

# OES BEACON

Newsletter of the Oceanic Engineering Society



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Members are encouraged to submit copy highlighting 1) Chapter Events, 2) People & Company News, 3) Student & Young Professional News, 4) Technology Updates, or 5) other material of broad interest to the OES. Please send to Beacon Editor-in-Chief, Harumi Sugimatsu <harumis@iis.u-tokyo.ac.jp>. Word format, 1-1/2 space; Photos (always encouraged): jpg, 300 dpi preferred. Material becomes property of IEEE-OES. Please send e-mail or physical address corrections or updates to the EIC.

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## From the President

### Greetings

A new Beacon edition! How lucky we are to have so many news items to pass to our members. This year will be my last year as President of the OES. But it won't be the least in terms of participation at events in which the Society is involved. Indeed, this year started with a workshop in Harbin, China, the "2016 IEEE/OES China Ocean Acoustics symposium".

Presently (at the time of this writing, mid-February) we are running our ExCom in San Diego, CA, following the IEEE Technical Activity Board meeting. This is a great opportunity to be able to discuss the latest developments and information concerning the life of IEEE, in all its forms: governance, finances, conference improvement, publications, etc.

For instance, there is a new proposal from the IEEE Board of Directors for a constitutional change. You will receive a request to vote this summer with the general ballot. At our ExCom we analyzed the document, and we are not convinced of the necessity for such a change. But, all the information is available on the following link: [http://www.ieee.org/about/corporate/election/2016\\_constitutional\\_amendment.html](http://www.ieee.org/about/corporate/election/2016_constitutional_amendment.html)



*Looking in the future after the ExCom in sunny California.*

You will be able to make your own mind.

Following the workshop in Harbin, China, we'll be quite active with OTC Asia in Kuala Lumpur and then our flagship conference, OCEANS, in Shanghai, China, in which I'll be pleased to welcome you. Then, again OTC in Houston in May and the 3rd South America Oceanic Engineering Society International Symposium, in Buenos Aires, Argentina in mid-June (<http://sites.ieee.org/argencon/oceanic-engineering-society-symposium/>). Don't hesitate to participate in our events by submitting technical contributions!

This first half of the year will be completed with the IEEE Panel of Conference Organizers (POCO) in July in Montreal, which will also host our next ExCom meeting.

In closing, I'd like to remind you to send us feedback on your expectations about the society and what subjects you would like to be addressed. You can do that, either by direct e-mail to me ([r.garello@ieee.org](mailto:r.garello@ieee.org)) or through the different surveys we will be conducting in the future. Don't be shy! It's your society. Tell us what you think.

**René Garello,**  
**OES President**



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## From the OES BEACON Editors

***Harumi Sugimatsu and Robert Wernli***

We hope you are enjoying the latest issues of the OES Beacon Newsletter. We are working to communicate the important society information to you and also provide highlights of our members. And, these highlights are not just for our society officers, this is your newsletter and you should provide us with input, be it technical, about your hobbies, publications, or an entertaining article about something you've recently accomplished.

We are also working to improve your ability to communicate with those responsible for running the society, whether AdCom, ExCom, Chapter Chairs, Technical Committee Chairs, Journal Editors and other society committees. We want you to participate and interact with them. Hard to do without an email address. You'll see in this issue that we have expanded the eye-challenging single page of society volunteers to two pages located inside the front and back covers. You now have the email addresses for all the Chapter Chairs. We'll soon expand to include our Technical Committee Chairs and others will be added as needed. Keep your newsletter handy so that you can easily contact the appropriate person within the society when necessary.



*Harumi at Ganges riverside in India and Bob on Whiheke Island, New Zealand.*

And most importantly, participate not only through this publication, but participate in the society. Volunteer to support the many officers who are working hard to provide you with what you are expecting from OES. Better yet, run for an office and work your way up the chain-of-command. No better way to network than getting involved in your technical society.

If you have any feedback or suggestions on how we can make this publication better, feel free to contact us. Now, enjoy the latest issue of the Beacon.





# OCEANS CONFERENCES



## Past Conference Locations



### United States

San Francisco, CA  
Los Angeles, CA  
San Diego, CA  
Honolulu, HA  
Seattle, WA  
Biloxi, MS  
Boston, MA  
Newport, RI  
Kona, Hawaii  
Providence, RI  
Washington, DC  
Hampton Roads, VA  
Fort Lauderdale, FL



### Canada

Halifax, NS  
Victoria, BC  
Vancouver, BC  
Quebec City, QC  
St. John's, Newfoundland

### Europe

Brest, France  
Bremen, Germany  
Aberdeen, Scotland  
Santander, Spain  
Bergen, Norway  
Genoa, Italy

### Asia-Pacific

Singapore  
Kobe, Japan  
Yeosu, Korea  
Sydney, Australia  
Taipei, Taiwan

## Join Us at these International Conferences

### North America



Monterey  
California  
18-22 September 2016



Anchorage  
Alaska  
19-22 September 2017



Charleston  
South Carolina  
20-26 September 2018



Seattle  
Washington  
16-20 September 2018



### Europe



Aberdeen  
Scotland  
12-19 June 2017



Marseille  
France  
12-19 June 2019

### Asia-Pacific



Shanghai  
China  
18-21 April 2016



Kobe  
Japan  
28-31 May 2018

### Sites Under Consideration



Singapore



Portugal



India



Canary Islands



Australia

**Want to Attend, Exhibit or Host an Ocean's Conference?**

Visit Us at Our "Events" Link on  
[WWW.IEEE.OES.ORG](http://WWW.IEEE.OES.ORG)

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## Vice President of Conference Development Update

**Albert J. Williams 3rd, OES VPCD**

The Vice President for Conference Development is responsible for bringing possible OCEANS Conference venues to the attention of the OCEANS Reconnaissance Committee (RECON), getting those selected by RECON to the Administrative Committee (AdCom) of OES and the MTS Board for approval, and then started along the path of becoming a registered IEEE Conference. The steps to getting a Conference registered are to form a Local Organizing Committee (LOC), select a PCO (Professional Conference Organizer), develop a budget, and complete an ICX (IEEE Conference Exchange) application. All of these abbreviations are explained in the OCOP, this last being the OCEANS Conference Operations Policy manual.

For purposes of this brief description of VPCD responsibilities, the criterion for a venue to be considered for a conference is the importance of that venue to a region or population that a conference might serve. Membership is one criterion but potential new members are another as for example where membership is low but there are many practitioners of ocean engineering. So underserved regions are of interest to the VPCD. Presently these include India, Africa, and South America.

These regions may not initially have the resources to host an OCEANS Conference so a Workshop or Symposium may provide a valuable precursor to an OCEANS Conference. VPCD may work with Chapters, Technological Committees, or Regional Sections and the OES Workshop Coordinator to register these events.

Even when such precursor Workshop or Symposium has taken place and been successful, the actual path to hosting an OCEANS Conference is 7 years to provide time to be vetted by RECON, build the LOC, and be registered by IEEE. When approved by the OES AdCom and the MTS Board, a financial loan is provided by the Societies to permit contracts with a convention center and hotels to be secured. Exhibits sold for the conference also provide funds before registrations are collected to help cover pre-conference costs, and patrons are also valuable to enable these costs to be covered early on.

When the loans have been made and the Memorandum of Understanding and Memorandum of Agreement, which more



completely states the requirements of the LOC, have been signed, the responsibility of monitoring the conference becomes operational and passes to the Vice President for Conference Operations. Through this transition a key component is the Liaisons, members of OES and of MTS, who report monthly on progress of the LOC to JOAB, the Joint OCEANS Administrative Board, which in turn keeps the OES AdCom and MTS Board informed.

VPCD is a position elected by AdCom from the present AdCom membership or former OES Officers. The term is 2 years with a limit of two consecutive terms. VPCD has cognizance of RECON. VPCD is a member of ExCom, which meets three times a year to deal with issues between AdCom meetings that do not require the full AdCom for a vote.

Presently, we have been able to approve upcoming conferences even beyond our 4 year advance goal. Upcoming approved conferences include the following:

- 2016 – Shanghai, China and Monterey, CA, USA
- 2017 – Aberdeen, Scotland and Anchorage, AK, USA
- 2018 – Kobe, Japan and Charleston, SC, USA
- 2019 – Marseille, France and Seattle, WA, USA
- 2020 – Singapore and Biloxi, MS, USA

Other counties that RECON will be evaluating in the near future include:

- Portugal
- Canary Islands
- India
- Australia

Our goal is to take the conference around the world so that it is accessible to all those who cannot travel to North America for those conferences. If you're interested in bidding for an OCEANS conference, visit the OES website for more information.

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## 2016: Upcoming OES Sponsored Conferences, Symposia and Workshops

**OTC Asia 2016**, Kuala Lumpur, Malaysia, March 22–25, 2016, <http://www.otcnet.org/>

**OCEANS'16 MTS/IEEE Shanghai**, Shanghai, China, April 10–13, 2016, <http://oceans16mtsieeshanghai.org/>

**OTC 2016**, Houston, Texas, USA, May 2–5, 2016, <http://2016.otcnet.org/Content/Join-us-for-OTC-2016/1/>

**3rd IEEE/OES South American International Symposium**, Buenos Aires, Argentina, June 15–17, 2016, <http://sites.ieee.org/argencon/oceanic-engineering-society-symposium/>

**7th Biennial Baltic International Symposium**, Ventspils, Latvia, August 28–31, 2016, Announcement and Call for Abstracts

**OCEANS'16 MTS/IEEE Monterey**, Monterey, California, USA, September 19–22, 2016, <http://oceans16mtsieemonterey.org/>

**Techno-Ocean 2016**, Kobe, Japan, October 6–8, 2016, <http://www.techno-ocean2016.jp/>

**Arctic Technology Conference (ATC) 2016**, St Johns, NF, Canada, October 24–26, 2016, <http://www.arctictechnologyconference.org/>

**IEEE AUV 2016 Workshop**, Tokyo, Japan, November 6–9, 2016, <http://www.auv2016.org/>



# From the Editor's Desk

## N. Ross Chapman—Journal Editor-in Chief

To start with, I am pleased to note that the announcements of the January issue of the Journal of Oceanic Engineering went out smoothly from IEEE and the format of the message looks very good. I knew there would be a learning period for the distribution system, so I'm keeping my fingers crossed that all the bugs have been worked out. We continue to work with the folks at IEEE publications to introduce new features about the articles, so stay tuned for more news about this as things move forward.

Since the last issue of the Beacon there's been some new developments at the Journal that I'd like to share with you. First, I'd like to introduce three new Associate Editors who were appointed to three-year terms last fall at the ADCOM meeting of OCEANS15 in Washington, DC.

**Merrick Haller** is an associate Professor at Oregon State University with joint appointments in the Schools of Earth, Oceanic and Atmospheric Science and Civil and Construction Engineering. His appointment introduces much needed expertise on the Editorial Board to handle manuscripts related to physical oceanography, particularly applications involving ocean waves and currents. His expertise in remote sensing of oceanographic features adds additional support for managing reviews of manuscripts on applications of coastal radar.

**Tetjana Ross** is a Research Scientist now at the Institute of Ocean Sciences in Sidney, BC, who has published extensively on her work in acoustic characterization of turbulence in the ocean. Her appointment strengthens our expertise on the Editorial Board in managing reviews of manuscripts related to acoustical oceanography and physical oceanography.

**Brian Bingham** is an Associate Professor now at the Naval Postgraduate School in Monterey. His expertise in positioning, navigation, control and mapping applications of autonomous underwater vehicles maintains our ability on the Editorial Board to manage reviews of manuscripts related to underwater vehicles, which continues to be one of our fastest growing fields of research for manuscripts submitted to the Journal.

I am very pleased to include these folks in our Editorial Board, and look forward to working with them over the next three years.

We are continuing to develop new topics for special issues in the Journal. This year we will publish special issue articles on acoustic analysis of underwater noise from pile driving, and we are now receiving and reviewing articles for special issues on 'Sensors and Systems for a Changing Ocean' and 'Waterborne Noise from Surface Shipping'. The deadline for papers for the Target and Reverberation Experiment TREX13 special issue was extended, and we are expecting papers for this special issue after the end of March. In addition, we announced in the January issue a special issue on 'Cutting Edge AUV Technologies and their Applications' with a deadline for papers on 31 January 2017. I am very pleased with the response to these special issues, and acknowledge the initiative commitment of



the guest editors who are taking the task of managing the reviews of the manuscripts. Their contribution is greatly appreciated.

To conclude this short message, I am continuing the plan to publish a list of papers that have been published on IEEE Xplore as Early Access papers in the last three months. To remind you, Early Access enables publication of papers that are accepted in the review process when final approval is given by the Editor-in-Chief. Printing the list of papers provides a means to announce the publication to a wider audience.

*'Experimental Confirmation of Nonlinear-Model- Predictive Control Applied Offline to a Permanent Magnet Linear Generator for Ocean-Wave Energy Conversion'*, Tom, N., and Yeung, R.W.

*'Ampacity Derating Analysis of Winch-Wound Power Cables: A Study Based on Deep-Water ROV Umbilical'*, Vedachalam, N., Umapathy, A., Ramesh, R., Babu, S.M., Muthukumaran, D., Subramanian, A., Hari Krishnan, G., Ramadass, G.A., and Atmanand, M.A.

*'Retrieval of Young Snow-Covered Sea-Ice Temperature and Salinity Evolution Through Radar Cross-Section Inversion'*, Firoozy, N., Komarov, A.S., Mojabi, P., Barber, D.G., Landy, J.C., and Scharien, R.K.

*'Reduction Method of Sinusoidal Noise due to Phase Drift of Interferometric Optical Fiber Hydrophone'*, Saijyou, K., Okuyama, T., Nakajima, Y., and Sato, R.

*'An Overview of Underwater Time-Reversal Communication'*, Song, H.-C.

*'Doppler-Resilient Orthogonal Signal-Division Multiplexing for Underwater Acoustic Communication'*, Ebihara, T., and Leus, G.

*'Experimental Study of the Electric Pulse-Width Effect on the Acoustic Pulse of a Plasma Sparke'r'*, Huang, Y., Zhang, L., Yan, H., Zhu, X., Liu, Z., and Yan, K.

*'Human-Visual-System-Inspired Underwater Image Quality Measures'*, Panetta, K., Gao, C., and Agaian, S.

*'Statistical Modeling of the Reflection Symmetry Metric for Sea Clutter in Dual-Polarimetric SAR Data'*, Gao, G., Wang, X., and Niu, M.

*'Computing the Scattering From Slightly Deformed Spherical Shells'*, Fawcett, J.A.

*'Localization and Subsurface Position Error Estimation of Gliders Using Broadband Acoustic Signals at Long Range'*, Uffelen, L.J.V., Howe, B.M., Nosal, E.-M., Carter, G.S., Worcester, P.F., and Dzieciuch, M.A.

*'Experimental Broadband Channel Characterization in a Sea Port Environment at 5.8 GHz'*, Reyes-Guerrero, J.C.

*'Design, Implementation, and Characterization of Precision Timing for Bistatic Acoustic Data Acquisition'*, Fischell, E., Schneider, T., and Schmidt, H.

*'A Study on Pulse-Width-Modulation-Based Power Amplification for Underwater Acoustic OFDM'*, Zhou, H., Xu, X., Wei, L., Zhou, S., and Cui, J.-H.

