

OES BEACON

Newsletter of the Oceanic Engineering Society



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Welcome to OCEANS'18 Kobe

OTO'18 *Ocean Planet It's our home*

OCEANS'18 MTS/IEEE Kobe /Techno-Ocean2018

May 28-31, 2018, Kobe Convention Center, Japan



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From the President

Did you know?

The Administrative Committee (AdCom) of the Oceanic Engineering Society (OES) comprises 18 members elected by the OES membership (Associate and higher membership grades numbering 1,539 as of January 31, 2018), and 10 members of the Executive Committee elected by AdCom. ExCom meets 3 times per year, usually in the turbulent wake of the IEEE-wide Technical Activities Board (TAB) meetings held in February, June, and November. AdCom meets twice a year, usually in conjunction with an OCEANS conference.

What have these 28 folks done for OES lately? In 2016, ExCom established a 10-year strategic plan that was approved by AdCom in September 2016. In 2017, ExCom and AdCom successfully overcame a 200k USD reduction in income to finish the year with a slightly positive cash flow. In addition, ExCom and AdCom modified the OES Bylaws to streamline the management of conferences, workshops, and symposia organized or co-organized by OES. As a result, since January



20, 2018, OES has a Vice President for OCEANS, who oversees all aspects of the twice-yearly OCEANS conferences co-organized with the Marine Technology Society, and a Vice President for Workshops and Symposia, who oversees all such events in which OES takes an active role. We have now reached the critical implementation phase, while still on the budgetary diet plan started in 2017—stay tuned!

What can you do to help run OES? Perhaps the easiest way to become involved (a few minutes of your time) is to vote in the yearly OES elections for 6 AdCom members who serve a 3-year term of office. OES needs a diverse representation of its membership on AdCom, so you may help also by nominating yourself, or a qualified and willing colleague, to run for AdCom. Nominations must be submitted to the Chair of the OES Nominations and Appointments Committee (r.garello@ieee.org) by March 1. A nomination includes a one-page biographical sketch and a

(continued on page 41)

From the OES BEACON Editors

Harumi Sugimatsu and Robert Wernli

Welcome to the March 2018 issue of the Beacon. And, once again, we'd like to thank all of the contributors to our quarterly newsletter. As you can see by the content, this is your newsletter, and we try to cover all aspects of the society activities from our workshops, symposia and conferences to what our individual members, chapters and committees are up to. And, don't forget, all issues of the Beacon are available on the OES website.

Our last issue, the biggest to date, covered the OCEANS '17 Anchorage conference, to include the Student Poster competition results, society awards and a large number of member, committee and chapter reports. And this issue will continue with our OCEANS events and will be available at the OCEANS '18 Kobe conference. Be sure to read the Welcome to Kobe article.

The chapter activity has certainly been picking up as reported by Malaysia, Singapore, India and Providence chapters in addition to the new UKRI chapter. Holding an Offshore Technology Conference, which OES co-sponsors, in Kuala Lumpur, Malaysia, every two years certainly helps keep things active in that area. This year's event is set for 20–23 March.

Besides our many ads that provide details on upcoming conferences and events, our new Vice President for Workshops and Symposia (VPW&S), Philippe Courmontagne, provides details on many events planned for this year. And for those of you who



Sandy Williams, former OES VP for Conference Development and your Beacon Co-EiC, and former OES VP for Professional Activities, toast their friends at their final ExCom meeting last November.

present technical papers, with a goal of being eventually published in the OES Journal of Oceanic Engineering, be sure to review the list of papers by your peers that are now available on line prior to publication in upcoming issues of the JOE. And, we continue our Who's Who in the OES with an article by John Watson, two-time chair of OCEANS Aberdeen (thanks John) and our newest chair of the Student Poster Competition.

Brandy Armstrong, our new Student Activities chair provides the latest update and invitation to participate to include getting involved in our OES social media efforts, an area where the society is working hard to expand and optimize. Stay in touch with Brandy to stay informed on our upcoming efforts to provide financial support to our student chapters to include travel for selected students to our OCEANS conferences.

There is a wealth of other information and articles in this issue that we hope you enjoy. And, as always, we'll close by inviting you to participate in your society. Submit articles and material for the Beacon. Or . . . volunteer for other society activities as a participant or an elected officer. It's your society and it is here to help you reach your professional goals. Enjoy.



EiC Harumi Sugimatsu and team on her latest AUV expedition to #5 Takuyo Seamount.

Member Benefits—Did You Know?

