minutes from Kobe Airport by Port Liner rail.

Kobe's Cutting Edge Projects: Port island is also home to a cluster of life-science research institutions and commercial enterprises active in fields such as iPS cells and supercomputing simulations. In fact. the Center for Developmental Biology and "K (Kei) supercomputer" are next door to the Kobe Convention Center.

Visitor Sights and Attractions: Kobe may be famous for its ultra-tender beef but it is also a historical homeland for Japanese "sake", offering tastings and manufacturing tours. Other cultural themes, include "kimono wearing", "ikebana","'the tea ceremony" and "calligraphy". Traditional relaxation can be enjoyed in the spa town of Arima Onsen, nestled in the geo-thermal rich Rokko mountains which also afford spectacular night views of the sea and city.

The Future? We look forward to meeting you in Kobe !

**Tecnadyne**
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Tecnadyne's primary business focus is remotely operated vehicle (ROV) and autonomous underwater vehicle (AUV) research and development which has led to our emergence as a worldwide leader in underwater propulsion, motion control and related technologies. In this capacity, Tecnadyne has served the worldwide robotics community since being founded over 20 years ago.

To date, Tecnadyne has manufactured over 4,000 underwater thruster motors. In addition, Tecnadyne manufactures DC electric rotary actuators, DC electric linear actuators, DC powered hydraulic pumps and HPUs, intelligent hydraulic valve packs, subsea and harsh environment controllers, subsea position sensors, subsea pan & tilt units, and subsea pressure compensators.

**Teledyne Marine**
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Phone: 508 563 1000

Teledyne Marine is a collaboration of twelve undersea technology companies assembled by Teledyne Technologies. In keeping with Teledyne's philosophy, the organizations in the Marine group remain committed to their origins, as they join together to provide their collective customers with a new level of combined technology, innovation, and worldwide support.

Exhibiting at Oceans: Teledyne Benthos, Teledyne BlueView, Teledyne Gavia, Teledyne RDI, and Teledyne Webb Research

**Teledyne Marine Interconnect Systems**
**Booths: 104**
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United States of America
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Phone: 858 842 3100

Teledyne Marine Interconnect Solutions designs and manufactures high reliability electrical, fiber optic, and hybrid electro-optic connector solutions for any ocean depth and the harshest environments. Our products are proven and currently employed in subsea instrumentation, sensors and control systems, ROVs, AUVs, oil and gas and seismology applications.

**TELEDYNE RESON INC**
**Booths: 607**
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The Teledyne RESON name is the hall mark of class leading sonar equipment, transducers, hydrophones and survey software that you can count on. Headquartered in Denmark, Teledyne RESON has a global presence with offices and representatives around the world. Teledyne RESON flagships are the Seabat Multibeam Echosounders and our Data Acquisition Software PDS2000.

**The International SeaKeepers Society**
**Booths: 822**
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**The Sexton Corporation**
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Website: www.thesextonco.com
Email: amy@thesextonco.com
Phone: 503 371 6239

At The Sexton Corporation we have over 60 years of combined experience meeting the need within the scientific community for both practical and prudent underwater housing systems including: camera/instrument housings, cable assemblies, precision optical systems, and mounts. We also have experience creating camera systems that are protected from dust, extreme temperatures, and other environmental hazards. We continually strive to provide exceptional customer service, and innovative designs that meet your needs, fit your budget, and exceed your expectations.

**The Tsurumi-Seiki Co., Ltd.**
**Booths: 712**
PO Box 70648
Seattle WA 98127
United States of America
Website: http://www.tsk-jp.com
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Phone: 2062574899

TSK is a leading oceanographic equipment manufacturer. TSK products include a wide range of instrumentation designed specifically to support the study of the water environment. They include expendable probes and probe autolaunchers, water quality monitors, laboratory salinometers, wave meters, CTDs, and mechanical oceanographic equipment.

**Tritech International Ltd**
**Booths: 726**
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Phone: +44 (0)1224 744111

Tritech International Limited [Tritech] is a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications.

Tritech operates in many professional underwater markets, including; Defence, Energy, Engineering, Survey and Underwater Vehicles and remains an industry leader in the provision of sensors and tools for ROVs and AUVs.

The company's Sales & Customer Support offices are located in Westhill, Aberdeenshire, Scotland and in Katy, Texas. Tritech also provides a dedicated support office in Macaé, Brazil. The company's Design & Production Sites are located in Ulverston, Cumbria and in Edinburgh, Scotland. Tritech has further global representation through a broad Distributor Network.

Tritech is now a Moog Inc. company, a worldwide designer, manufacturer and integrator of precision control components and systems.

For more information visit: www.tritech.co.uk.