*'Optimum Design of Broadband Passive Sonar'*, Gao, Y.  
*'Image-Based Automated Change Detection for Synthetic Aperture Sonar by Multistage Coregistration and Canonical Correlation Analysis'*, G-Michael, T., Marchand, B., Tucker, J.D., Marston, T.M., Sternlicht, D.D., and Azimi-Sadjadi, M.R.  
*'Low-Complexity Uncertainty-Set-Based Robust Adaptive Beamforming for Passive Sonar'*, Somasundaram, S.D., Butt, N.R., Jakobsson, A., and Hart, L.  
*'Observation on Forces and Motions of a Mariculture Cage From Model and Prototype Experiments'*, James, J.G., Kumar, S., Dharmasree, K.K., Nagarajan, V., Mukherjee, C.K., and Dash, B.

*'Statistics of Broadband Echoes: Application to Acoustic Estimates of Numerical Density of Fish'*, Lee, W.-J., and Stanton, T.K.  
*'Time-Reversal Mirror-Virtual Source Array Method for Acoustic Imaging of Proud and Buried Targets'*, Yu, Z.-B., Zhao, H.-F., Gong, X.-Y., and Chapman, N.R.  
*'Preliminary Design of a Trench Cutter System for Deep-Sea Mining Applications Under Hyperbaric Conditions'*, Spagnoli, G., Miedema, S.A., Herrmann, C., Rongau, J., Weixler, L., and Denegre, J.  
*'System Identification of Vessel Steering With Unstructured Uncertainties by Persistent Excitation Maneuvers'*, Perera, L.P., Oliveira, P., and Guedes Soares, C.

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## Request for Nominations to The Administrative Committee Class of 2017

**Jerry Carroll, OES Junior Past President**

The IEEE OCEANIC ENGINEERING SOCIETY is governed by an Administrative Committee of 18 members. Six are elected each year to serve three-year terms. Members are limited to two consecutive terms, although they may be reelected after a lapse of one year.

The Nominations and Appointments Committee is chaired by the Junior Past President with the Senior Past President completing the Committee. They are charged with proposing a slate of nominees and with conducting the election, which is done electronically to the entire membership. The electronic election requires each member that wishes to vote to have an IEEE account. Therefore, visit IEEE.org to establish your account if needed.

Qualifications for Administrative Committee membership are membership in the IEEE and OES, and a willingness to serve the oceanic engineering profession. The Society wishes to have the Administrative Committee characteristics to reflect characteristics of the IEEE membership. I ask that each of you identify and nominate qualified candidates for the Administrative Committee. Self-nomination is encouraged.

The nomination Packet should include a Letter of Nomination accompanied by a one page biographical sketch of the proposed candidate with picture and a one-page statement from the proposed candidate giving his or her views of the opportunities and challenges facing the Society and steps to be taken to advance the IEEE Oceanographic Engineering Society.

The election will be conducted in accordance with our Bylaws. You can read them by going to the Society's Web Site ([www.ieeeoes.org](http://www.ieeeoes.org)), and pointing to Bylaws under Governing Documents. The Bylaws specify that general nominations close on March 1, and nominations by petition close by April 15, 2016. Please submit nominations to the undersigned. Please do not delay your efforts in finding and nominating qualified candidates.

**Jerry Carroll**  
**Chair, IEEE/OES Nominations**  
**and Appointments Committee**  
[jerrycortez@charter.net](mailto:jerrycortez@charter.net)

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## Request for Nominations for DTAA and DSA 2016

**Jerry Carroll, OES Junior Past President**

### Request for Nominations for The Distinguished Technical Achievement Award 2016

The IEEE Oceanic Engineering Society is hereby soliciting nominations for the society Distinguished Technical Achievement Award for significant accomplishments in oceanic engineering. A nomination form can be downloaded from the OES website under Professional Activities-Honors and Honorees-Award Forms. Nominations should be forwarded to the Awards Chair, Jerry Carroll at [jerrycortez@charter.net](mailto:jerrycortez@charter.net). The dead line for nominations is 1 May 2016.

### Request for Nominations for The Distinguished Service Award 2016

The IEEE Oceanic Engineering Society is hereby soliciting nominations for the society Distinguished Service Award to honor an individual IEEE member for outstanding contributions towards furthering the objectives of the Oceanic Engineering Society. A nomination form can be downloaded from the OES website under Professional Activities—Honors and Honorees—Award Forms. Nominations should be forwarded to the Awards Chair, Jerry Carroll at [jerrycortez@charter.net](mailto:jerrycortez@charter.net). The deadline for nominations is 1 May 2016.



# MTS/IEEE OCEANS'17 – Aberdeen, Scotland

## A Vision for our Marine Future

We are delighted to announce that the 2017 European OCEANS'17 Conference will take place in Aberdeen, Scotland from 19–22 June 2017.

This will be the second time that the MTS, IEEE/OES's flagship conference covering all aspects of ocean science, technology and engineering will be hosted in Aberdeen. The OCEANS'17 event will be the 60th in the OCEANS Conference Series.

Professor John Watson of the University of Aberdeen and Co-Chair of the OCEANS'17 organising committee said "being able to celebrate the 60th OCEANS conference is testament to the endurance, relevance and significance of this event in the global perception of oceanic engineering, science and technology. The fact that OCEANS is returning to Aberdeen, after the highly regarded meeting in 2007, highlights the importance and size of the oceanic industry to the region."

## Conference Themes

OCEANS'17 will reflect the diverse nature of marine sector in Scotland and the rest of the UK with 7 key topic areas being highlighted:

- Subsea Engineering and Subsea Operations
- Subsea Sensing, instrumentation and optical imaging
- Deployment of Subsea Capabilities in other Sectors (Subsea Mining, Defence, etc.)
- Emerging Technologies for IRM
- Fisheries & Aquaculture
- Decommissioning and Salvage
- Marine Renewables (offshore wind, wave, and tidal)

Dr. Radhakrishna Prabhu, Robert Gordon University, Co-Technical Chair said "The programmes and themes represent the diversity of marine science and engineering in the area. In particular Scottish universities and industries are at the forefront of the growth in subsea sensing application. Aberdeen is the UK centre for subsea engineering and operations. Another aspect which is growing in significance is the exploitation of subsea capability and expertise in cross-over sectors such as defence and deep-sea mining."



## Educational Links

The City's two universities are committed supporters of OCEANS'17 and both Principals are Honorary Chairs of the meeting. Between them they contribute to the blend of scientific achievement, culture, commerce and history of the city.

The University of Aberdeen was founded in 1495, it has roughly 16,500 students and provides access to a wide range of academic subjects and excellence in research, and boasts four Nobel Prize winners in its long pedigree. The campus also has a state of the art Library completed in 2012 and outstanding sports facilities in the Olympic standard Aberdeen Sports Village and Aquatic Centre (to which delegates will have access).

The involvement of Robert Gordon University, with around 17,000 students is one of the top performing modern Universities in the Britain, and brings additional local expertise to the team in many of the key technological areas of relevance to the conference.

## Patrons

Subsea UK have been confirmed as OCEANS'17 Gold Patron and highlight Aberdeen as a Centre of Excellence for Subsea Engineering. Neil Gordon, chief Executive of Subsea UK said "In supporting OCEANS'17, we are backing subsea companies in their efforts to develop new ideas, new technology and better ways of working which will ensure the long-term future and sustainability of our industry and the oceans in which it operates.

"Featuring global thought-leaders, academics and the latest technologies, OCEANS'17 will offer structured networking opportunities to help professionals from all disciplines in the marine community to establish relationships and work together on a global scale."

Visit Aberdeen and Visit Scotland, the two principal tourism organisations covering Aberdeen and Aberdeenshire, have recently been confirmed as Silver Patrons.

## Why Aberdeen?

Aberdeen is a vibrant, cosmopolitan city with everything that is needed to host a dynamic and successful event. Aberdeen also





acts as the Gateway to Castle and Whisky Country. Castles run through the heart of Aberdeenshire and the Whisky Trail lies within an hour of Aberdeen and has a range of venues to help

visitors to find out more about this Scottish delicacy. The area also abounds with some of the best golf courses in the world such as Royal Aberdeen and Cruden Bay. There will be opportunities at **OCEANS'17** to make the most of Scottish hospitality through a range of social events which will take place both in the city and more rural settings in Aberdeenshire; there will also be options for delegates to extend their stay in Scotland and take in more of the historic and unique atmosphere.

Aberdeen International Airport is a growing regional airport, and is one of the best hub-connected airports in Europe. The region is continuing to attract new routes with key hubs connecting Aberdeen to London, Frankfurt, Amsterdam, Copenhagen and Paris daily. New routes via Reykjavik will open in early 2016. The airport is currently undergoing a terminal upgrade and development with work set to be complete by early 2017.

### Conference Venue

The majority of the event will take place in an area that houses a purpose-built Exhibition and Conference Centre (AECC) with years of experience. AECC is Scotland's second largest conference venue, regularly hosting major international events. AECC is purpose built, with 25 years of experience in providing a professional and friendly service to conference organisers for the UK and overseas.

The venue also provides a wide range of in-house services including AV and IT, Exhibition Services and Catering.

### For more information

Visit the Conference Website at [www.oceans17mteeeaberdeen.org/](http://www.oceans17mteeeaberdeen.org/)



## Chapter News

### Victoria Chapter—Saturna Island Acoustic Noise Workshop

*Kristin Kanes, Caitlin O'Neill and Ross Chapman*

The Victoria Chapter of the IEEE Oceanic Engineering Society supported three students, Leandra Carpenter, Kristen Kanes and Caitlin O'Neill, to participate in the Saturna Island Acoustic Noise Workshop. The Workshop was a gathering of coastal British Columbia (BC) citizen science groups interested in non-invasive long-term research of cetaceans, monitoring ambient noise in the coastal waters of BC, and the effect of noise generated by ships on cetaceans. The workshop took place January 17–18 on Saturna Island, BC, and was hosted by the Saturna Island Marine Research and Education Society (SIMRES). The purpose of this meeting was to share new knowledge and

advances since the last meeting in 2012, and to identify technical needs and issues. Kathy Heise from the Vancouver Aquarium organized and chaired the meeting.

The coastal waters of BC are home to the Southern and Northern Resident Killer Whales. In addition, many other marine mammals forage in the area: transient (Biggs) killer whales, humpback, gray and fin whales, harbour seals, sea lions and Pacific white sided dolphins. The Georgia Strait and Juan de Fuca Strait are heavily used shipping lanes by local ferries and merchant ships into Vancouver, and there are plans to increase the shipping traffic into the northern BC city of Prince Rupert. Increase in the ambient noise level in these waters is a concern for its impact on the marine life. Monitoring the noise level is an important task, since current levels are not well known and so there is no baseline from which to establish the impact of changes in the noise due to increased shipping.

Over the past few years, several hydrophone monitoring systems have been installed along the northern BC coast by local citizen science groups. In 2012, the groups came together in Vancouver to set up plans to co-ordinate their efforts in long term monitoring of the noise levels. Each of the following groups attended the Workshop and presented updates on the activities and research directions at their hydrophone stations.

OrcaLab (<http://orcalab.org/>) was the first citizen science group on the west coast of BC. They began recording killer whale vocalizations in 1970 out of interest, and their purpose evolved to using acoustics to monitor the behaviour and movements of the Northern Resident Killer Whale population year round. They currently have six hydrophones deployed in Blackney Pass and Johnstone Strait. Their hydrophone network covers approximately 50 km<sup>2</sup> of Northern Resident Killer Whale critical habitat. They are currently developing a camera network to complement their hydrophone network. Their cameras and hydrophones stream to the internet in real time.

CetaceaLab (<http://www.cetacealab.org/>) was established in order to address the question, “where do the Northern Resident Killer Whales go when they’re not in Johnstone Strait?” Although this is the reason the lab choose its location, they discovered that this area is also really important to humpback whales, and recently Fin whales have also been inhabiting the area. CetaceaLab is located on Gil Island, BC, and has 11 hydrophones covering the waters around Gil Island and Campania Island. This area includes proposed tanker routes, so the group is focusing on collecting baseline data to compare to with the future increase in shipping traffic as well as conducting long-term research of local cetaceans.

In order to collect the spatial data gap between OrcaLab and CetaceaLab, Pacific Wild (<http://pacificwild.org/>) was developed. Their lab is located next to Bella Bella, BC, on Denny Island. Pacific Wild has six hydrophones deployed along the central coast of BC. They also have multiple cameras to capture whale activity. Unlike OrcaLab and CetaceaLab, which use FM transmitters, Pacific Wild uses microwave transmission to transmit their hydrophone data to shore stations. The data from all the hydrophones stream to the internet, with one also being



Figure 1. Tom Dakin describing hydrophone installations in Georgia Strait.



Figure 2. Students at the Saturna Island Acoustic Noise Workshop: (L-R) Kristin Kanes, Caitlin O'Neill and Leandra Carpenter.



broadcasted on an FM radio station. In 2014 they had had five of their hydrophones calibrated.

Beam Reach (<http://www.beamreach.org/>) monitors the Salish Sea. They have two hydrophones deployed off of San Juan Island, one hydrophone in the Strait of Georgia, and one hydrophone at the entrance of Puget Sound. They also have an AIS decoder for recording ship traffic. They are interested in public education, Southern Resident Killer Whale research, and monitoring ambient noise levels.

SIMRES (<http://saturnamarineresearch.ca/>) is the newest member of the BC citizen science hydrophone community. In the summer of 2013 they deployed three hydrophones off Saturna Island, and hosted the workshop in order to learn from the other research groups. SIMRES is planning to study local shipping and commercial activity as well as whale activity. They are looking to attract researchers and expand upon their research capabilities.

Although not a citizen science group, the Department of Fisheries and Oceans (DFO) Pacific Biological Station presented an overview of their BC coast acoustics program. Tom Dakin from Ocean Networks Canada (ONC) also attended the workshop. He discussed the calibrations he recently conducted for OrcaLab, CetaceaLab, and Pacific Wild and factors that could affect their validity. He also offered recommendations on how to best conduct future calibrations.

A common interest of all the labs was a desire to attract students and scientists to publish research using their data, assist with data collection, maintain databases, and annotate and analyze data. Unfortunately these labs do not have a lot of monetary resources, but they are rich in cetacean knowledge and data.

Caitlin O'Neill is a Masters student at the University of Victoria (UVic) who is researching marine mammal vocalizations in Resolute Bay in the Canadian Arctic for her degree. Kristen Kanes is also a Masters student at UVic. Her thesis is on localization and classification of marine mammal vocalizations. Both students are supervised jointly by Drs. Stan Dosso (UVic) and Svein Vagle (DFO). Leandrea Carpenter is a BC first nations student from Bella Bella who works with the Pacific Wild hydrophone station.

## San Diego Chapter—Sidus Solutions Visit

**Kevin J. Delaney, BMT Scientific Marine Services Inc**

On 3rd December 2015, the San Diego OES Chapter visited Sidus Solutions for a presentation on the development of HD underwater cameras. Leonard Pool, president of Sidus Solutions, discussed the industrial applications of underwater lights and cameras. The meeting also included a factory tour and a demonstration of a prototype underwater optical communications link promising high data transfer rates.



Figure 3. San Diego OES members discuss Sidus Solutions product development.



Figure 5. Leonard Pool, president of Sidus Solutions, discusses the development of underwater HD cameras.



Figure 4. Kevin J. Delaney San Diego OES Chapter Chair, welcomes members and guests to the meeting.



Figure 6. The dinner of the OES Chapter with Jules Jaffe at the back, our Distinguished Lecturer.

## Providence Chapter Formation and Activity

*Albert J. Williams 3rd, OES Providence Chapter Chair*

In March 2015 an OES Chapter was formed in the Providence Section of IEEE Region 1. The reason for forming this Chapter was a request by Dr. Atmanand, Director of National Institute



Figure 7. RV Knorr.