Member Discounts

IEEE members can take advantage of exclusive and discounted pricing on insurance and a variety of products and services (where available) that can add up to substantial savings. Discover what IEEE Member Discounts can offer you. Visit the IEEE website at:

https://www.ieee.org/membership_services/membership/discounts/index.html

OES Awards

Did you know all of the past winners of OES awards are listed on our website? As you'll see in this issue, we're looking for nominations for this year's awards. You can find past winners at the following link:

<http://ieeeco.es.org/page.cfm/cat/64/Honors-and-Honorees/>

And, get involved in OES and you may be a future award winner.

VPTA Report

Malcolm Heron, OES Vice President for Technical Activities



What is the biggest conference that you have been to? For me it was the Offshore Technology Conference in Houston last year—with over 64,000 attendees and 2,470 trade exhibitors. You need GPS navigation to get around the place. This year OTC Houston will be celebrating 50 years.

OTC has expanded into several other events around the world. There is a biennial OTC Asia. This

is 'little brother' to OTC Houston with only 30,000 attendees, and will be held on 20–23 March 2018. Also this year, the Arctic Technology Conference (which is an OTC spin-off) will be held in Houston on 5–7 November 2018. And OTC Brazil is scheduled for Rio de Janeiro in 2019.

While OCEANS is the premium conference for OES, the OTC series are a significant part of our technical activities and, as I write this, preparations are in place for an OES led Panel Session on AUV technology, and a Metocean Special Session at the OTC Asia conference in Kuala Lumpur in March.

If you are attending any of these OTC events, please be sure to check the box on the registration form to show that you are an OES member—there are rewards for this.



Jerry Carroll (Senior Past President) currently manages OTC matters for OES. Here he is in the Exhibition Booth talking to a prospective student member. Photo M. Heron.

From the Vice President for W&S

Philippe Courmontagne, Vice President for W&S



By the way of loans to support the startup of a conference/workshop/symposium, or grants to support student participation or to bring keynote speakers, IEEE OES is involved in several upcoming events as a co-sponsor. But a co-sponsoring is not only a question of financial

sponsorship, it is a question too of members participation. So we highly recommend or encourage you to participate in the following conferences/workshops/symposia as authors or attendees.

SAUVC 2018—9–12 March 2018, Singapore

Autonomous underwater robotics is an exciting challenge in engineering, which students get to experience at SAUVC. The com-

petition is a great learning ground for students to experience the challenges of AUV system engineering and develop skills in the related fields of mechanical, electrical and software engineering.

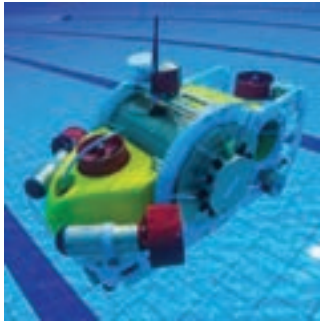
The competition also features workshops and lectures from world renowned experts in the field of marine robotics and autonomous underwater systems to inspire students with new ideas and techniques to solve challenges and build an interest in careers related to marine robotics.

This competition exists for 5 years now. For this edition, 30 teams coming from Bangladesh, China, Hong Kong, India, Indonesia, Malaysia, Pakistan, Portugal, Russia, Singapore, Sri Lanka, Thailand are competing together.

More than a competition, SAUVC 2018 will be the place to learn from prestigious speakers:

Tom Curtin (Senior Principal Research Scientist at the University of Washington): *Lessons Learned from Twenty Years of Student Autonomous Underwater Vehicle Competitions.*

Roland Bouffanais (Assistant Professor at the Singapore University of Technology and Design): *Swarming technology*



for pervasive monitoring of the marine environment.

Hayato Kondo (Associate Professor at the Tokyo University of Marine Science and Technology): *AUV development during the last decade.*

William J. Kirkwood (Senior Research and Development Engineer at the Monterey Bay Aquarium Research

Institute): *Competitions, Workshops, Conferences and Membership: How they can advance your Maritime Career?*

Baltic International Symposium— 12–15 June 2018, Klaipeda, Lithuania



The event will be hosted by Klaipeda University and Baltic Valley Association. This will be the fourth time the Symposium has been in Klaipeda and has always received great support from the Lithuanian government and the U.S. Embassy.

The program will include plenary talks by experienced lecturers, oral and poster presentations, round table discussions, and a field trip to the UNESCO Natural Heritage Site—Curonian Spit. Basic topics for the Symposium will be **Energy Security and Independence, Hazard Planning and Mitigation, Handling of the Extensive Ammunition and Ordinance** that have been disposed of in the Baltic Sea and **Ecosystems and Socio-Economic Impacts**.