**Triton Imaging, Inc.**
**Booths: 802**
2121 41st Ave., Ste. 211
Capitola CA 95010
United States of America
Website: www.tritonimaginginc.com
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Phone: 831722 7373

Triton Imaging® is a global provider of software solutions for the marine survey industry. Triton products are used by commercial, scientific, hydrographic and military organizations worldwide to acquire, process, visualize, and interpret data from sidescan, multibeam, sub-bottom, and swath bathymetry systems. In San Diego, Triton will be featuring its competitively-priced product packages: ISIS Offshore, SurveyPro, and Perspective that provide a complete, innovative solution for the planning, acquisition, real-time quality control, processing, and interpretation of multi-sensor survey data. With over 25 years of development, Triton has created a suite of products that continue to meet the changing needs of the modern surveyor. Our drive for continual improvement coupled with our mission to meet every customer's needs has produced powerful products with unique tools for maximizing data quality and usability.

**Turner Designs, Inc.**
**Booths: 414**
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Sunnyvale CA 94085
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Phone: 408 749 0994

Turner Designs provides innovative fluorescence-based solutions for basic research, water quality analysis, pollution control analysis and specialized OEM industrial applications. Having a unique focus on fluorescence instrumentation for over 40 years and customers throughout the world, Turner Designs is the leader in filter fluorometer design, manufacture, and support. Turner Designs is known for providing rugged, reliable and stable submersible, field, handheld, laboratory, and online fluorometers and turbidimeters varying in functionality, size and price to fit any type of user need. With our applications lab we provide presales support to help customers identify instrument requirements as well as post sales support to assist with implementation.

**Ultra Electronics**
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40 Atlantic St.
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Since 1947, Ultra Electronics Maritime Systems Inc. (Ultra) has been a leader in the development of underwater sensors and sub-systems. Ultra has an outstanding team with proven capability in the development and delivery of technologically advanced products for the challenging underwater environment.

Ultra's underwater acoustic projectors emphasize low-frequency operation (< 300 Hz), with high source level, and broad bandwidth (> octave). One of the families of underwater acoustic projectors is Ultra's Free Flooded Ring (FFR). FFR projectors have exceptional properties for a variety of applications: wide bandwidth (Q~1), high efficiency (up to 75%), and almost unlimited depth capability (tested to 4500 m). Our FFR designs operate from 800-10000 Hz. In addition to FFRs, Ultra's family of ring-shell projectors (RSP) are a Class V flextensional that can produce a high acoustic output at low frequency. RSPs are designed to operate over frequencies 200-1300 Hz while producing an omni-dimensional beam pattern.

Ultra will also be featuring a new Magneto-Inductive communication product: DiverCOMM. DiverCOMM provides divers with two-way voice communications for tactical operations underwater. DiverCOMM offers superior performance and reliability in acoustically noisy environments, confined spaces and in areas where physical occlusions can interfere with communications, and across the air-water boundary.

**Underwater Technology Research Center**
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UTRC (Underwater Technology Research Center) of Institute of Industrial Science, the University of Tokyo has been seeking the advance technologies such as underwater platform systems, sensors and ocean perception systems to explore the deep-sea world. With the aim of leading the ocean related researches in the world and developing the integrated observation systems for sub-sea valuable resources for future, many researchers and engineers, both domestic and foreign, and from various fields, cooperate, create networks, and exchange necessary information with a global perspective.

**United States Navy League San Diego**
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UNH Center for Coastal and Ocean Mapping

**VideoRay LLC**
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VideoRay is the largest volume producer of Underwater ROVs (Remotely Operated Vehicles) in the world. Established in 1999, VideoRay has worked with technology and mission partners throughout the world to develop and prove the small ROV tool for a wide range of applications. With over 2,500 units delivered to a wide range of organizations for a wide range of missions, hundreds of VideoRays work every day throughout the world underwater keeping us free from terrorism, finding and retrieving objects, inspecting infrastructure both inland and offshore, and keeping divers safe from hazardous conditions. We pride ourselves on state-of-the-art customer support and easily operated and maintained underwater robotic systems.

**WFS Technologies**
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WFS Technologies is a global leader in the delivery of underwater wireless instrumentation and control solutions

**Workshops for Warriors**
**Booths: 833**
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Phone: 619 550 1620

Workshops for Warriors (WFW) is a 501 (c)(3) nonprofit that currently trains, certifies, and places veterans into manufacturing careers at no cost to the veteran. With no federal, state, or municipal funding, Workshops for Warriors offers sixteen week courses that lead to internationally recognized credentials in Welding, Machining, and Fabrication. Our eight classes are completely filled with 54 veterans gaining skills and credentials through the American Welding Society (AWS), the National Institute of Metalworking Skills (NIMS), SolidWorks, and MasterCam. We have almost 500 veterans on the waiting list for our programs, and almost 1,500 jobs available for them once they graduate. Our placement rate is at 100%. We are the chokepoint and need funding to enlarge our facility and hire additional instructors. On the 17th of April 2013, Workshops for Warriors received accreditation through NIMS ? obtaining that certification in the shortest amount of time in their history. Workshops for Warriors is now the only nonprofit in the United States that is officially accredited as a training center and solely dedicated to training, certifying, and placing veterans