Figure 8. Titanium Alvin sphere in which Sandy made his dive is still there.



Figure 9. Alvin is gone, but visitors can find the AUVs such as Sentry.

of Ocean Technology in Chennai, India, for an invitation by the “OES Chapter” in Woods Hole, which he was planning to visit on June 24, 2014. This request was in April 2014. There was no such Chapter nor was there an active OES Chapter even in Boston. So a petition to form an OES Chapter was circulated among the 47 members of OES on Cape Cod. This membership was selected by telephone area code from a National Member list. An announcement of a talk by Dr. Atmanand was sent to this list with the opportunity for attendees to sign the petition to become a Chapter. 16 signatures were obtained at this meeting and by email and these were passed along to IEEE Providence Section. Meanwhile, René Garello, President of the OES, signed his Society’s approval. Providence Section approval was obtained after a presentation was made to the Providence Section ExCom on October 7, 2014. The Chapter was approved in February of 2015.

On July 9, 2015 James Bellingham provided the first official OES Providence Chapter talk on AUVs and other scientific submersibles at Massachusetts Maritime Academy in the evening. Attendance was 39. This was followed by a Distinguished Lecturer, Jules Jaffe on September 21, 2015 at U. Mass. Dartmouth. Also in the evening to accommodate attendees from as far away as Narragansett, Rhode Island, attendance exceeded 58. A third Chapter talk was presented by a Woods Hole Oceanographic Institution scientist, Anthony Kirincich, on November 9, 2015. This was held at the Woods Hole Oceanographic Institution just after work on a Monday to accommodate a local audience, which was only a dozen but mostly OES members. Three weeks later we had a fourth Chapter talk by Chris de Moustier on December 3, 2015 at WHOI again after work with a substantial local audience. This talk opportunity arose spontaneously at an ExCom meeting dinner when Chris de Moustier noted that he would be in Woods Hole in two weeks and would like to give a Chapter talk.

Since the end of 2015 we are pursuing two speakers and considering a third plus doing two joint Chapter meetings: with Signal Processing Providence Chapter and with Reliability joint Boston, New Hampshire, and Providence Chapter. An event was shared between the OES Chapter and the Providence Section to visit the Oceanographic Institution dock, RV Knorr, and Alvin submarine in Woods Hole on 19 November, 2015. This was fully subscribed with a limit of 60 persons.

In summary, a new OES Chapter was formed, not without some difficulty, but it has taken off now and is performing well.

## India Chapter—Inputs for BEACON

*R. Venkatesan, OES India Chapter Chair*

New office bearers of IEEE OES have taken over and systematic activities are scheduled. The following activities have been completed.

A talk on “Stochastic Ocean Prediction and Optimal Path Planning” by Dr. Deepak Subramani, Mechanical Engineering group at Massachusetts Institute of Technology MIT, USA, was organised on 4 January 2016 at the National Institute of Ocean Technology, Chennai in association with the IEEE Oceanic Engineering Society, India Chapter.





Figure 10. Audience.



Figure 11. Dr. Deepak Subramani, Mechanical Engineering group at MIT, USA.



Figure 12. Review committee (1 Row) and student Teams.

The National Institute of Ocean Technology (NIOT), under the Ministry of Earth Sciences in association with IEEE OES, yearly conducts a national level competition for students pursuing engineering degrees to visualize and design an autonomous underwater vehicle. For the year 2016, the Design concept review was conducted at the NIOT campus on 22 January 2016. Twenty teams (86 students) from various engineering institutes presented their design



Figure 13. Best Practices in Submersible Design workshop.



Figure 14. Trainers and participants of the workshop.

Table 1. India Chapter Office bearers elected for the year 2016.

IEEE OES Office Bearers for 2016	
Responsibility	Name
Chairman	Dr. R. Venkatesan
Vice Chairman	Dr. G.A. Ramadass
Secretary	Mr. N. Vedachalam
Treasurer	Mr. M. Arul Muthiah
Joint Secretary	Mr. S.Rajesh
Joint Secretary	Dr. Unnikishnan

concepts and out of 20 teams, 14 teams were qualified for final competition.

The Workshop on **Best Practices in Submersible Design** was conducted at the NIOT Campus on 21 January 2015 on behalf of the IEEE OES India Section; 46 students from 19 institutes participated and benefited from this workshop. Mr. Emerson Hasbrouck of WHOI, USA, delivered a lecture on subsea O-rings, cables and connectors and IEEE OES members presented on various topics.



# IEEE OES SINGAPORE Chapter Activity Report for the Year 2015

*Prepared by Venugopalan Pallayil*

The IEEE OES Singapore Chapter organised its flagship activity, the Singapore AUV Challenge, in the year 2015. A detailed report on that competition has been provided in the BEACON Newsletter released in Dec 2015. We are now gearing up for the 2016 AUV challenge to be held from 4–6 Mar 2016. There are 11 teams so far registered and we are looking forward to an exciting competition. The Chapter also has been organising a number of technical talks jointly with the National University of Singapore as well as an annual industrial workshop in collaboration with local industries. In this report we cover the details of the industrial workshop and technical talks organised in the year 2015. We also have a new committee to lead the Chapter

activities for the year 2016. A brief on the committee members and their roles is also given in this report.

## Technical Talks/Seminars

The chapter organised four separate technical talks in the year 2015. This is in addition to the technical talks organised during the two events; the SAUVC 2015 and the industrial workshop. On 28 July Mr. Satish Ramachandran, ROV Technical Manager at Horizon Geosciences and Headquartered in United Arab Emirates, gave a talk on “Underwater Robotics and Underwater Acoustics—Current and Future Developments”. After the talk a social gathering with Chapter members and invited guests was organised. On 21 August, Mr. Richard Coe presented a talk on his proposed ocean expedition and their objectives to an invited audience by the Chapter. Richard was undertaking a unique journey from London to Sydney in a single vehicle, an amphibious 6x6 truck, DUKW. Dr. Ying-Tsong Lin, Associate Scientist from Woods Hole Institute of Oceanography, presented his work on “Three dimensional underwater sound propagation in complex oceanic environments” on 16 October 2015. The year-end technical talk was delivered by Dr. Douglas H Cato, Principal Scientist from the Maritime Division of the Defence Science and Technology Group Australia on 10 Dec 2015. He gave an excellent talk on “Australia studies of ambient sea noise and whale acoustics”.

## Annual Industrial Workshop

The industrial workshop, an annual event jointly organised with some of the local company partners, was held on 9 October 2015. There were four technical talks and two industrial talks as



*Figure 1. Technical talks presented by various speakers (see text).*



*Figure 2. Some of the participants at the workshop.*



Figure 3. Visit to one of the proposed venues, Suntec Singapore.



Figure 4. Visit to Gardens by the Bay – a possible venue for social events.

part of this event. Dr. Pablo Valdivia, and IEEE OES member and Asst. Prof at Singapore University of Technology and Design gave a talk on “Modelling and control of soft body underwater fin locomotion”. Dr. Valdivia was also the Chair of the local Chapter in 2013. His talk was followed by a presentation on “Estimating the geoacoustic parameters using underwater acoustic remote sensing methods” by Dr. Daniel Tan Bien Aik from the DSO National Laboratories. Dr. Gonzalo Carrasco, a Post-doctoral Associate at the Singapore-MIT Alliance Research and Technology, presented his work on “Zinc Complexing Ligands in a Tropical pristine river”. Another interesting technical talk was given by one of the industry representatives, Mr. David Velasco from Nortek AS, who spoke on “Advances in Long Range Current Profiling with Composite Broadband Transducers”. The abstracts of all the presentations are available at the website <http://www.ewh.ieee.org/r10/singapore/oes/Activities.html>.

The Sea and Land Technologies Pte Ltd., Singapore was one of the major sponsors of the event. The company exhibited some of its products during the event and presented them to the attendees. Other companies who exhibited and presented their products were Seatronics and Subnero Singapore. The event was also well supported by Nortek AS who also provided sponsorship for the event. The event ended with a BBQ dinner, which provided a useful networking opportunity for the Chapter members, guests and industry representatives.

## OCEANS '20 Singapore

Apart from the above activities, the Chapter also hosted the visit by Prof Sandy Williams, the Vice-President for Conference Development for IEEE OES and Mr. Drew Michel, the



Figure 5 The visit also included a technical tour of the Singapore's NEWater membrane plant facility built and maintained by the Public Utility Board (PUB).

immediate past President of MTS, who were in Singapore to assess the venues for hosting OCEANS '20. They visited three convention centres short-listed for hosting the conference and also visited a few hotels and venues for hosting social events, such as the Gala Dinner. The Singapore Tourism Board (STB) made all the arrangements for the tour including transportation and stay. Marina Bay Sands, one of the short-listed convention centres, also supported the visit.



## New Office Bearers for the Singapore IEEE OES Chapter

The annual general body meeting of the IEEE OES Singapore Chapter was held immediately after the Industrial workshop on 9 October 2015. The outgoing Chairman, Tawfiq Taher, presented a summary of the chapter report. This was followed by the election for new office bearers. Following are the chapter committee members for the year 2016.

### Chairman—Teo Hoe Eng, Ken

Email: [thoeeng@dso.org.sg](mailto:thoeeng@dso.org.sg)



**Ken Teo** received the bachelor degree in Mechanical Production and Engineering from Nanyang Technological University, Singapore, in 2000. In 2005, he received the M.Sc. degree in Mechatronics Engineering from the National University of Singapore, Singapore. In 2010, he received the M.Sc. degree in Ocean Engineering from Florida Atlantic University, USA. Since 2000, he has been working as a Research and Development Engineer at DSO National Laboratories in Singapore and has been appointed as a Principal Member of Technical Staff since 2012. He specializes in autonomous underwater vehicle design, development and system engineering. He also has wide experience in designing and implementing the guidance, navigation, control, docking, as well as obstacle detection and avoidance algorithms onto DSO AUVs.

### Vice Chairman—Manu Ignatius

Email: [manu@subnero.com](mailto:manu@subnero.com)



**Manu** is a core member of a technological team in a Singapore start-up company namely Subnero, which focuses on developing underwater communication, navigation, monitoring, and sensing technology and solutions. He has a B.Tech degree in electronics and communication engineering from Mahatma Gandhi University, Kerala, and an M.S in electrical and computer engineering from the National University of Singapore. If you would like to know more about Manu visit this page <http://thedragonflypage.com>.

### Secretary—Hari Vishnu

Email: [hari@arl.nus.edu.sg](mailto:hari@arl.nus.edu.sg)



**Hari Vishnu** is a Research Fellow at the Acoustic Research Laboratory, National University of Singapore. He obtained his B. Tech. in Electronics and Electrical Engineering from National Institute of Technology, Calicut, Kerala and his PhD from the Nanyang Technological University Singapore. More details about him can be found at <http://arl.nus.edu.sg/twiki6/bin/view/ARL/HariVishnu>.

### Treasurer—Chia Chin Swee

Email: [cchinswe@dso.org.sg](mailto:cchinswe@dso.org.sg)

**Chin Swee** is currently the Head, Underwater Laboratory, and a Distinguished Member of the Technical Staffs at the DSO National Laboratories, Singapore. He has joined DSO since 1993, and he is actively involved in the R&D program in underwater sonar process-



ing and environmental acoustics. Besides conducting R&D research, Chin Swee also provides technical consultations to DSTA and RSN pertaining to the acquisitions of naval underwater systems. Chin Swee is a Senior Member of IEEE and also a past chairman of the local IEEE OES Chapter. He received his Masters of Science (Ocean Engineering) from Massachusetts Institute of Technology, USA, and his B. Eng. (Electronics) degree from Nanyang Technological University, Singapore.

### Executive Committee Members

#### Arnab Das

Email: [arnab@arl.nus.edu.sg](mailto:arnab@arl.nus.edu.sg)



**Arnab Das** is a Research Fellow at the Acoustic Research Laboratory, National University of Singapore. He earned his Masters and PhD from the Indian Institute of Technology Delhi. He spent 20 years in Indian Navy before retiring as a commander. You can find more about him and his work by following the link <http://arl.nus.edu.sg/twiki6/bin/view/ARL/ArnabDas>.

#### Venugopalan Pallayil

Email: [venu@arl.nus.edu.sg](mailto:venu@arl.nus.edu.sg)



**Venugopalan Pallayil** is one of the founding members of the IEEE OES Singapore Chapter and currently works as a Senior Research Fellow and Deputy Head at the Acoustic Research Laboratory, National University of Singapore (NUS). To know more about Venu, please visit the following link <http://arl.nus.edu.sg/twiki6/bin/view/ARL/VenugopalanPallayil>.

#### Tawfiq Taher

Email: [tawfiq@ieee.org](mailto:tawfiq@ieee.org)



**Tawfiq Taher** is a senior Research Manager at the Centre for Sensing and Modelling (CENSAM) under the Singapore MIT Alliance on Research and Technology (SMART). Prior to the current position, Tawfiq was working for Honeywell Automation & Control Solutions division. He received his MSc in computer Control & Automation from the Nanyang Technological University (NTU), Singapore. Tawfiq is also the immediate past Chair of the IEEE OES Singapore Chapter.

#### Tay Yen Hai Harold

Email: [harold@arl.nus.edu.sg](mailto:harold@arl.nus.edu.sg)

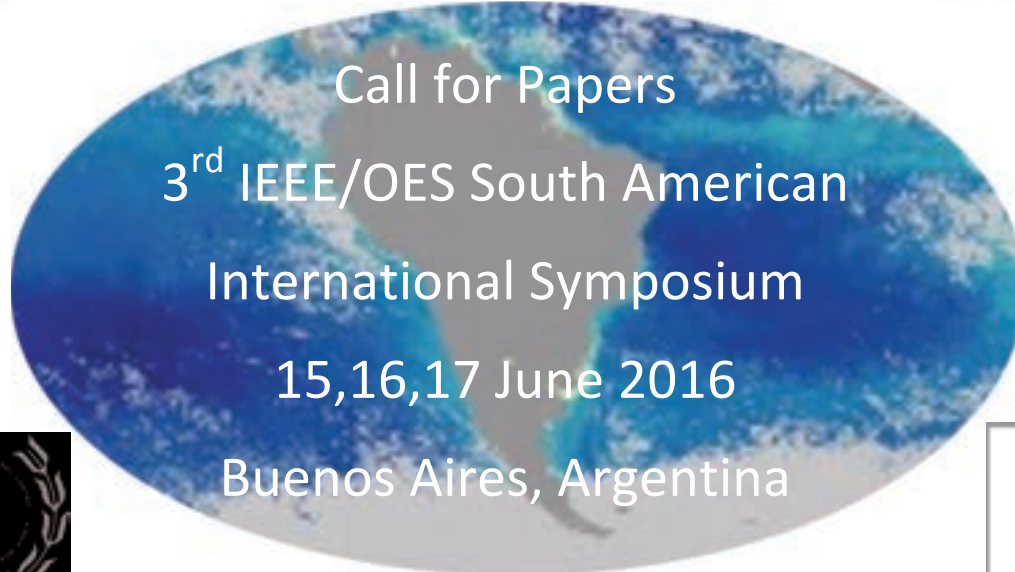


**Harold** is a Senior Engineer at the Acoustic Research Laboratory (ARL), National University of Singapore. He has been trained as a mechanical engineer who later shifted his work to software engineering. Currently he spends most of his time designing electrical and electronics designs for many of the projects in ARL. Harold is also the Chair for the Singapore AUV Challenge, an AUV competition annually held by the Chapter, for the year 2016.