Klaipeda has hosted the IEEE/OES Baltic Symposium in 2004, 2006, 2012 and now returns for the fourth time in 2018, when about 150 anticipated participants will come and join this event for the four intensive Symposium days.

For this **7th IEEE/OES Baltic Symposium “Clean and Safe Baltic Sea and Energy Security for the Baltic countries”**, the important dates are:

February 23, 2018: deadline for abstract submission;

April 25, 2018: deadline for registration and full research paper submission

June 4, 2018: final announcement (including programme)

International Symposium on Industrial Electronics—12–15 June 2018, Cairns, Australia



The conference will provide a forum for discussions and presentations of advancements in knowledge, new methods and technologies relevant to industrial electronics, along with their applications and future developments.

Several current and upcoming frontier technologies, innovative solutions, research results, as well as enterprises related to industrial electronics and their applications will be presented. Several well-known academic and industrial experts will deliver the plenary and keynote talks.

It is too late to submit an abstract or propose a special session, but not too late to register (Early bird registration: 15 March, 2018)

OSes 2018—4–6 July 2018, University of Nottingham Ningbo, China



OSes2018 expands its lead in the sustainable advancement of integrated coastal/offshore energy systems. In its 5th and largest iteration, OSes2018 Ningbo builds on the well-known and expanding OSes Event legacy established in Windsor, Edinburgh, Malta, and Cape Cod. Leading industrial, policy, and academic professionals will converge to challenge convention. Offshore Energy Generation and Storage Technology, Environmental Integration, Policy, and Expanding Global Markets will be a priority. Cleaner and smarter energy systems mean sustainable economic growth. Offshore Energy and Storage capitalizes on the tremendous resource opportunities associated with coastal regions. Over half the world lives near the coast. Its energy should too.

Since its inception in 2014, the OSes conference has become the leading annual forum for the revelation and examination of new thinking in the space of offshore energy systems. Join OSes2018 to help set the new ambition for offshore energy.

The deadline for abstract submission was 16 February 2018, but it is not too late to register!

Ucomms—28–30 August 2018, Lerici, Italy



The mission of the UComms conference series is to promote the development of a deep understanding of the propagation of communication signals underwater and the performance of higher layer protocols with the objective of supporting the intelligent choice of

network-wide standards, as a foundation for interoperability.

UComms'18 is the fourth conference of the series organised by the NATO Centre for Maritime Research and Experimentation (CMRE) and is open to scientists and engineers involved in research, development, implementation and use of underwater communication systems.

The conference topics cover the full range of interests from physical understanding of the communication channels (acoustic optical, radio) through to network protocols and experimentation.

The 2018 edition of the UComms conference will follow the model adopted for the 2016 edition that was itself an evolution from the previous two meetings held in 2012 and 2014. The conference series is focused on working towards a deep understanding of the propagation of communication signals underwater and

the performance of necessary higher-level protocols with the objective of supporting the intelligent choice of network-wide standards, as a foundation for interoperability.

If you want to participate in this event, do not miss the deadline for submissions: 23 March 2018.

Do not forget IEEE OES exists to serve you, but only your participation in events can allow the society to fulfill its mission!

From the EIC's Desk

Mandar Chitre, Journal Editor in Chief

IEEE Journal of Oceanic Engineering Early Access Papers

Congratulations to the authors of our most recently approved papers for the IEEE JOE. The following papers were published as Early Access papers on IEEE Xplore and will appear in regular issues soon. You'll find these papers now:

"Ocean Floor Observation and Bathymetry System (OFOBS): A new Towed Camera/Sonar System for Deep-Sea Habitat Surveys," by A. Purser, Y. Marcon, S. Dreutter, U. Hodge, B. Sablotny, L. Hehemann, J. Lemburg, B. Dorschel, H. Biebow, and A. Boetius

"Performance of Multibeam Echosounder Backscatter-Based Classification for Monitoring Sediment Distributions Using Multitemporal Large-Scale Ocean Data Sets," by M. Snellen, T.C. Gaida, L. Koop, E. Alevizos, and D.G. Simon

"Iterative Per-Vector Equalization for Orthogonal Signal-Division Multiplexing Over Time-Varying Underwater Acoustic Channels," by J. Han, S. Chepuri, Q. Zhang, and G. Leus

"Fusion of Swath Bathymetric Data: Application to AUV Rapid Environment Assessment," by R. Fezzani, B. Zerr, A. Mansour, M. Legris, and C. Vrignaud

"Automatic Seagrass Disturbance Pattern Identification on Sonar Images," by M. Rahnemoonfar, A. Rahman, R. Kline, and A. Greene

"Deep Image Representations for Coral Image Classification," by A. Mahmood, M. Bennamoun, S. An, F.A. Sohel, F. Boussaid, R. Hovey, B.A. Kendrick, and R.B. Fisher