**Xeos Technologies Inc.**
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Xeos is a leading technology firm created by visionary engineers with a passion for excellence. Xeos prides itself on a pioneer mentality, always striving to create superior technological solutions to tracking and telemetry problems. We design and manufacture application specific telemetry and data collection products for environmental researchers, wildlife researchers and operational personnel.
Our customers require reliable and innovative solutions to track, monitor and control in harsh environments. With decades of design experience in the scientific, law enforcement and military markets we understand how to design for success in the world's harshest environments. Despite our extensive experience we maintain a pioneering perspective and understand each of our clients is truly a partner, deserving of the best we have to offer in design, quality control and support.

We are confident that once you experience our open and collaborative approach you'll wonder why it took so long to find us. We are always available to answer questions, discuss potential projects, or support your operational objectives. Please don't hesitate to CONTACT US for any reason at all.

**Xylem**
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Xylem provides products for environmental research used in oceanographic, hydrographic, river, lake and climate research markets. As part of the Xylem family of services, Aanderaa, SonTek, Waterlog, and YSI deliver the most technologically advanced self-contained and integrated remote underwater observation systems, environmental monitoring buoys, telemetry, water quality and velocity sensors in the market. Our employees bring a broad range of applications expertise with a strong focus on finding local solutions to the world's most challenging water problems. www.xyleminc.com

# OCEANS 2013
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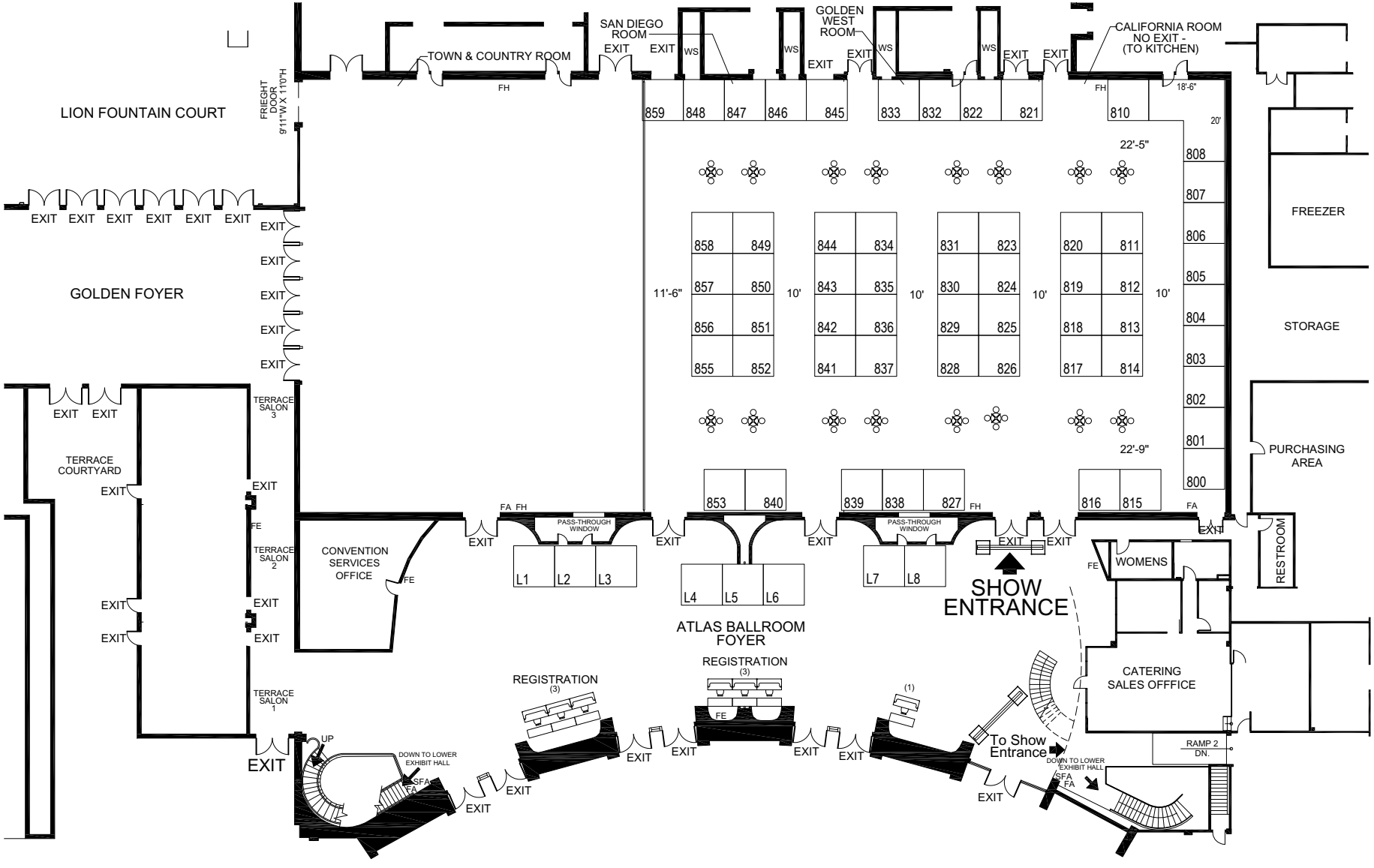
ALL BOOTHS 10'X10' UNLESS OTHERWISE NOTED.