Argentina Section



Call for Papers

3<sup>rd</sup> IEEE/OES South American  
International Symposium

15,16,17 June 2016

Buenos Aires, Argentina



### Topics to be covered:

- The role of the Oceans in the Climate Change
- Ocean Observation Systems, underwater sensing platforms: AUV – ROV – Gliders, Acoustic systems technology for fisheries, remote sensing, satellite images processing
- Coastal Zone Management
- Renewable Energy in the Oceans, alternative resources, gas hydrates, tidal energy, ...
- Acoustical imagery, underwater positioning systems, acoustical underwater communications
- Underwater instrumentation
- Sea and off-shore technology

### Location:

National Technological University (UTN-FRBA), Medrano 951, Ciudad Autónoma de Buenos Aires, Argentina – In parallel with the IEEE ARGENCON 2016 - <http://sites.ieee.org/argencon/simposio-sociedad-ingenieria-oceanica/>

### Important Dates:

- Full paper submission date: 4/4/2016
- Notification of acceptance date: 2/5/2016
- Final paper submission date: 16/5/2016
- Symposium: 15/6/2016

### Contact persons:

Gerardo Acosta – [gerardo.acosta@ieee.org](mailto:gerardo.acosta@ieee.org)

Marcelo Doallo – [m.doallo@ieee.org](mailto:m.doallo@ieee.org)

*Students' grants will be given!*

# OES Exhibitors – Take Advantage of Your Visitors

*Jim Barbera, Senior Past President*



First of all, the Oceanic Engineering Society would like to express thanks to the set of exhibitors that have been supporting the OCEANS conferences over the last few decades. This support has allowed the event to become international over the past eleven years with two events each year – North America each year and alternating between Europe and Asia-Pacific every other year. This international schedule

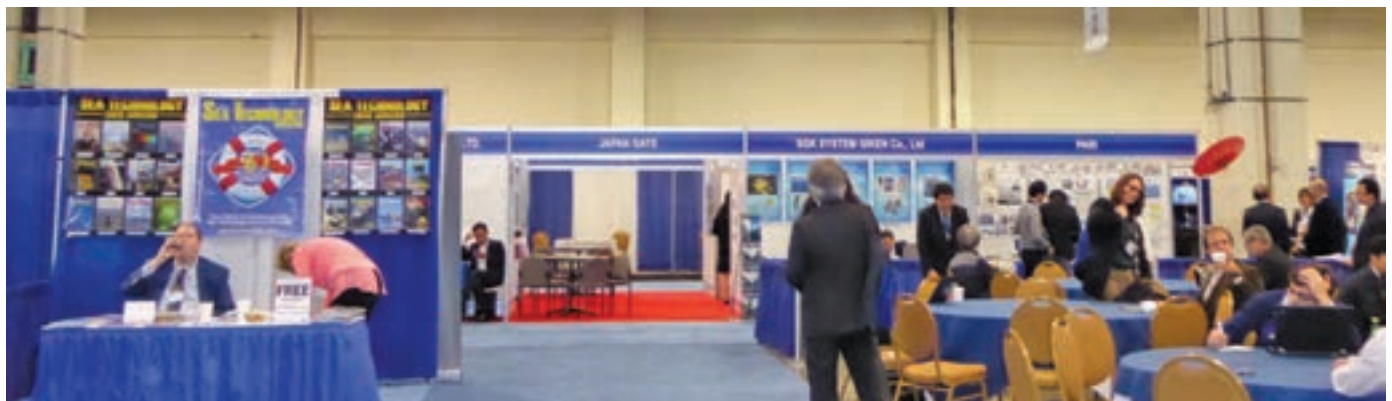
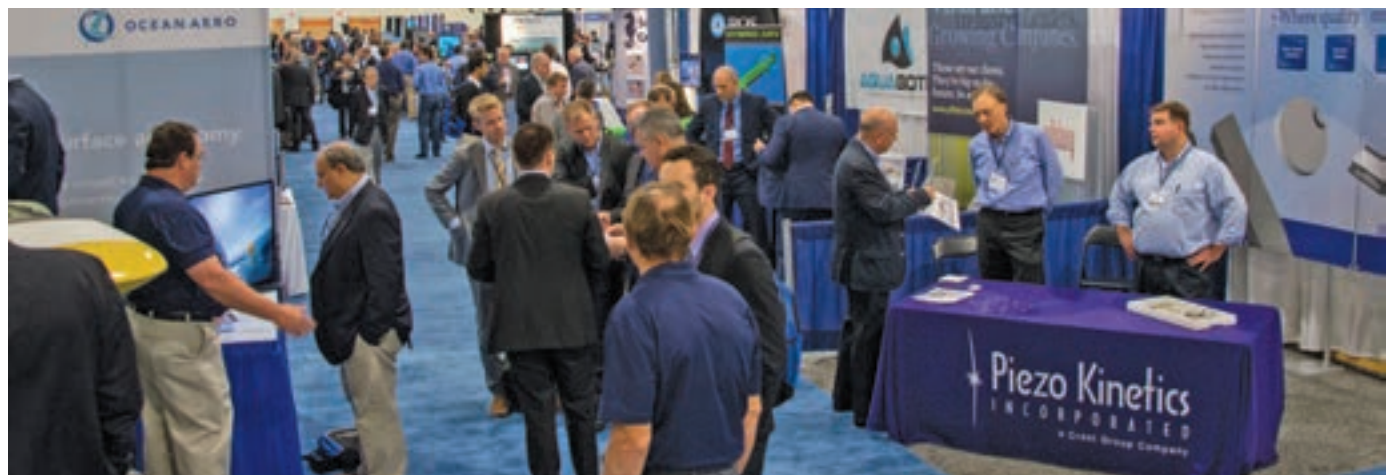
allows your products to be exposed to a worldwide population of research and design scientists and engineers. Therefore, each exhibiting organization has the opportunity to discuss the important uses for your products with the designers and users on a one to one basis. Such technical discussions with researchers, designers and users of your products on an individual basis allows their use and applications to be properly described. However, these discussions should not just be a sales pitch to your booth visitors. Take advantage of their knowledge.

Having technical discussions on a frequent basis with attendees during the exhibition presents an opportunity for you

to receive suggestions for potential product improvements and refinements, as well as other possible applications and market opportunities. Such interactions can lead to recommended changes and improvements to the products and their future applications and utility at sea.

In addition, the future of our industry is also attending the conference. Each OCEANS conference sponsors a group of twenty international poster competition students that are studying advanced topics in ocean engineering related subject matter. They will be the next generation of scientists and engineers that will make use of your products. Therefore, it would be prudent to spend some time talking with them and asking them to explain their poster subject matter and also to get a feel for their talents and possible employment with your organization. In addition, the society is working hard to encourage participation by other students so they can be exposed to ocean related career opportunities.

Again, thank you for your continued support and we at the OES look forward to your participation in future OCEANS conferences. And to keep your costs down, always try to avoid moving your exhibit into the hall in Sundays, if possible, as the mover's fees are higher on that day. If you have any suggestions related to a more efficient relationship with our OCEANS



*Exhibits at the OCEANS'15 Washington DC.*





*Exhibits at the OCEANS'15 Genova.*

conferences, please contact our Vice President for Conference Operations at: [ieeecoos.vpco@gmail.com](mailto:ieeecoos.vpco@gmail.com)

We look forward to seeing you at our OCEANS '16 conferences in Shanghai, China and also Monterey, CA, and next

year at OCEANS '17 in Anchorage, Alaska and also Aberdeen, Scotland, where you can leverage the knowledge of exhibit attendees to advance the efficiency and applications of your product line.

## The IEEE/OES Baltic 2016 International Symposium

***Jerry Carroll, OES Junior Past President***

The IEEE/OES Baltic 2016 International Symposium will be held in Ventspils, Latvia, 28 to 31 August, 2016, at the Ventspils University College. This is the seventh Baltic Symposium, first started in 2004 in Klaipeda, Lithuania. This Symposium was held in Tallinn, Estonia, in 2008 and 2014, in Riga, Latvia, in 2010, and again in Klaipeda in 2006, 2010 and 2012. The theme for this year's Conference is "Bridging the Divide between Satellite and In Situ Sensing for Marine Ecosystem Assessment." The organizers for this event are IEEE/OES, Latvian Institute of Aquatic Ecology, and the Ventspils University College. The Latvian Ventspils International Radio Astronomy Center (VIRAC) is now using the huge former Soviet Union radio telescopes installed at the largest Soviet spy center during the cold war for outer space science (see figures). The radio telescopes were used to intercept signals from US military and intelligence satellites and NATO/US communications. Tours will be conducted to see the refurbished telescopes. The Symposium webpage is at [www.lhel.lv/en/BalticSymposium.php](http://www.lhel.lv/en/BalticSymposium.php). Registration will be open on 2 March 2016. This Symposium will serve as an important stepping stone for the new generation of ocean scientists and engineers of the Baltic Sea region.



*Tours will be conducted to see the refurbished telescopes.*



# Title SYMPOL 2015 Held at Kochi, India 18–20 November 2015



**Dr. P. R. S. Pillai, Chairman and Dr. Supriya M. H., Coordinator**

## Introduction

The 2015 International Symposium on Ocean Electronics (SYMPOL 2015), addressing the Global Oceans, Systems and Technologies, organized by the Department of Electronics of the Cochin University of Science and Technology, Kochi with the technical co-sponsorship of the IEEE Oceanic Engineering Society (IEEE-OES) and Acoustical Society of America (ASA) was held during 18–20 November 2015. SYMPOL is being organized as a biennial program and the first symposium of the series was held in the Cochin University of Science and Technology, during 18–20 December 1991 to highlight the formal opening of the Center for Ocean Electronics established in the Department of Electronics as a joint venture of the University Grants Commission and Ministry of Human Resource Development, Government of India. Though various professional societies such as the Acoustical Society of India, Ocean Society of India, etc. organize conferences periodically, the SYMPOL, which is being organized under the aegis of the Centre for Ocean Electronics of the Department of Electronics, Cochin University of Science and Technology, as a biennial event, has been rated as one of the globally acclaimed international conferences addressing the Global Oceans, Systems and Technologies. SYMPOL 2015 was held at the CUSAT Seminar Complex.

## Inaugural Function

The three day 2015 International Symposium on Ocean Electronics (SYMPOL 2015) was inaugurated on 18th November 2015 by Shri. C. Durga Malleswar, Director & Outstanding Scientist/Sc 'H', Naval Science and Technological Laboratory, Visakhapatnam in a function presided over by Dr. J. Letha, Vice-Chancellor, Cochin University of Science and Technology.

While inaugurating the Symposium, Shri. Malleswar highlighted some of the documentations of Sardar K. M. Panikkar, the veteran statesman, diplomat and great visionary of India, according to which, millenniums before Columbus sailed the Atlantic and Magellan crossed the Pacific, the Indian Ocean had become a thoroughfare of commercial and cultural traffic. He also wrote that ancient Indians possessed the skills to construct sturdy ocean going sailing boats and knew the use of magnetic compass for precise navigation. Shri. Malleswar also indicated that India has to develop several key cutting edge technologies for surveying the Nations potential EEZ as well as design the required underwater systems and technologies for harvesting the Oceanic Resources from various depths. It is a well-known fact that there exist a wide technology gap in various spheres of ocean technology in India and there is a demand to develop multiple technologies to tap our seabed resources. The seabed has vast reserves of mineral wealth embedded in the polymetallic nodules, in the ocean floor. Unfortunately, India could not perform well in seabed exploration. Our Nation



*Figure 1. Shri. C. D. Malleswar, Director, NSTL, Visakhapatnam, inaugurates the SYMPOL 2015 by lighting the lamp. Dr. J. Letha, Vice-Chancellor, CUSAT, Prof. K. Poullose Jacob, Pro-Vice-Chancellor, CUSAT, Dr. K. G. Nair, Director, CSIS, CUSAT, Dr. P. R. S. Pillai, Chairman SYMPOL 2015, Shri. S. Kedarnath Shenoy, Director & Outstanding Scientist/Sc 'H', NPOL, Kochi, Prof. Supriya M. H., Co-ordinator, SYMPOL 2015 and Head, Department of Electronics, CUSAT are also seen.*



*Figure 2. Dr. C. D. Malleswar, Director, NSTL, Visakhapatnam delivers the key-note address on Trends in Ocean Electronics.*

has to redefine the modus operandi for accelerating its programmes on war footing basis for the extraction of strategic rare-earth metals from the seabed so that we will not be left too far behind. He further elucidated that in the Defence sector, India is self-reliant in Underwater Systems & Technologies as well as Underwater Weapons and Weapon Delivery Systems.

The weapon systems include light weight and heavy weight Torpedoes, Mines and Decoys. India has also excelled in developing stealth technologies for naval platforms.

Dr. J. Letha, who presided over the inaugural function, also emphasized the need for strengthening the security of the country by developing appropriate Buoy based Security Surveillance Systems at strategically important locations, as the Indian Ocean Region has witnessed a steep increase in global terrorism, which culminated in the Mumbai strikes in November 2008. The region is also a hot bed of international crimes with the large number of weapon, human and drug trafficking.

Professor K. G. Nair, the founder Chairman of SYMPOL also elucidated the need and requirements for revamping the research and development activities keeping in view the technological goals of the Nation. Professor K. Poulse Jacob, Pro Vice-Chancellor of the University in his address suggested the need and requirements for capability building in developing systems and technologies for improving the search and rescue operations at the sea, quoting the Malaysian flight mishap in July 2014. Shri S. Kedarnath Shenoy, Director, Naval Physical and Oceanographic Laboratory released the Proceedings of

SYMPOL 2015. Dr. P. R. S. Pillai, Chairman, SYMPOL 2015 welcomed the gathering and Dr. Supriya M. H., Coordinator, SYMPOL 2015 proposed the vote of thanks.

## Technical Program

The technical program of SYMPOL 2015 commenced with a key-note address on *Trends in Ocean Electronics*, by Shri. C. D. Malleswar. In his address he presented a vivid account of the various ocean electronics systems and technologies in use for strategic and civilian applications. He further indicated the emerging trends in these areas, which greatly enhanced the operations leading the effective exploitation of the oceanic resources.

The following eight state of the art invited talks on emerging topics in Ocean Systems and Technologies were also delivered by eminent and distinguished engineers/scientists from various Research Laboratories and academia.

Dr. Manu Korulla, Associate Director and Scientist 'G', Naval Science & Technological Laboratory (NSTL), Visakhapatnam delivered a talk on *Technologies for Sustainable Ocean Operations*, in which he highlighted the rapid



Figure 3. Dr. Manu Korulla delivers an invited talk on *Technologies for Sustainable Ocean Operations*.



Figure 5. Dr. Suresh Nair delivers an invited talk on *Overview and Applications of Systems Developed in-house for Underwater Applications*.



Figure 4. Dr. M. A. Atmanand delivers an invited talk on *Technological Advances for Improved Ocean Climate Monitoring*.



Figure 6. Dr. G. A. Ramdass delivers an invited talk on *Underwater Navigation*.





Figure 7. Dr. D. D. Ebenezer delivers an invited talk on Underwater Acoustic Bullet Beams.



Figure 9. Prof. Gopu R. Potty delivers an invited talk on Underwater Noise: A Curse or Blessing?



Figure 8. Dr. Tarun K. Chandrayadulla delivers an invited talk on Mode-based Statistical Signal Processing Methods for the Deep Water Acoustic Channel.



Figure 10. Dr. Dhilsha Rajappan delivers an invited talk on Acoustical Imaging and Synthetic Aperture Sonars.

advancements in ocean technology and renewed interest in oceans and their sustainable exploitations.