"A Decision Support System to Ease Operator Overload in Multibeam Passive Sonar," by I. Rice, and D. Lowe



"Hydropod: An Onboard Deployed Acoustic-Visual Device for Propeller Cavitation and Noise Investigations," B. Aktas, M. Atlar, S. Leivadaros, N. Sasaki, and P. Fitzsimmons

"Marine Spatial Planning Using High Resolution Synthetic Aperture Radar Measurements," G. Benassai, D. Di Luccio, V. Corcione, F. Nunziata, and M. Migliaccio

"Double-Loop Integral Terminal Sliding Mode Tracking Control for UUVs with Adaptive Dynamic Compensation of Uncertainties and Disturbances," by L. Qiao, W. Zhang

"A Simple Frequency-Domain Negative Acknowledgment Feedback for Automatic Repeat on reQuest Underwater Acoustic Networks," by A. Petroni, H-L Ko, T. Im, Y-H Cho, S. Pergoloni, G. Scarano, R. Cusani, and M. Biagi

"Localizing Snapping Shrimp Noise Using a Small-Aperture Array," by Y.M. Too, M. Chitre, G. Barbastahis, V. Pallayil

"Sound-Source Localization in Range-Dependent Shallow-Water Environments Using a Four-Layer Model," by X. Wang, S. Khazaie, D. Komatitsch, and P. Sagaut

"Motion Control of a Hovering Biomimetic Four-Fin Underwater Robot," T. Salumäe, A. Chermori, and M. Kruusmaa

"Preamble Detection for Underwater Acoustic Communications Based on Sparse Channel Identification," by W. Li, S. Zhou, P. Willett, Q. Zhang

"Performance Analysis of Single-Receiver Matched-Mode Localization," by Y. Le Gall, F.-X. Socheleau, J. Bonnel

"Impact of Current Disturbances on AUV Docking: Model-Based Motion Prediction and Countering Approaches," by S. Fan, B. Li, W. Xu, and Y. Xu

“Performance Analysis of Constant-False-Alarm-Rate Detectors Using Characteristic Functions,” by D. Abraham

“Accuracy Assessment of Surface Current Velocities Observed by OSMAR-S High-Frequency Radar System,” by Y. Lai, H. Zhou, Y. Zeng, and B. Wen

“Estimates of Internal Tide Energetics in the Western Bay of Bengal,” by S. Mohanty, A.D. Rao, and H.K. Pradhan

“A Low-Cost Dead Reckoning Navigation System for an AUV Using a Robust AHRS: Design and Experimental Analysis,” by M.T. Sabet, H.M. Daniali, A. Fathi, and E. Alizadeh

“Modeling AUV Localization Error in a Long Baseline Acoustic Positioning System,” by D.J.M. Thomson, S.E. Dosso, and D.R. Barclay

“Using a Stationary Compact Array of Acoustic Sensors to Estimate the Motion Parameters of Sources,” by I.R. Urazghildiiev, and D.E. Hannay

“Coupled Hydroplane and Variable Ballast Control System for Autonomous Underwater Vehicle Altitude-Keeping to Variable Seabed,” by J. David, R. Bauer, and M. Seto

“A Sensor Web Architecture for Integrating Smart Oceanographic Sensors into the Semantic Sensor Web,” by J. Del Rio, D.M.Toma, E. Martinez, T.C. O’Reilly, E. Delory, J.S. Pearlman, C.Waldmann, and S. Jirka

“Physical Modeling for the Gradual Change of Pitch Angle of Underwater Glider in Sea Trial,” by L. Gao, B. Li, and L. Gao

“Long-Term Inertial Navigation Aided by Dynamics of Flow Field Features,” by Z. Song, and K. Mohseni

“An Operational Concept for Correcting Navigation Drift during Sonar Surveys of the Seafloor,” by A.J. Hunter, W.A. Connors, and S. Dugelay

“Balancing Power Absorption Against Structural Loads with Viscous Drag and Power-Take-Off Efficiency Considerations,” by N. Tom, Y.-H. Yu, A. Wright, and M. Lawson

“Hydrodynamic Coefficients of Heave Plates, with Application to Wave Energy Conversion,” by A. Brown, J. Thomson, and C. Rusch

“Multibranch Autocorrelation Method for Doppler Estimation in Underwater Acoustic Channels,” by J. Li, Y.V. Zakharov, and B. Henson

“Experimental Demonstration of Shadow Zone Localization Using Deep Water Interference Patterns Measured by a Single Hydrophone,” by J.-B. Weng, and Y.-M. Yang