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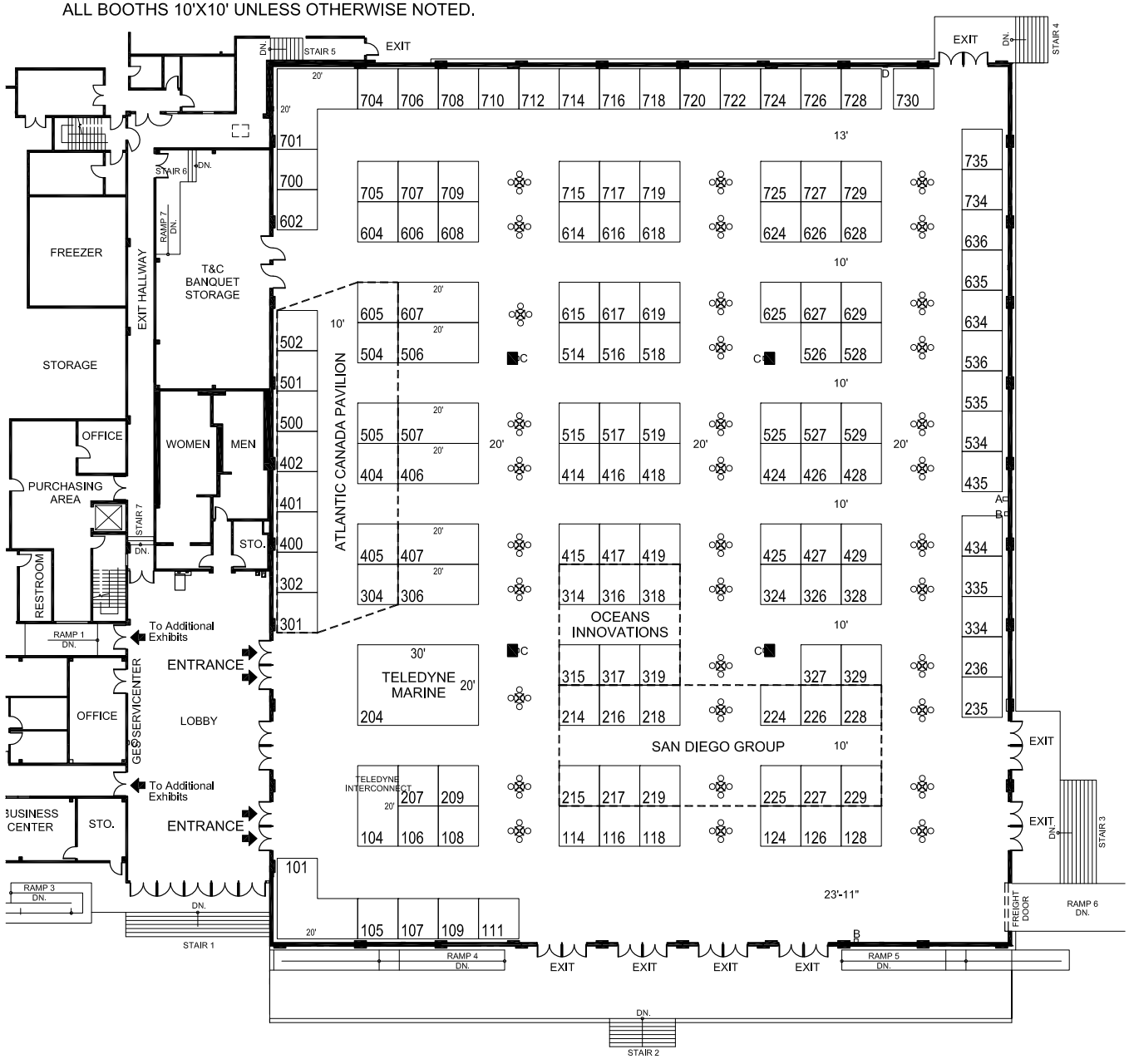

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