Dr. M. A. Atmanand, ESSO-National Institute of Ocean Technology, Chennai delivered a talk on Technological Advances for Improved Ocean Climate Monitoring. In his talk, Dr. Atmanand indicated that new observational platforms that ensure long-term data continuity with the ability to discern small but persistent signals and that satisfy the climate monitoring principles is a need of the hour. Global warming has shown its warning sign in the southeast Asia which resulted in the increased occurrence of droughts and floods in response to the more frequent, intense and persistent La-Nina events.

Dr. Suresh Nair, Chief Technology Officer, NeST Group, delivered a talk on *Overview and Applications of Systems Developed in-house for Underwater Applications*, in which he touched upon some of the systems including the Data Acquisition and communication gadgets. He also elucidated certain

design aspects for preventing the intrusions in submarine cable communications.

Another invited talk on *Underwater Navigation* was delivered by Dr. G. A. Ramdass, National Institute of Ocean Technology, Chennai. Dr. Ramdass indicated that most of the underwater navigation systems are based on acoustic techniques. The position of the mother ship is determined by GPS while the position of underwater vehicle with respect to the mother ship is determined by the acoustic positioning system such as USBL or LBL. The choice depends on the accuracy requirement. He also suggested that vision based navigation and sonar based navigation techniques are also gaining popularity.

Dr. D. D. Ebenezer, Naval Physical and Oceanographic Laboratory, Kochi delivered a talk on *Underwater Acoustic Bullet Beams*. In this talk, he suggested that acoustic bullet beams maintain their peak amplitude and/or general shape as they propagate. Bullet beams are also solutions to the linearized

acoustic wave equation and have been shown to exist both theoretically and experimentally.

Another invited talk on *Mode-based Statistical Signal Processing Methods for the Deep Water Acoustic Channel* was delivered by Dr. Tarun K. Chandrayadulla, Indian Institute of Technology, Chennai. This talk describes travel time estimation and tomography results from the Long Range Ocean Acoustic Propagation Experiment (LOAPEX). LOAPEX used a low frequency source to transmit from ranges of 50 km, 250 km and 500 km. Due to the waveguide anisotropy of the underwater medium, signal processing methods required for experiments such as LOAPEX are unique with respect to approaches for the wireless or electromagnetic media.

Professor Gopu R. Potty, Department of Ocean Engineering, University of Rhode Island, USA delivered a talk on *Underwater Noise: A Curse or Blessing?*. He indicated that the ambient noise which has been a topic in the forefront of public awareness mainly because of the effect of noise on marine environment. Recently there has been a change in the manner in which noise has been perceived i.e.; from unwanted nuisance to signal of opportunity. He has reviewed the ocean ambient noise on the perspective of utilising it to extract its information content.

Dr. Dhillsha Rajappan, Head, Marine Sensors Systems Group, National Institute of Ocean Technology, Chennai delivered a talk on *Acoustical Imaging and Synthetic Aperture Sonars*. Dr. Dhillsha has indicated that Synthetic Aperture Sonars are able to generate 2D and 3D images. This technology has revolutionized the underwater object detection, localization and classification problems. Recently, National Institute of Ocean Technology (NIOT) has initiated the indigenous technology development for the detection of buried objects in the shallow waters and the creation of underwater images.

## Recommendations of the Technical Panel of SYMPOL 2015

A meeting of the Technical Panel of SYMPOL 2015 comprising of the Chairpersons of various technical sessions, as well as invited speakers and organisers was convened at 6.30 p.m. on 19<sup>th</sup> November, 2015. Dr. P. R. S. Pillai in his introductory

remarks presented the salient highlights of the technical programs of all the SYMPOLs held earlier. He further sought the comments and suggestions as regards to the technical program of SYMPOL 2015. The technical panel made the following recommendations, based on the deliberations at the panel meeting.

- The panelists unanimously opined that the quality and standard of the papers presented and published in the Proceedings of SYMPOL 2015 are very good.
- To maintain the quality of papers, the technical panel of SYMPOL 2015 resolved to strictly adhere to the two level review process for the forthcoming SYMPOL 2017 too.
- The panelists strongly felt that the Symposium, i.e., International Symposium on Ocean Electronics does not encourage the technologists in the diverse field of Ocean Engineering to participate. It is hence necessary to make the symposium more wider including all areas of ocean technology. With this background, it is resolved that, retaining the logo of SYMPOL, the symposium will hither to be **International Symposium on Ocean Technology**.
- The technical panel of SYMPOL 2015 further resolved to place on record its gratitude and acknowledgements to the IEEE-Oceanic Engineering Society and Acoustical Society of America for extending their support and co-operation by way of rendering the technical co-sponsorship for SYMPOL 2015. The panel also resolved to place on record its appreciation and gratitude to all the reviewers for rendering their intellectual services by promptly completing the technical review of the papers within the prescribed time limits.

## Valedictory Function

A Valedictory function was organized at 1.00 p.m. on 20<sup>th</sup> November 2015. Dr. P. R. S. Pillai in his welcome note brought to the notice of the delegates and other guests of SYMPOL 2015 the resolution passed by the Technical Panel in its meeting held on 19<sup>th</sup> November 2015. Dr. M. A. Atmanand presented the rationale in moving the resolution to widen the scope of SYMPOL by including other identified areas of Ocean Technology. He suggested that such a decision of the Technical Panel will certainly attract more submissions in Ocean Technology related



Bharatanatyam



Thiruvathirakali





*Kerala Natanam*



*Mohiniyattam*



*Kathak*



*Traditional Kerala Folk Song*

areas for future SYMPOLs. Dr. Supriya M. H. in her thanks giving address solicited the delegates and invited guests to give a wider publicity for the decisions of the Technical Panel to widen the scope of the forthcoming SYMPOLs by including other identified areas of Ocean Technology.

### Socio-Cultural Evening

A traditional cultural art forms such as Thiruvathirakali, Bharatanatyam, Mohiniyattam, Kerala Natanam, Kathak, Traditional Kerala Folk Song, etc. were performed during the socio-cultural evening of SYMPOL 2015 at 6.00 pm on 18th November 2015.

**Thiruvathirakali** (also known as Kaikottikkali), a very popular dance form of Kerala, presented by women folk to attain everlasting marital bliss. **Bharatanatyam**, a classical dance form of South India, originated in Thanjavoor in the state of Tamil Nadu during 500 BC. **Mohiniyattam**, a traditional South Indian dance form of Kerala, which has elements from the two South Indian dance forms, viz., Bharatanatyam and Kathakali. **Kerala Natanam** (Kerala Dance) is a new style of dance that is now recognised as a distinct art form evolved from Kathakali, a form of Indian dance-drama. **Kathak** is one of the eight forms of Indian classical dance. This dance form traces its origins to the nomadic bards of ancient northern India, known as Kathakars or storytellers.

### Sponsorship

SYMPOL 2015 had the technical/financial co-sponsorship from the following Government Agencies/ Departments and Professional Bodies.

- IEEE Oceanic Engineering Society, USA
- Acoustical Society of America, USA
- Naval Research Board, Defense Research & Development Organization, New Delhi
- Science and Engineering Research Board, New Delhi
- Council of Scientific and Industrial Research, New Delhi
- University Grants Commission, New Delhi
- Kerala State Council for Science, Technology and Environment, Government of Kerala.

### Announcement of SYMPOL 2017

The Symposium on Ocean Technology (SYMPOL 2017) is scheduled to be held at Cochin during 6–8 December 2017 with the technical co-sponsorship of the IEEE-Oceanic Engineering Society (IEEE-OES) and Acoustical Society of America.

### Conclusions

This Report addresses the background and rationale in organizing the Symposium on Ocean Electronics as a biennial event along with the salient highlights of the technical program of SYMPOL 2015.

## Behind the Scenes at OCEANS – Part 2

### Liz Corbin – MTS Past President and chair of OCEANS '15 Publicity

*This is Part 2 of an article written by Liz Corbin for the MTS Currents newsletter. It provides an in-depth look at the history, planning and operation of an OCEANS conference. Thanks to Liz and MTS for allowing us to reprint the article. Part 1 was in the December issue of the Beacon. Enjoy.*

#### Organization: Who Does What

It takes a lot of commitment in time and effort to put on a successful OCEANS. The group that submits the proposal forms the nucleus of the all-volunteer Local Organizing Committee (LOC) made up of members of both societies, usually from the region of the conference, but sometimes drawing on member expertise from elsewhere, and occasionally from non-members. Not every LOC has exactly the same composition, but there are some positions that are common to all:

- General Chair (or Co-chairs) has the overall responsibility to insure that the event is on track for success and all LOC members are carrying out their functions;
- Technical Program Chair duties include overseeing the solicitation, review, acceptance and scheduling of the papers that will be presented during the conference and included in the Proceedings, as well as coordinating the efforts of the Tutorial Chair and Student Poster Competition and other student activities;
- Exhibits Chair coordinates recruiting exhibitors and the operations of the exhibit hall;
- Finance Chair supervises the preparation and tracking of the budget, processing of revenue and expenses, and maintaining records for the audit;
- Promotion Chair handles news releases, advertising and preparation of promotional material;
- Local Arrangements Chair coordinates with the hotel and conference center, oversees onsite arrangements, registration, and special events;

- Other functions that sometimes stand alone or are incorporated into other committees include: Patrons, Outreach, Education, Social Media and others specific to the LOC.

All LOCs are supported in two major ways. The first is through the IEEE/OES and MTS liaisons who are appointed by the two Societies to ensure the conference is proceeding in accordance with the established guidelines in the Conference Manual. They also serve as the points of contact between the LOC, JOAB, and the Societies to answer questions, resolve any areas of concern, and provide JOAB resources to the LOC.

The second way the LOCs are provided support is through the services of a Professional Conference Organizer (PCO). For the North America conferences, there is a fixed set of services to provide consistency from conference to conference, and a menu of optional services that can be selected by the LOC depending on their particular needs. Working with the PCO provides a level of professional management that insures a reliable quality for all OCEANS events and takes some of the responsibility for executing the details from the LOC volunteers.

One way in which the support of the PCO promotes consistency between the North America conferences is evident with the Exhibition. The PCO's exhibits manager develops relationships with repeat exhibitors that greatly enhance the effectiveness of the efforts of the LOC Exhibits Chair. The exhibits manager also facilitates the barter agreements with the conference media partners, expanding our ability to promote the event.

#### Operations: Working the Plan

Now that the location has been selected and the LOC formed, what happens next? Fortunately, the Conference Manual includes a fairly detailed planning schedule for each of the major functions, with the earliest starting about 24 months before the event.



*The Falmat team, one of our most loyal exhibitors, enjoys their opportunity to promote their products at OCEANS '13 San Diego.*



*The OCEANS '17 Anchorage logo is an eye-catcher.*





*Special technical programs such as "OCEANS '25 (and beyond)—Envisioning the Future of Marine Technology and Ocean Engineering," moderated by NOAA Chief Scientist Dr. Rick Spinrad at OCEANS '15 DC, often result in standing room only.*

That's also when the LOC starts filling any vacancies and holding planning meetings and/or conference calls, usually beginning on a quarterly schedule. As the conference date nears, the pace intensifies, meetings are held more frequently and the emails start to fly, with a lot of work being done between meetings.

One of the earliest tasks is the development of the conference theme and logo which will constitute the conference brand. These are used repeatedly to build awareness and help promote participation and attendance.

A strong technical program is the foundation of an OCEANS conference because it fulfills a purpose of both MTS and IEEE/OES to share technical information and advance technology and engineering related to the ocean. Therefore, one of the most crucial functions of the conference is the development of the technical program. The first task is identifying a number of Local Interest Topics which supplement the Core Topics common to all OCEANS conferences. It allows for a mix of interests that are both regionally important yet also includes broad national/international issues. Said MTS President Ray Toll, "The OCEANS partnership between MTS and IEEE/OES is a very productive way for both Societies to meet one of our common core missions; furthering the advancement and understanding of marine technology. We couldn't do this without the commitment of our members who volunteer to serve on the LOC and undertake the big job of putting on the conferences." Ray



*And shine the LOC did at OCEANS '15 DC. What a team!*

also served as General Chair of OCEANS '12 MTS/IEEE Hampton Roads.

Putting together the technical program also is one of the most time-sensitive conference jobs. There must be an adequate window between the Call for Abstracts and the closing date, as well as ample time for carrying out the peer review in time to notify accepted authors so that they can prepare and submit the final paper. All of this must be done with enough time left before the conference for the schedule to be finalized and published and the proceedings prepared. The Technical Program Chair draws on the expertise of the MTS Professional Committees and the IEEE/OES Technology Committees to help in this effort.

Each of the LOC chairs works on their particular tasks, with the support of the rest of the LOC, the PCO and the two Societies. As the conference date nears, communication becomes key to success as all the pieces start to fall into place. There are always last minute glitches and unforeseen challenges: that's when the team that has come together over the preceding two years has the opportunity to shine.

## Changes: Incorporating Tradition with Innovation

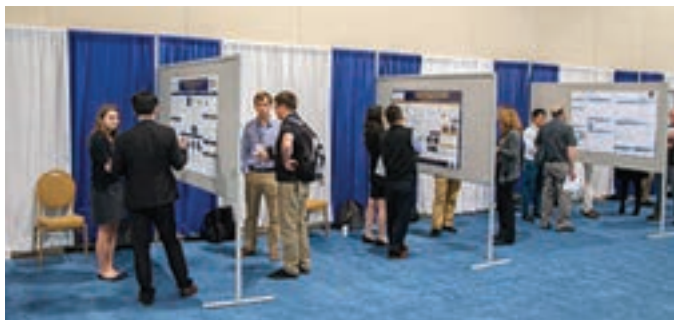
In many ways, OCEANS conferences haven't changed much during the 25 years of my experience. There have been tweaks to the schedule and variations in approaches, but it's basically the same combination of technical presentations, exhibits, student activities and social events.

A major innovation in the process of putting on OCEANS was the introduction of web-based tools in 2005. The first module to be developed was for the Technical Program. Before that innovation, the task of receiving and sorting through 400–600 abstracts, sending them out for review, notifying authors, and providing the blue-line templates for final papers was incredibly labor intensive. I can still remember the giant chart, easily 6 × 8 feet, covered in sticky notes, that was used in 2001 to assign the papers and schedule the technical sessions.

Since the beginning of the Web Tools project, additional modules have been added, including the Delegate Registration Module which is integrated with the Technical Program Module, the Content Management System and the Exhibitor Registration Module. Each OCEANS sees further extension of the features, capabilities, and integration of the modules. "Importantly, the modules follow the policies of the Societies and allow for easy and full-featured administrative control, easing the burden on the LOC and the Societies," noted Todd Morrison, OCEANS Webmaster from 2003–2015.

The big advancement in the presentations was replacing slide shows and overheads with PowerPoint. There's nothing like the ability to create stunning graphics at no cost, not to mention being able to make last minute changes. We just have to convince scientists and engineers that fewer words would make it so much easier to read.

Shifting from printed proceedings to providing them on CD was another innovation that



*Student poster competitors proudly present their research at OCEANS '15 DC*



*OES Administrative Committee Meeting at OCEANS '15 DC*

was not only kind to the planet, it also made the process of guessing how many would be needed much less significant. For the 2001 OCEANS in Hawaii, we were transitioning and sadly ended up with a lot of three-volume print editions left over at the end.

There has been less change on the exhibit floor. We still use pipe and drape to create the booths. The signage is more sophisticated and may include electronic spaces. We've seen the progression from pay phones to cells; clunky monitors to big flat screens; and the Internet Café to WiFi. The latest innovation is universally available lead retrieval using QR codes printed on attendee badges. The amount of information was expanded even more at OCEANS '15 in Washington, DC.