“Spread-Spectrum Method Using Multiple Sequences for Underwater Acoustic Communications,” by F. Qu, X. Qin, L. Yang, and T.C. Yang

“Spatial Modeling of Deep-Sea Ferromanganese Nodules with Limited Data Using Neural Networks,” by V.N. Hari, B. Kalyan, M. Chitre, and V. Ganesan

“Model and Algorithm Improvement on Single Beacon Underwater Tracking,” by Z. Zhu, and S.-L.J.Hu

“AUV-Based Underwater 3-D Point Cloud Generation Using Acoustic Lens-Based Multibeam Sonar,” by H. Cho, B. Kim, and S.-C. Yu

Request for Nominations for DTAA and DSA 2018

René Garelo, Chair of IEEE/OES Nominations and Appointments Committees, Junior Past President

Request for Nominations for The Distinguished Technical Achievement Award 2018

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, Dr. René Garelo at r.garelo@ieee.org. The deadline for nominations is 1 May 2018.

Request for Nominations for The Distinguished Service Award 2018

The IEEE Oceanic Engineering Society is hereby soliciting nominations for the society Distinguished Service Award to honor an individual IEEE member for outstanding contributions toward 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, Dr. René Garelo at r.garelo@ieee.org. The deadline for nominations is 1 May 2018.

PLOCAN Glider School—November 2017

Brian Kieft- MBARI

In November 2017 I had the opportunity to present and participate as an instructor at the Oceanic Platform of the Canary Islands (PLOCAN) glider school (<http://gliderschool.eu/>). Following a prior cruise with collaborators from Geomar and MARUM, I was invited to discuss Waveglider and general UUV applications for science as well as to help with on water instruction and testing during the week-long school. As PLOCAN does not provide funding for any of its participants, MBARI and OES were kind enough to send me to participate. I've been an IEEE member since 2006 and have had the opportunity to teach AUV tutorials at OCEANS conferences since 2012. There is a large amount of investment currently going on in the Macaronesia region and I was happy to participate in some outreach and field deployments in the region again. Much of the physical oceanography is similar to the West coast of the U.S. as they experience upwelling, coastal nutrient enrichment from land, and open ocean eddies. The entire region is largely undersampled and ripe for the use of autonomous vehicles to provide a persistent observational presence. Fairly frequent ship surveys also reduce the risk of operating in this type of offshore environment and compliment the science already being done in the region.

I was teamed up with some familiar collaborators from MARUM and presented on autonomous vehicle applications at MBARI and the general state of the art of autonomous vehicles during the classroom session. Following that, I answered questions and helped to orient students to the Wavegliders there (SV3 and SV2). The SV3 waveglider that was present was familiar to me as I was lucky enough to participate in its first deployment



Escorting the SV3 in at the end of the day.



Post launch inspection of the tether.



No vessel ever touched the Waveglider. The dockside crane handled launch and recovery.

from a large research vessel back in February 2017 with our collaborators from MARUM. This fall we decided to attempt a boat-free launch and recovery at the Taliarte harbor adjacent to PLOCAN. This style of launch is applicable to many users around the world as it only requires a vessel of opportunity for emergencies versus the larger investment of a ship/crew. Following a couple successful entries and exits in and out of the harbor under its own power, we escorted students to sea on a breezy day to observe the vehicle in action. There's nothing like a rough day at sea to make people appreciate the value of robots!

We had an opportunity to discuss many different types of autonomous vehicles that week and I think students left with a greater sense of the applicability of autonomous systems to ocean observing as well as how various types of platforms could best meet their needs. I believe expanding the school to include even more types of autonomous systems would help enrich the experience even more and provide further options to support the science being done in the region.



2018

November 6 - 9
Porto, Portugal

Call for Papers AUV 2018

2018 IEEE OES Autonomous Underwater Vehicle

Rectorate Building, Porto University, Porto, Portugal

Every two years the IEEE Oceanic Engineering Society (IEEE OES) sponsors a collaborative workshop to bring together those working in the field of autonomous underwater vehicles.

In 2018 this diverse group from around the world will meet in Porto, Portugal, at the University of Porto for AUV 2018.

Topics

AUV2018 invites the authors to submit contributions in the following topics.

- Vehicle Design
- Vehicle Navigation
- Sensor Fusion
- Vehicle Control
- Vehicle Planning and Execution
- Control
- Multi Vehicle Systems
- Vehicle Applications
- Open Source Robotics

Important Dates

Abstract Submission Page Open	April 9, 2018
Deadline for Abstract Submission	June 22, 2018
Notification for Authors	July 27, 2018
Deadline for Full-paper Submission	September 7, 2018

Student Poster Competition "AUV conceptual design challenge"

Students are invited to submit proposals to address an AUV conceptual design challenge
The winners will receive incentive fund and travel support!

Organizers



IEEE Oceanic
Engineering Society



For Inquiries, please contact AUV2018 Secretariat: auv2018@lsts.pt

auv2018.lsts.pt

Chapter News

Submit Chapter News to Beacon Co-Editors and OES Chapter Coordinator

UKRI Chapter—New UKRI Chapter Recruits New Members at SUBSEA EXPO in Aberdeen

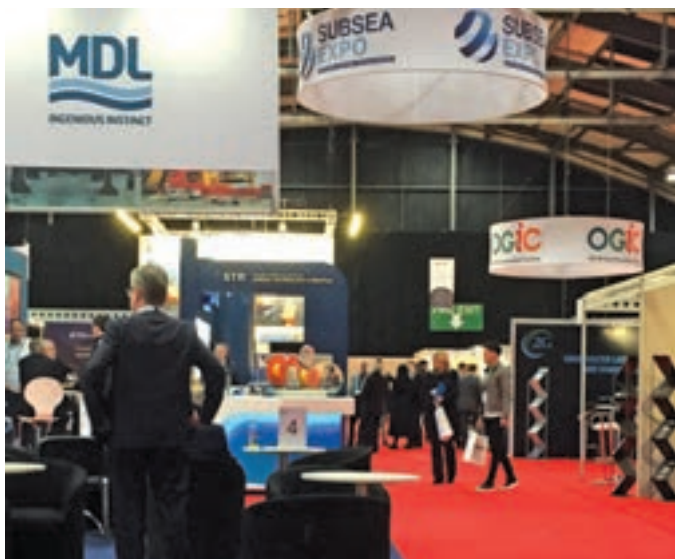
Brian Horsburgh, Secretary

Professor John Watson (Deputy Chair) and Brian Horsburgh (Secretary) of the new UKRI OES Chapter attended Subsea Expo, 7–9 February, to promote OES membership and its activities. Over 3500 attendees from the ocean engineering community attended the 3-day annual expo. During the event, a number of new contacts were made, including 12 prospective new members. Interest was also shown in future OES/MTS conferences by potential exhibitors. Organised at short notice, the UKRI committee members attending were pleased with this response. (Thanks to Subsea UK for their support in enabling our participation at the event.)

Professor Nick Wright, Chapter Chair, will host the inaugural Chapter event at University of Newcastle, UK, on 27 March. Speaker to be confirmed



Brian Horsburgh speaks to prospective new member.



Subsea Expo hall.

Malaysia Chapter—Meeting Report and Activities

Reported by Rosmiwati Mohd Mokhtar and Mohd Rizal Arshad

4th Annual General Meeting 2018

The 4th IEEE OES Malaysia Chapter Annual General Meeting (AGM) was held on the 27th January 2018 at the Everly Hotel, Putrajaya Kuala Lumpur. The 2017 chapter activities report was presented by the Chair, Prof. Ir. Dr. Mohd Rizal Arshad. The chapter had conducted 15 administrative meetings, 22 educational activities, 7 technical activities, 1 membership drive, 1 professional activity, 1 social activity and 4 others. The AGM was then followed by the treasurer's report which was presented by Dr. Zool Hilmi Ismail. Next the election for 2018 IEEE OES Malaysia Chapter Executive Committees was conducted. The standing committees for 2018 can be seen as in the table below.

2018 IEEE OES Malaysia Chapter Executive Committee.	
Chair:	Mohd Rizal Arshad
Vice Chair:	Khalid Isa
Secretary:	Rosmiwati Mohd Mokhtar
Treasurer:	Zool Hilmi Ismail
Excom:	Ahmad Faisal Mohamad Ayob Mohd Fairuz Nor Azmi Mohd Shahrieel Mohd Aras Mohamad Faizal Abd Rahman Herdawatie Abdul Kadir



Photo taken after the 4th AGM.

Malaysia Autonomous Underwater Vehicle Challenge (MAUVC)

Reported by Mohd Shahrieel Mohd Aras & Rosmiwati Mohd Mokhtar

The Malaysia Autonomous Underwater Vehicle Challenge was a first-time event being organized by the IEEE OES Malaysia Chapter. The event took place at the International Islamic University Malaysia on the 17th and 18th December 2017. The competition was opened to all university students in Malaysia



Photos from MAUVC event.

with the aim to provide students an opportunity to experience the challenges of AUV system engineering as well as to develop their skills in the associated technologies. As the first-time event, the organizer received 7 participation teams coming from Universiti Teknikal Melaka UTeM (3 teams) and Universiti Sains Malaysia (USM), International Islamic University Malaysia (IIUM), Universiti Teknologi Malaysia (UTM) and Universiti Tun Hussein Onn Malaysia (UTHM) for 1 team each, respectively.