In the past decade, MTS has stepped up its efforts to support member companies who are exhibiting at OCEANS. These have included arranging for special marketing presentations, member signs for the booths, and more. "In addition, we have held special seminars on member company key issues, including one on conducting international business with the U.S. Commercial Service. We even incorporated games on the floor with prizes donated by member exhibitors, to encourage attendees to visit as many of them as possible," explained Rich Lawson, MTS Executive Director.

A very significant evolution has been the increasing emphasis placed on student activities. IEEE/OES and MTS place great importance on supporting the next generation of professionals. For many years, OCEANS has held a Student Poster Contest, with support from the Office of Naval Research. Students from around the world compete to be invited to attend the conference and present their posters.

In recent years, activities for the students have been expanded to include inviting them to co-chair technical sessions, a student mixer, and the MTS Student Leadership Meeting which brings leaders of MTS Student Sections to OCEANS to gain leadership skills and benefit from meeting with industry leaders.

## Challenges: Passing the Test

Every OCEANS has its share of challenges and opportunities that bring out the best in the LOC and its support team. Over the years, I've heard stories ranging from registration disasters

to the sudden disengagement of the Technical Program Chair. Whatever happens, people rally together to find a solution and make it work.

The biggest challenge in my personal experience was when the tragedy of September 11, 2001 occurred less than two months before OCEANS was to be held in Honolulu. After we got over the first shock, the LOC and the leaders of the two Societies discussed how to proceed. We all agreed that letting the terrorists dictate our actions was not an option and we would move forward.

There was certainly some risk. Most of the attendees would be flying in and no one knew when restrictions on air travel would be lifted, or if the many attendees from the military and federal agencies would be allowed to travel. We were fortunate. Shortly before the conference started on November 5th the travel restrictions were lifted and almost everyone who had planned to attend was able to come, many bringing their families. OCEANS 2001 was the first international conference to be held in Honolulu after 9/11.

## Final Thoughts

Now, the next time you're at an OCEANS, and you see someone wearing a shirt that says "Ask Me, I'm on the LOC," you'll know what that means. And you'll understand why they look both exhausted and content, satisfied that once again, the rabbit has been pulled out of the hat and another successful OCEANS is in the bag, to mix a few metaphors. Let's meet up at OCEANS '16 MTS/IEEE Monterey!



*Our thanks again to Liz Corbin and MTS for letting us use her excellent article in the Beacon. As explained in the article, there would be no OCEANS conferences without a lot of work by many people. As shown in the following photo, it takes a large team—or family—to run the society that supports our excellent conference series. So, think about getting involved. Join an LOC or volunteer to support the society officers. Or...run for office and join the OES family. It's worth the effort, both personally and professionally.*



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# The Shell Ocean Discovery XPRIZE

**Jyotika I. Virmani, Ph.D.**

On 14th December 2015, XPRIZE, the world leader in incentivized technology-focused prize competitions, announced a new global competition of great relevance to the Ocean Engineering community. The \$7 million Shell Ocean Discovery XPRIZE, a three-year competition, challenges teams to develop advanced underwater robots that will map the deep sea floor at a high-resolution and return high-definition digital imagery of archeological, biological or geological ocean features. Part of this prize includes a \$1 million National Oceanic and Atmospheric Administration (NOAA) Bonus prize to develop pioneering technology that can detect a biological or chemical signal in the water and track that signal back to its source.

Although more than two-thirds of our planet is covered by water, we have only explored 5% of the ocean environment. We don't know the planet that we live on. In fact, there are higher-resolution maps of the surface of Mars than there are of our sea floor. This Ocean Discovery XPRIZE seeks to change that, and usher in a new era of ocean exploration.

The physically challenging environment of salt water and high pressures prohibits today's mapping technologies from exploring the ocean at unprecedented scales. Innovation is required to reach the depth, speed and resolution necessary to illuminate the mysteries of the deep and discover what has remained unknown since the dawn of time.

Regular Team Registration for the Shell Ocean Discovery XPRIZE is open until the end of June, 2016. Innovators from over 45 countries have already expressed an interest in competing. Successful teams for this new XPRIZE will be truly interdisciplinary, and we encourage participation from any background.



Short video overview on the Discovery XPRIZE: <https://www.youtube.com/watch?v=Vhx7NCSEpe4>

So, whether your interest is AI, AUVs, or data visualization, or whether your passion is for software, robotics or nanotechnology, join us on this adventure to discover the deep. For more information and to sign up as a team or to learn more, please visit [ocean-discovery.xprize.org](http://ocean-discovery.xprize.org).

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## Newly Appointed Administrative Committee Members

*The following two members have been appointed to fill these vacancies in the OES Administrative Committee:*

- **Venugopalan Pallayil** (from 2014–2016)
- **Steve Holt** (from 2015–2017)

This article provides their background and describes their technical expertise and exceptional dedication to our society.

**Venugopalan Pallayil**, or Venu as he is popularly known among his friends, has a post graduate degree in physics (1981) and a PhD in Microwave Electronics (1992) both from Cochin University of Science and Technology, India. He, however, ended up working in underwater acoustics, much lower in frequency, but the same wavelength as microwaves. He had been a recipient of many research fellowships from reputed Indian



scientific organisations such as Indian Space Research Organisation, Council of Scientific and Industrial Research and Department of Atomic Energy, during the period of his PhD work. In 1986 he was selected for a 1 year Electronics Fellowship Course by the Government of India through a national selection process and after the successful completion of the course was posted as a Scientist in Naval Physical and Oceanographic Laboratory (NPOL), Cochin, India. In NPOL he worked as an R&D Scientist contributing to the Indian Defence Research &

Development Organisation (DRDO) with major contributions in the field of air-borne ASW systems such as sonobuoys and helicopter sonars. In 1998, he left India to join his wife and kids who had already shifted to Singapore. He was lucky to meet up with Dr. John Potter, then head of the Acoustic Research Laboratory (ARL), National University of Singapore, who hired him as a Research Fellow. He is currently a Senior Research Fellow at ARL.

He has been responsible for the successful completion of many projects in ARL, namely Ambient Noise Imaging, Time Reversal Mirror Experiment and Digital Thin Line Towed Arrays. He was one of the leading members of the ambient noise imaging project namely ROMANIS, which won the prestigious Defence Technology Prize in 2004 for the best Group Project. Currently he is leading the research activities on the development of lightweight towed arrays, including fiber optic arrays, for underwater applications using AUV and USV platforms. He has several publications to his credit. He has ran many collaborative projects with internationally renowned institutions like SIO (USA), CMRE (Italy), Atlas Elektronik (Germany), DSO National laboratories and ST Engineering (Singapore) as well as DRDO (India). He was a participant of ASIAEx 2001 experiment.

Apart from research activities, he also supports the lab as a Deputy Head, helping out the head of the lab on many fronts such as HR and finance management. He has also served as the Manager for Operations for the Tropical Marine Science Institute until April 2014. In this capacity he helped out the Director of the Institute on the administrative matters such as facility management and finance.

Venu is a member of IEEE since 1997 and a Senior Member since 2002. He is also a member of the Acoustical Society of America and Society of Acoustics (Singapore). He is one of the founding members of IEEE Oceanographic Engineering Society, Singapore Chapter and has been serving the chapter in various capacities such as Chair, Vice-Chair and Treasurer. For the past two years he has been in the executive committee in an advisory role. He was the Chair for Finance for the IEEE OCEANS 2006 Conference and also served as Chair for Exhibits for the WESPAC 2015 conference held in Singapore in Dec 2015. He has been instrumental in starting the industrial workshop and the Singapore AUV Challenge, which are the two flagship activities for the local Chapter. He has served as the co-Chair and Chair for the Singapore AUV Challenge 2013 and 2014 respectively. He has also served on the technical committees of Sympol, UT15 and OTC-Asia 2014. He is currently on the IEEE OES sub-committee for the OTC-Asia 2016 and also serves on the technical committee for IEEE AUV 2016 Workshop. He supports the editorial team for BEACON Newsletter by providing articles from Singapore and has recently accepted to be on the IEEE OES Scholarship committee as a reviewer. He has successfully led the bid for OCEANS'20 for hosting the conference in Singapore and will be focusing much of his activities to see it through with great success. He is a reviewer for the Ocean Engineering, an online journal from Elsevier and regularly reviews OCEANS conference papers. He cooks South Indian dishes at home almost every day.

**Stephen M. Holt** received his B.S. in Mathematical Physics from Wilmington College (Wilmington, Ohio), and his

B.S. in Electronic Engineering from Franklin University (Columbus, Ohio). He also completed his M.S. in Engineering (with emphasis in Ocean Engineering and Underwater Acoustics). He also completed Graduate Certificates in Engineering Management (from The Catholic University of America in Washington, DC), and Program Management and Advanced Federal Contracting, both from The George Mason University (Fairfax, Virginia).

Steve is currently employed with SGT, Inc. of Greenbelt, Maryland, USA as a Senior Systems Engineer working with National Aeronautics and Space Administration (NASA) supporting development of the future James Webb Space Telescope. He has also supported NASA with programs as diverse as the Solar Dynamics Observatory (SDO), the Lunar Reconnaissance Observatory (LRO), and the Laser Interferometer Space Antenna (LISA). He earlier supported the National Oceanic and Atmospheric Administration (NOAA) with several meteorological and oceanic programs. These included programs also as diverse as meteorological radar and satellite systems, sonar systems, and tsunami warning systems.

He joined the IEEE Oceanic Engineering Society (OES) and was first elected to its Administrative Committee in 2000. He was later elected to the grade of Senior Member of the IEEE in 2001. He was also one of three Executive Co-Chairs for the Oceans 2005 Conference in Washington, DC in September 2005. Recently, he was the Secretary for the recent MTS/IEEE Oceans 2015 Conference in Washington, DC. Steve was the elected member to the OES Executive Committee as its Secretary for ten years, from the beginning of 2001 to the end of 2010. In 2007, he was awarded the IEEE OES Distinguished Service Award (DSA).

Steve presently serves as the IEEE OES Webmaster, where he maintains the integrity of and implements new technology initiatives related to the web site. He also serves as the Co-Chair for the Global Earth Observing System of Systems (GEOSS) Technology Committee. Additionally, he has been appointed as the OES representative to the IEEE Systems Council. He also is the Chair for the Standing Committee on Promotions. His personal interests include listening to classical music, plus performing amateur astronomy and paleontology. His technical interests include image, radar, and sonar signal processing, astronomical optics, as well as remote sensing of the atmosphere and oceanic environments.





# The Sea, Oceanology 2016 and England

**Kevin Hardy, Associate Editor-in-Chief**

London is a city on an island that has forever been tied to the sea. When visiting **London** for Oceanology International 2016, take time to visit the IEEE OES exhibit stand, A435, and then continue on to see the maritime monuments in and near this great capital city.

The invading Romans in their galleys, established Londinium in 43 AD. London was part of the Roman Empire for over 350 years. Remains of a Roman galley were unearthed near Westminster Bridge during the construction of County Hall, London in 1910. The National Geographic February 2016 cover story, “Under London: Uncovering the City’s Buried Past”, tells how modern construction is also revealing an ancient past.

It’s a short ride on the DLR to the Greenwich stop to visit the **Royal Observatory Greenwich (ROG)**. Now a museum, the Royal Observatory was commissioned in 1675 by King Charles II.

In 1714, Parliament passed the “Longitude Act”, an open challenge with a monetary award to the inventor of a simple, practical and precise method to determine a ship’s longitude at sea.

It was fiercely competed. A London watchmaker, John Harrison, won the award. All five of John Harrison’s marine chronometers are on display at the Royal Observatory, and it is possible to see Harrison’s mind at work as he tackles the problem through successive iterations. The prime meridian runs through the campus, and visitors can stand with one foot in both the eastern and western hemispheres. It is the home of *Greenwich Mean Time (GMT)*.

British explorer Captain James Cook used the K1 Chronometer, an exact copy of Harrison’s H4 built by Larcum Kendall, on his second and third voyages. Cook praised the performance of the marine chronometer. His subsequent charts of the southern Pacific Ocean made with its use were remarkably accurate even by modern standards. (<http://www.rmg.co.uk/royal-observatory>)

Just down the hill from the Royal Observatory is the **National Maritime Museum**, the world’s largest, which encourages visitors to “explore gripping stories of exploration and endeavor



*Romans built the London Wall, circa 200AD. Six surviving segments still stand, including this one near the Tower of London.*



*The Royal Observatory Greenwich. (Photograph: The Royal Navy Museum/PA)*



*John Harrison's H5 Chronometer (Photo: Worshipful Company of Clockmakers)*



*National Maritime Museum. (Photograph: The Royal Navy Museum/PA)*



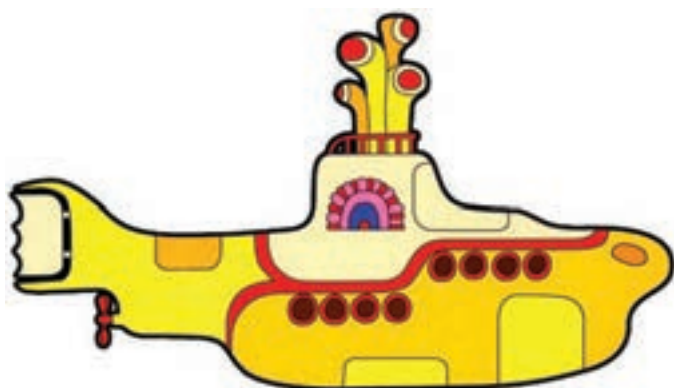
*The Royal Barge, 1751. (Photograph: The Royal Navy Museum/PA)*



*Adm. Lord Horatio Nelson (Photograph: The Royal Navy Museum/PA)*



*The Cutty Sark was among the last of the merchant sail ships.*



*HMS Victory in the center of the Portsmouth Historic Dockyard, where visitors can see the Royal Navy of the past, present and future.*

that shaped the world we live in today.” Its displays and exhibits are breathtaking, including the magnificent state barge of Prince Frederick, the son of King George II. After the prince’s death in 1751, it was used as the principle royal barge. <http://www.rmg.co.uk/national-maritime-museum>

Nearby the National Maritime Museum, the speedy British clipper ship, **Cutty Sark**, built in 1869 for the India tea trade, is open for tours. She was one of the last tea clippers to be built and one of the fastest, coming at the end of a long period of design development, prior to sailing ships being replaced by steam propulsion. She is one of only two remaining clipper ships from the nineteenth century.

Visit **St. Paul’s Cathedral** and stand next to the sarcophagus of British national hero **Adm. Lord Horatio Nelson**, who signaled “England expects every man will do his duty,” as his fleet sailed into the Battle of Trafalgar in October 1805.

Today, Nelson’s command ship, the *HMS Victory*, lies in the heart of the **Portsmouth Historic Dockyard**. The National Rail line will get you there from London.

Inside the Portsmouth Historic Dockyard, the **National Museum of the Royal Navy Portsmouth** showcases treasures from the past 350 years, examining the common bonds that link the sailors of England’s ‘Wooden Walls’ to the proud crews of today.

It’ll take a whole day, but the Dockyard holds great legends including Henry VIII’s *Mary Rose* (1510), the HMS Warrior (1860), the Royal Navy Submarine Museum featuring the WWII submarine HMS Alliance (1945), the Royal Marines Museum, and numerous interactive educational displays. <http://www.historicdockyard.co.uk/>.