Winners for the challenge are as follows:

Champion—Roboteam, IIUM

First Runner Up—UTeRG, FKE, UTeM

Second Runner Up—UCRG, USM

Congratulations to all winners!

IEEE 7th International Conference on Underwater System Technology: Theory and Applications (USYS'17)

The USYS'17 conference marked another successful event organized by the IEEE OES Malaysia Chapter. The conference was held on the 19th and 20th December 2017 at the Universiti Teknologi Malaysia, Kuala Lumpur. The two day conference provided such a fruitful knowledge in sharing activities and a

platform for extending the networking among researchers in the ocean engineering related area. The event included 5 distinguished keynote speakers in one session, presentation of technical papers, a workshop as well as an exhibition.

Keynote Speech 1 by Professor Dr. Fabrice Meriaudeau:
A New Insight about Underwater Image (2D/3D) Acquisition and Restoration

Keynote Speech 2 by Professor Dr. Kamal Zuhairi Zamli:
Meta-Heuristic and Hyper-Heuristic Algorithms: Solving General Optimization Problem

Keynote Speech 3 by Ir. Shaiful Khalid:
"Be Real"—How New Technology for Ocean Engineering Make the Project Economic?

Keynote Speech 4 by Mr. Kelvin Chow:
Autonomous Vehicle—Now and Future

Keynote Speech 5 by Professor Dr. Kelvin Pere Ridao:
Autonomous Underwater Vehicles for Intervention Applications

During the conference 3 papers have been selected as recipients of best paper awards. The author and the paper presented are as follows:

Best Paper Award—First Place:

Underwater Localization Utilizing a Method Acoustic Indoor Tracking System
Dominik Jan Schott

Best Paper Award—Second Place:

Development of Drifting Buoy Inspired by Water Strider for Shallow Water Environment
Herdawatie Abdul Kadir

Best Paper Award—Third Place:

ASV Data Logger for Bathymetry Mapping System
Muhammad Faiz Abu Bakar



Photo with some of the USYS'17 keynote speakers and participants.

Apart from keynote and technical paper presentations, the two day conference also showcased an exhibition of underwater platforms which have been developed by several institutions in Malaysia. A half-day workshop on Searching Algorithm was also conducted in conjunction with the conference event. The workshop was delivered by Prof. Dr. Kamal Zuhairi Zamli.



Prof. Rizal delivered welcoming note during the opening ceremony.



Prof. Dr. Fabrice Meriaudeau.

Singapore Chapter—Annual Workshop and GBM

Reported by Venugopalan Pallayil, Ken Teo, Hari Vishnu and Bharath Kalyan

The IEEE Oceanic Engineering Society, Singapore Chapter, organized its 2017 annual workshop and general body meeting (GBM) on 10 Nov 2017 at the S2S conference room in the Tropical Marine Science Institute, National University of Singapore. Technical talks were delivered by experts from both academia and industry. The talks spanned a wide variety of disciplines related to ocean engineering and marine sciences. A list of talks organized and the speaker names are provided in the table.

Speaker Name and affiliation	Title of Talk and brief description
Dr. Tiago Oliveira, Research Fellow, Tropical Marine Science Institute, National University of Singapore	Global Scale Underwater Sound Modeling: A 3D underwater sound propagation model using parabolic equation model and a split-step Fourier transform method and results thereof from numerical simulation were presented and compared with field data
Dr. Lim Swee Cheng, Research Fellow, Tropical Marine Science Institute, National University of Singapore	A new genus and species of abyssal sponge commonly encrusting polymetallic nodules in the Clarion-Clipperton Zone: In this very exciting talk the speaker described his discovery of a new species of sponge in the Clarion-Clipperton Zone (CCZ) of the East Pacific and at depths of around 4000 m
Dr. David Mateo, Researcher at the Singapore University of Technology and Design	Swarming technology for pervasive monitoring of the marine environment: The presenter described how his team of researchers built and tested a large swarm of low cost and rapidly deployable robotic buoys for ocean environment monitoring. The design was inspired by the process of self-organization and swarming observed throughout the natural world.
Dr. Cheng Siong Chin Director of Innovation and Associate Professor in System Design and Simulation, Newcastle University in Singapore	Simulation and Design of Lithium-Ion Battery Power System for Underwater Applications: This talk was centred around the design and development of large format Lithium-Ion batteries for use in underwater robotic vehicles and deep-water ROVs employing electric propellers.
Dr. Martin Gutowski Regional Sales Director at Kongsberg Maritime, Singapore	3D Sub-bottom Profiling—High Resolution 3D Imaging of Shallow Subsurface Structures and Buried Objects: This talk discussed new developments in sub-bottom profiling, which brings 3D reflection seismics, routinely used in hydrocarbon exploration, to the shallow survey market by down-scaling the conventional techniques to achieve decimetre resolution imaging of the top tens of metres of the sub-surface in three dimensions.