Take a **boat tour** along the River Thames, and step back in time through the docklands and their riverboats, the WWII light cruiser HMS Belfast <http://www.iwm.org.uk/visits/hms-belfast>, Westminster Abbey, London Bridge, and many other sights. There is also a famous British Yellow Submarine.

Hop the tube to St. John’s Wood and walk a few blocks to Abbey Road Studios. The neighbors are quite used to their busy crosswalk. An easy stroll south on Park Road brings you to the London Beatles Store. Always fun ☺



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## Member Highlights

**Contact The Editors If You Have Items of Interest for The Society**

### **Ralf Bachmayer—Sabbatical Year in Bremen, Germany**

On December 1994, I left my hometown on the beautiful Neckar River between Stuttgart and Heidelberg, in Germany for Woods Hole, Massachusetts. I joined the Deep Submergence Lab at the Woods Hole Oceanographic Institution for a 6 month project as part of my engineering studies at the Technical University of Karlsruhe. Unexpectedly, the 6 months turned into now more than 20 years away. My path led from Woods Hole to Johns Hopkins University in Baltimore to Princeton University, New Jersey. Then another leap in 2003 to St. John's, Newfoundland, where I first joined the National Research Council Canada and in 2008, I joined Memorial University of Newfoundland (MUN). After 6 years at MUN it was time for my first sabbatical.

Together with my wife Karina and my 5 year-old twin boys, Marco and Sebastian, we moved to Bremen, Germany from August 2014 to July 2015. We followed an invitation by Dr. Christoph Waldmann to participate in the design of a new blended wing type underwater glider. This project is part of the research program on Robotic Exploration of Extreme Environments (ROBEX) funded through the Helmholtz Association. I was hosted at MARUM, the Center for Marine Environmental Sciences at the University of Bremen.

This sabbatical did not only represent a professional opportunity, but it also gave my family the possibility to learn more about my roots, connect with my German family, learn the language and immerse themselves into the German culture.

Back at MARUM I enjoyed meeting and working with students, engineers and researchers. The institute has a 5000 m Explorer type AUV, a 2000 m and a 4000 m capable ROV, two seafloor drilling rigs (MeBo70 and MeBo200) and a SV3 Waveglider available. Furthermore, besides the underwater glider, there is a flatfish type hybrid ROV and a seafloor crawler (CMOVE) under development. In addition, my projects and students at home in Newfoundland at the Autonomous Ocean Systems Lab (AOSL) continued. Our largest development, a one-ton semisubmersible type USV called SeaDragon, was



*Figure Ralf and his wife Karina at the Christmas market in Bremen.*

undergoing tank tests at the MUN Marine Institute's flume tank and the planning for the 2015 field season was well underway.

Slowly our time in Bremen was coming to an end. We all thoroughly enjoyed our stay in Bremen. The personal and professional interactions with colleagues and new and old friends, the institute, the city and the whole region around Bremen made it a valuable and worthwhile experience for my family and me.

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## Who's Who in the OES

### **Kevin Hardy, VPPA Committee and Associate EIC of the Beacon**

Kevin recalls being drawn in to marine engineering by witnessing the great ocean events of the 1950's and '60's including the deep diving bathyscaph Trieste, the SEALAB manned habitats, George Bass and the beginnings of marine archaeology, the Cousteau aqualung and films, Mike Nelson and Sea Hunt, the open horizons of the new science of oceanography, mixed with summers at a family beach house in Newport Beach, CA.

Kevin began his career at Scripps Institution with the North Pacific Experiment (NorPax) in June 1972. The U.S. was still landing men on the moon, and lunar rocks were being examined in the basement laboratories at the south end of Scripps campus. By the end of 1972, he had moved to the Institute of Geophysics and Planetary Physics (IGPP), where he spent the majority of his career. In 2002, he was invited to join the SIO Director's Office to manage the Scripps Centennial, a

celebration of that great institution's 100th birthday. He was Vice-Chair of Oceans2003 MTS/IEEE.

He spent many years as part of Bob Wernli's team planning conferences such as the ROV Conference, later known as the Underwater Intervention Conference.

After the Scripps Centennial he returned to ocean engineering, spent a couple of years on sabbatical to industry, returning to Scripps for another year, then retired as a Senior Development Engineer in June 2011. He continued as a volunteer for another few months to dive the Mariana Trench's Sirena Deep with benthic landers of his design in August 2011. In October 2011, he was personally recruited by James Cameron to join the **DEEPSEA CHALLENGE** Expedition to develop and dive the deepest ocean depths with benthic landers that would accompany Cameron's manned submersible.

In March 2013, Hardy was an invited speaker at the British Royal Academy of Engineering, the British Royal Society, and as a Keynote at the Oceanology conference. Hardy was lead author on the chapter "Underwater Cables and Connectors" in the second edition of the "The ROV Manual", published by Elsevier, London, England in 2014.

In a throwback to the earliest days of oceanography, in 2011 he presented a proposal to the International SeaKeepers Society to make megayachts available to academic ocean researchers. The idea was accepted, and the Discovery Yacht program was started shortly afterwards.

Kevin continues to develop benthic lander systems and goes to sea, motivated by the potential of enabling the next generation of



*Kevin in front of the Scripps Pier, La Jolla, CA.*

marine scientists and technologists. He enjoys writing for the OES Beacon, Ocean News & Technology, the Journal of Diving History, Sea Technology, the MTS Journal, and other marine publications.

In addition to the regular journals, Kevin enjoys MAKE magazine, Nuts & Volts, and Servo magazine. He likes to tinker, and relaxes baking banana bread for his wife's 8<sup>th</sup> grade Algebra students. He is married with two grown children, both married, and two grandchildren. He and his wife, Michelle, reside in San Diego, CA. His activities include hiking, biking, and an occasional picnic at the bay.

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## OES Trend Setters

The below advertisement comes from a recent New Yorker magazine. What? The fashion experts are just realizing that white sneakers are what the in-crowd is wearing? Well, three of our members have been way ahead of the fashion game as the second photo, taken at the OTC'15 Brazil conference, proves.



*Fashion aficionados—Jim Barbera, Bob Wernli and Jerry Carroll—are shown standing by the OTC Newsletter with their trend setting "booth boy" attire at the OTC'15 Brazil conference in Rio.*



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# Welcome New and Reinstated Members

## Australia

Kevin G Eastment  
Alan C Noble  
Mark Underwood  
Graham S Woods

## Brazil

Felipe Salles Alves  
Tatiana Vitorio Isidorio  
Robert N Soek

## Bulgaria

Iliia Hristov Iliev

## Canada

Jean-Francois Bousquet  
Cheng Li  
Masoud Mahdianpari  
Ashley John Morton  
Jacqueline A Nichols  
Siva Prasad  
Edward Ross  
Tetjana Ross  
Michael Shaw  
Fabian Vergara  
Scott Williams

## Chile

Paula Olea

## China

Zheng Chen  
Naigao Jin  
Di Lu  
Hua Peng  
Xingbin Tu  
Chengke Xiong  
Xinhai Zhang  
Jiangbin Zhao  
Weizhengrong Zhou  
Yilin Zou  
Zheguang Zou

## Colombia

Bibiana Carolina Torres

## France

Christian Audoly  
Jacques Marchal

## Hong Kong

Laurie Yiu Chung Lau  
Ross D Murch

## India

Latha G  
Pandu Ranga Prasad Modi  
Srikanth Sattenapalli

## Indonesia

Yuning Widiarti

## Japan

Kousi Haraguchi  
A Kaneko  
Shuhei Nishida  
Muneo Yoshie

## Korea (South)

Sungbin Im  
Byoung Nam Kim  
Seung-Sep Kim  
Keunhwa Lee

## Malaysia

Syed Saad Azhar Ali

## New Zealand

Donald G Peat

## Norway

Walter Caharija  
Alfred Hanssen  
Svein I Sagatun  
Connie Elise Solberg

## Portugal

Joao Pedro C Gomes

## Singapore

Michael Lochinvar S Abundo  
Cheng Siong Chin  
Bharath Kalyan

## Spain

Javier Fernandez  
David Fornas

## Trinidad And Tobago

Yaoting Tseng

## United Kingdom

Fabrizio Ferrucci  
Christopher C Holt  
Sain Gee K Man  
Angus Mcfadzean  
Trevor J Sutton  
Matias Alejandro Valdenegro  
Simon C Webster

## USA

Stacey Ann Bottorff  
Brendon J Bruns  
Douglas M Butler  
Stephen A Carr  
Jayne F Cerone  
David Chambers  
Alan Thomas Cooper  
Jonathan Crowell  
Brad A Darroch  
Kyle David Dewitte  
Charles Donnelly  
Stephen Estrin  
Jacob George  
Jose A Gutierrez  
Scott A Hamilton  
Ryan Hutchins  
Kelly J Benoit-Bird  
William Jobst  
Eric G Johnson  
David Paul Locarno Jr  
Ed R Henkel Jr  
Hovannes Kulhandjian  
Carel Lachlan Lewis  
Stephen Charles Lingsch  
Efrain Lopez  
Jose Rolando Serrano Lopez  
Kendra Lynn  
Douglas L Manchester  
Michael W Mccann  
Peter A Mckibbin  
Benjamin D Mcpheron  
Andy Meecham  
Martin Shawn Moran  
Keith Nelson  
Arthur E Newhall  
Jennifer Diem Ngo  
Lester Harry Oakes  
Claudio Olmi  
Cynthia A Palmer  
Karen A Panetta  
Pardip Singh Randhawa  
Brian R Rapids  
Cynthia L Recker  
Jason Rudzinsky  
Alexander R Sabo  
Andrew C Singer  
Kassandra Diane Smith  
Jun Tao  
Katherine Rose Todoroff  
James D Tucker  
Jennifer G Vining  
Charles M Wohl

# OES Student Scholarship Program Applications Open

**Liesl Hotaling, Chair, OES Scholarship Committee**

The IEEE Oceanic Engineering Society (OES) recognizes that the future of ocean engineering depends on the recruitment of talented, engaged young people. To encourage advanced education in ocean engineering, OES offers up to eight awards annually for \$5,000 each. Funding is for academic tuition and fees, and is not intended to fund research.

Selections are made twice each year. Applications are due 1 May for scholarship award in September of that year and 1 September for an award the following January.

Applicants must be an IEEE Oceanic Engineering Society student or regular member in good standing. There is no waiting period. If you are not yet an IEEE member, please visit the following website to join:

[http://www.ieee.org/membership\\_services/index.html](http://www.ieee.org/membership_services/index.html)

Applicants must be enrolled full-time at an accredited college or university in a field of study that will lead to a career in ocean engineering or a related ocean science field and must have demonstrated excellence in academics.

Undergraduate students must have completed (at least) the second year of study. Graduate students must be currently enrolled, or have been accepted, in a graduate program of ocean engineering or a related ocean science field and must have demonstrated the ability to perform independent research through professional and/or academic recognition programs.

Recipients of scholarships will be featured in the Beacon Newsletter or on the IEEE OES website. For more information about the program, or how to apply, please visit:

<http://ieeoes.org/page.cfm/cat/62/Student-Scholarship-Program/>

Recipients of the OES Scholarships awarded in January 2016 include:

**Xiao Liu**, Dalhousie University, majoring in Electrical Engineering, focusing on underwater acoustic communication.

**Filippo Sanfilippo**, Norwegian University of Science and Technology, majoring in Engineering Cybernetics, specializing in marine control systems and control algorithms for maritime cranes.

**Seyedhabib Mirhedayati Roudsari**, Dalhousie University, majoring in Electrical Engineering, focusing on underwater acoustic systems.

**Eric Ferguson**, University of Sydney, Australia, majoring in Electrical Engineering, with applications in the sensing and processing of acoustic signals in the underwater environment.

**Mohammadreza Babaee**, Technical University of Munich, majoring in Electrical Engineering, focusing on the development of interactive visual data mining algorithms with applications in underwater vision.

Please look for personal statements, detailing their studies and interests from the winners in future editions of the Beacon.

The review and management of the OES Scholarship Program requires the time and effort of volunteer members. With the deepest gratitude, the following volunteers served on the Scholarship Committee in 2014–2015:

Christophe Sintès, Chair  
Kenneth G. Foote  
Liesl Hotaling  
Marina Martini  
Sophie Scappini  
Andre Lesaut

In 2016–2017, the committee will include:

Liesl Hotaling, Chair  
Ruth Perry, Co-Chair  
Kenneth G. Foote  
Philippe Courmontagne  
Mal Heron  
Venugopalan Pallayil  
Ye Li  
Arjuna Balasuriya  
Hans-Peter Plag  
John Watson  
Hanumant Singh  
Paul Hines  
Hayato Kondo  
Brandy Armstrong  
Frederic Maussang

We look forward to receiving your scholarship applications by 1 May.





## OES Awards Student Scholarships

*OES awards eight scholarships a year to deserving students across the world. Profiled below are Rafael Leal, a first-year master's student of the Nordic Master in Maritime Engineering–Ship Design Track-, which is a dual degree program between Aalto University (Finland) and Chalmers University of Technology (Sweden), who received a scholarship award in May 2015; and Filippo Sanfilippo, a student of the Norwegian University of Science and Technology pursuing a degree in Engineering Cybernetics, who received a scholarship award in January 2016.*

### Personal Statement By Scholarship Recipient, Rafael Leal

It was 2012 and there I was, exactly in the same place where, one century before, one of the greatest marvels of Engineering had been built... Water dripping from the ceiling, peeling paint falling off the walls, broken floor creaking at every step. That bleak environment could not contrast more with my inner excitement: through the dust, I could vividly imagine the engineers working while the Titanic took shape in the Belfast shipyard, right outside the large windows... In that very specific moment, I realised the answer to my anxieties about my professional future.

### Personal Motivation

To better understand the long and winding road that led me here, we must come back even more years in time. By the moment I graduated in Engineering, in 2009, I had become interested in finance and economics. Presented to a robust trainee programme in a multinational company, one of the



Figure 1. Me next to the keel stand in the Thompson Dry Dock



Figure 2 Panoramic view of the Drawing Room. Both Figures were taken during my visit to the Harland & Wolff Shipyard, Belfast, where the Titanic was built.

largest consumer good manufactures in Brazil, I dove deep into this field. Fortunately, I had an extremely accelerated career there, receiving several corporate awards and becoming the youngest professional to reach the middle management level. I was rapidly climbing the executive ladder and recognition from top executives comfortably suggested a very promising future ahead. But, after 4 years as a Finance Manager, it was clear that I missed a much higher motivation in my work: the pride of contributing more significantly to society – Engineering was calling me back, more specifically, Maritime Engineering.

My fascination with ships comes from my childhood. When I was 10 years old, the classic black and white movie “A Night to Remember”, about the ill-fated Titanic, got my attention so intensively that, soon after watching it, I registered as a member of the Titanic Historical Society. From that moment on, I started an impressive collection of books, films and memorabilia not only on the Titanic, but also on several ocean liners of the past – a hobby that kept me linked with vessels, even though I have never worked in the area or studied naval architecture. Furthermore, my interest is not limited to old steamers: I love to sail on weekends and I have learned the basics to be an amateur skipper.

In the beginning of the 2010's, with the confirmation of the discovery of the huge Pre-Salt oil reservoirs in the Brazilian coast, my personal pastime started to find a match with the country's needs. Since these findings pushed ultra-deepwater platforms to hostile environments out of helicopters' range, it was imperative to develop tailored solutions to transport supplies, oil and people safely by sea, improving the productivity and reliability of our offshore production. Consequently, it dramatically increased the investments in the sector, after almost three decades of stagnation, and unleashed the demand for highly qualified naval architects and marine engineers.

This exciting combination of lifelong passion, technical challenges and opportunities to solve impacting society's

issues was crucial in my decision to come back to student life. I resigned from my previous job and enrolled in the Federal University of Rio de Janeiro's (UFRJ) Postgraduate Programme in Offshore Systems Engineering, for which I will defend my thesis in the next months. The better understanding of present and future technologies available, be it remotely operated platforms or innovative offloading systems, and the laboratory lessons in the university's model tanks, gave me even more certainty that I should follow a Master's Degree in the field.

After a lot of reflections and discussions with students and professors around the world, I accepted, among many others, the offer from the Nordic Master in Maritime Engineering, a Dual Degree from the Aalto University (Finland) and the Chalmers University of Technology (Sweden). This programme attracted me because it provides a strong Ship Design specialisation combined with a close collaboration with the renowned Scandinavian maritime industry, which is specialised not only in the offshore segment, but also in special vessels, such as icebreakers.

### Academic, Professional and Personal Backgrounds

Although I am aware of the risks of changing careers, my past accomplishments instil in me the self-confidence to be well prepared to succeed. Furthermore, I believe I am a qualified candidate for postgraduate studies because this decision is deeply embedded in my personal background.

I grew up in a family that fosters self-learning and deep reflections, values and principles that have guided me through all my life. Watching the example of my parents, I understood the importance of focus and tenacity, based on high quality and moral standards, to achieve my goals. My commitment to excellence, which is my most distinguishing characteristic, provided the numerous scholarships that allowed me to move forward in my studies and the results that made me stand out in my jobs.

Moreover, I have always been a knowledge seeker. During Elementary and High School, I studied some extracurricular subjects, such as classical culture, history of arts, philosophy and music—surely, an infinite source of creative insights. To refuel my energies and to fulfil my love of travel, I have also been to more than 35 countries, exposing myself to several cultures and places, as different as Auschwitz and Machu Picchu. These experiences have made me a more broad-minded and articulate person, as well as more flexible in the face of unexpected situations. They also improved my communication competence in 4 languages (Portuguese, English, French and Spanish), undoubtedly an important advantage in the globalised context.

About my academic performance, the national 2nd and the state 1<sup>st</sup> place in the 2003 National Examination of High School (ENEM), among 1.3 million students, ensured my 1st place in the admission process to two of the most renowned Brazilian Universities, guaranteeing a Full Tuition Scholarship to attend the Pontifícia Universidade Católica do Rio de Janeiro. At PUC-Rio, I pursued a Dual Bachelor's Degree in Mechanical and Production Engineering, with a top 0.5% GPA, for which I received 5 times the Annual Excellence Certificate. I also expanded my experience in an exchange semester at the

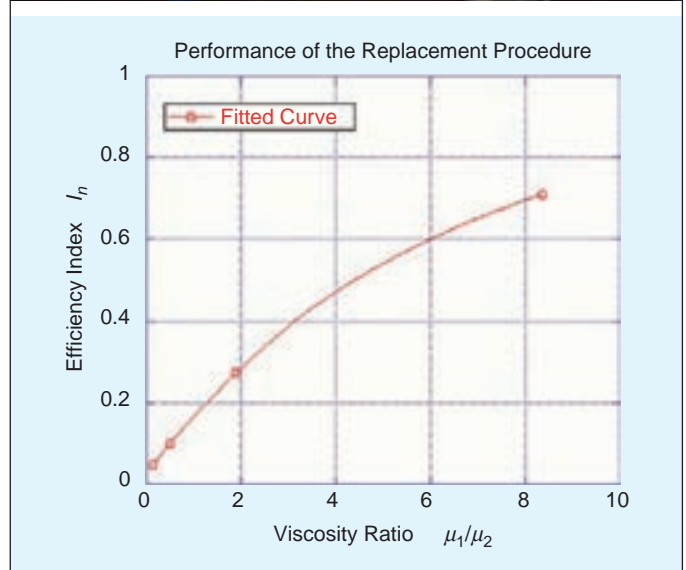
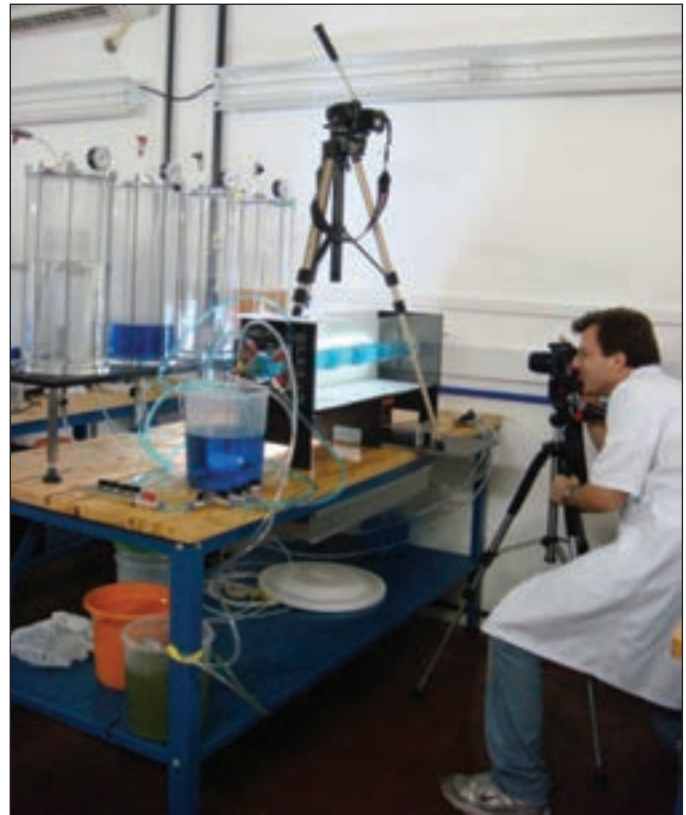


Figure 3 & 4 Undertaking an experiment at the PUC-Rio's Rheology Laboratory and some of the results published in my Bachelor's Thesis.

University of Liverpool, which honed my interpersonal skills and pointed the way abroad for my Master's education.

Even though I have also engaged as a teaching assistant of "Linear Algebra I", my most significant undergraduate extracurricular activity was as a research assistant in the Rheology Group, for almost 3 years funded by the National Council of Science and Technology (CNPq) and tutored by Prof. Paulo R. Souza Mendes, where I nurtured my interest in advanced fluid mechanics. Among other projects, I investigated innovative "PIG" device's configurations to maximise the cleaning of oil & gas pipelines,



## General call for scholarship applications

The IEEE Oceanic Engineering Society recognizes that the future of ocean engineering depends on the recruitment of talented, engaged young people. To encourage advanced education in ocean engineering, OES offers up to eight awards annually for \$5,000 each. Graduate and undergraduate students are encouraged to apply for these grants at any time. Selections are made twice each year, with deadlines of 1 May and 1 September. Information on the application process is available on the OES website: <http://ieeeco.org/page.cfm/cat/62/Student-Scholarship-Program/>

Applications for OES scholarships are reviewed. This requires the time of volunteer members. Thanks to the following who are presently on the OES Scholarship Committee: Liesl Hotaling, Chair; Ruth Perry, Kenneth G. Foote, Philippe Courmontagne, Mal Heron, Venugopalan Pallayil, Ye Li, Arjuna Balasuriya, Hans-Peter Plag, John Watson, Hanumant Singh, Paul Hines, Hayato Kondo, Brandy Armstrong, Frederic Maussang.

applying CFD software. Later on, I recovered and calibrated an old broken thermal conductivity meter, when I understood the difficulties involved in hands-on jobs and the value of shop floor personnel. After that, I conducted non-Newtonian fluids' characterisation that allowed the timely conclusion of a colleague's study, which led me to my first co-authored published paper, showing me how cooperation is essential in Academia.

But, I am particularly proud of my last initiative in this Group: my Mechanical Engineering Final Undergraduate Project "Newtonian Fluids Displacement in Non-Rectilinear Horizontal Oil Wells", a year-long investigation that I conducted with a partner on the influence of the viscosity ratio over the displacement interface between two fluids in the annulus of horizontal oil wells. Leading the methodology definition, the experimental set design and assembly coordination, the experiments conduction and, finally, the results public presentation, I gained a holistic view of the whole research cycle. Besides that, I improved my teamwork skills and tackled exacting situations, such as to develop a new plug-system to reduce turbulence and coordinate an emergency operation to fix a damaged apparatus. Despite all obstacles imposed by the complex geometry, we managed to pioneer a new experimental line of study in our Research Group. All the effort was eventually recognised when I was granted the 2009 PUC-Rio's Scientific Initiation Distinction Award.

Later, I also reached the 1st place at the 2008 National Examination of Student Performance (ENADE), among all Industrial Engineering senior undergraduates, for which I received a Ministry of Education Graduate Scholarship. Using this credential and driven by my zest for life-long learning, after starting working with finance, I engaged in a part-time Master of Finance at the prestigious Fundação Getúlio Vargas (FGV), where I was presented to advanced statistical concepts that, interestingly, can also be applied in ocean engineering subjects, such as material/structural reliability and stochastic theory of sea loads. Even not having previous foundations in economics, my thesis about the

econometrics of low liquidity stocks was published as an article at the most important finance meeting in Brazil.

Additionally, I am sure that my past managerial experience will be an advantage to my new engineering job. Since maritime industries must thrive under very difficult conditions, such as capital-intensive investments, customer-tailored job production and long operating/cash conversion cycles, highly dependent on the volatile oil prices, it is important that their engineers have both cutting-edge technical abilities and business competences.

Finally, my participation as a speaker in several scientific seminars on Engineering and Finance, as well as a volunteer in an educational entrepreneurship program with High School students, demonstrate my great enthusiasm regarding knowledge dissemination and social cooperation. Hence, I seek to promote, together with my classmates and professors, new ideas for the next generation of maritime industry leaders.

## Future Plans and Goals

During my Master's, I want to specialise in Marine Hydrodynamics and investigate advanced active-control systems to reduce the response of ships and ocean structures to extreme wave-induced loads and motions. Therefore, I particularly look forward to collaborate with Prof. Matusiak in Aalto and Prof. Hogström in Chalmers. Their computational and experimental research on the non-linear dynamics of intact and damaged ships in waves, flooding and sloshing, is of vital importance in the new generation of performance-based stability criteria, a sensitive issue in oceanic oil exploration. Additionally, as there is a pressure to increase the environmental sustainability of marine transportation, I am also intrigued by the studies of Prof. Bensow and Prof. Larsson, at the Chalmers' Rolls-Royce UTC in Computational Hydrodynamics. Their distinctive investigations on improved propulsion concepts and drag reduction technologies, such as the Energy Efficient Air Cavity Ships, perfectly match my interest to develop sustainable high-speed OSVs that can operate efficiently under harsh sea conditions.

Upon completion of studies, I envision myself as a project manager in a large shipyard or as a naval architect in a major design office. The practical experience gained in the Ship Design Project course, the access to the world-class VTT (Finland) and SSPA (Sweden) Towing Tanks, as well as the opportunity to do my Master's thesis in-company are going to be essential assets to meet the technical acumen this industry demands and to compensate my lack of professional experience in this area.

My ultimate goal is to accumulate sufficient field know-how and become a reference of expertise and reputation, in order to set up, within 10 years, my own ship design & consulting firm in Brazil, focused in computational hydrodynamic optimisations and motion-control systems. As I hope to contribute to the revitalisation of the Brazilian shipbuilding industry, I plan to establish my company in Rio de Janeiro, where the main naval and petroleum industries' R&D facilities are located. In this way, I am sure that the relationships established with the Master's alumni, professors and partners will be an endless source of knowledge transfer and business opportunities, especially considering the local content policy. I would also like to

participate in scientific education and dissemination, lecturing to undergraduates in a part-time job or volunteering in educational programmes for underserved students in the region.

Although I have prepared myself during the last year to self-fund this Master's, the recent deterioration of the Brazilian economy depreciated the national currency, making my savings lose value in dollars. For this reason, I kindly thank the Oceanic Engineering Society for this Scholarship, which will allow me to achieve professional and personal realisation, while collaborating to solve some of the complex technological challenges faced in this field.

Based on my solid academic and research backgrounds, large personal experience and broad business vision, combined with my self-motivation, I am determinate to contribute to the excellence of my Master's Programme and ultimately to the advancement of the engineering practice. I hope, in this way, to honour the trust placed on me and give back to the society the support received from the IEEE OES.

### Personal Statement By Scholarship Recipient, Filippo Sanfilippo



**Filippo** is currently a student at the Norwegian University of Science and Technology pursuing a degree in Engineering Cybernetics. His current research focuses on the following topics: alternative control algorithms for maritime cranes or robotic arms, haptics and wearable technology for offshore operations, and control methods for modular grasping robots. He has presented

his research at the MTS/IEEE OCEANS '15 Conference in Genova and the 2015 IEEE Canadian Conference on Electrical and Computer Engineering in Halifax. In his personal statement, Filippo expresses that he has always been fascinated by robotics, particularly in the field of ocean engineering. We asked Filippo

in his application to elaborate on his fascination and specifics of his research that is supported by the Research Council of Norway.

"During my studies and research activities, I focused on developing control methods for maritime cranes and robotic arms. Robotic arms and maritime cranes show similarities in the way they operate and in the way they are designed. However, maritime cranes are usually controlled by a human operator joint-by-joint using simple joysticks where each axis operates only one specific actuator, while robotic arms are commonly controlled by a central controller that controls and coordinates the actuators according to a specific algorithm. In addition, maritime cranes rely on a more complex model of the environment. Therefore, their control is always a challenging task, which involves many problems such as load sway, positioning accuracy, wave motion compensation, and collision avoidance.

In my research, I have developed a flexible and general control system architecture that allows for modelling, simulation, and control of different models of maritime cranes, and more generally, robotic arms. The proposed architecture allows for using the same universal input device regardless of their differences in size, kinematic structure, degrees of freedom, body morphology, constraints, and affordances. The developed system was successively integrated with the Crane Simulator, developed by the Offshore Simulator Centre AS (OSC). More recently, I have also started to investigate the problem of identification and isolation of dangerous zones in offshore installations. In particular, an *XBee* positioning system is being developed as a wearable integrated health-monitoring system with embedded haptic feedback that can be used to monitor the health state of offshore operators."

Filippo is very motivated to continue his research activities in the near future. His long-term goals include the integration and standardization of the developed framework and control methods for maritime cranes. Be sure to congratulate Filippo when you see him at the next IEEE Conference!





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Every fall, the Marine Technology Society and the Oceanic Engineering Society sponsor OCEANS, a prestigious conference/exhibition that draws an international audience of more than **2,000** attendees. The conference highlights **500** professionally reviewed technical papers, including sessions focused on local themes. Additionally, the conference features plenary sessions with leaders from industry, academia, the military and government and over **150** exhibitors showcasing the latest innovations in products and services.

Preparations are well underway for the first ever OCEANS Conference to be held in Monterey, California. The program will feature **Dr. Marcia McNutt** as the first female President of the National Academy of Sciences as a plenary speaker, a panel looking at the future of ocean science and technology moderated by NOAA Chief Scientist **Dr. Rick Spinrad**, and much more.

The conference will also include networking opportunities such as: Monterey Bay Aquarium Research Institute tours; ocean view golfing; kayaking with otters; and more. Space is limited so please check the website and be prepared to register for the conference in August. Information on VISA's, the program, and more can be also be found on the website.

We look forward to you joining us in Monterey!

**Important Dates:**

**Call for Abstracts Closes April 15th 2016**

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