Figure 1. Group photo of participants.



Figure 2. A view of one of the talks in progress.



Figure 3. Interaction and discussions by the participants during the high-tea session.

There was also an active participation from the student community. Mr. Steven Harta Prawira, a student from NUS, shared the team's novel experience during the 2016 RobotX Challenge organized by AUVSI. All the talks were well attended and facilitated interaction between academics, industry as well as students in the field of oceanic engineering. More details on the talk, as well as other OES activities and events, can be found at its website <http://www.ieeeoessg.org/>.

The event drew more than 40 attendees from across industry, academia, research institutions and other organisations. There was also a high-tea reception during the event that provided a good avenue for participant interaction. The event also was successful in recruiting some new members into IEEE and OES.

At the end of the workshop, the OES Chapter held an annual general body meeting of its members. Office bearers for the year 2018 were elected during this meeting and also the plan of action for activities for 2018 was discussed.

A list of office bearers for the year 2018 is given below:



Hari Vishnu: Chairman
harivishnu@gmail.com



Bharath Kalyan: Vice-Chair
bharath@arl.nus.edu.sg



Ahmed Mahmood: Secretary
ahmed@arl.nus.edu.sg



Cheng Siong Chin: Treasurer
cheng.chin@newcastle.ac.uk



Vignesh Subramanian: Committee Member
vignesh.subramaniam1@gmail.com



Chi Cheng: Committee Member
tmschic@nus.edu.sg



Metarsit Leenayongwut: Committee Member
metarsit.l@hotmail.com



Anshu Singh: Committee member
anshu.arlmail@gmail.com

India Chapter—Meeting Report and Activities

Reported by S. Rajesh

Exclusive Committee Meetings for OCEANS 2022

The IEEE OES India chapter had meetings and discussions with the Marine Technology Society—India Council on 24 July, 7 Aug at the National Institute of Ocean Technology (NIOT) Campus on organizing the OCEANS 22 conference in India. It was decided to jointly organize OCEANS 22 with the Ocean Engineering Department, IIT Madras. As a part of the OCEANS conference protocol, the Local Organizing Committee (LOC) was formed as shown in the table given below. The LOC comprises members from the National Institute of Ocean Technology (NIOT), the Integrated Coastal and Marine Area Management (ICMAM), the Indian Institute of Technology (IIT)—Madras and the Indian industries.



Exclusive committee meeting.

Table 1. Local Organizing Committee for the OCEANS 2022.

Chair	Responsibility	
	IITM	NIOT/ICMAM/ Industry
General	Dr. S.A.Sannasiraj	Dr. M.A. Atmanand
Technical	Dr. V. Sriram	Dr. G.A. Ramadass
Finance	Dr. K. Murali	Dr. M.V. Ramanamurthy
Exhibit	Dr. R. Sundaravadivelu Dr. R. Vijayakumar	Mr. S. Rajesh Mr. S.O. Dinesh Babu (M/s. Samhitha Marine Private Limited)
Tutorial	Dr. P. Ananthakrishnan	Mr. N. Vedachalam
Publicity	Dr. V. Sundar	Mr. K. Nandakumar (M/s. Elektronik Lab)
Local Arrangement	Dr. Suresh Rajendran	Mr. M. Arul Muthiah
Patron	Dr. Nilanjan Saha	Cdr. K. Gopakumar
Student Poster	Dr. Deepak Kumar	Mrs. A. Malarkodi
Student Activities	Dr. Tarun K Chandrayadula	Dr. R. Venkatesan
Volunteer Logistics	Dr. R. Pannerselvam	Mr. P. Muthuvel

The first exclusive committee meeting of OCEANS 22 was held on 22nd August 2017 at the Department of Ocean Engineering, Indian Institute of Technology, Madras (IITM) to discuss the organization of OCEANS 2022.

Ocean Technology Students Camp (OTSC)

The chapter along with the National Institute of Ocean Technology and the Marine Technology Society (MTS) India Section organized the Second Ocean Technology Student Camp (OTSC 2017) on 1st September 2017 at the National Institute of Ocean Technology Campus. More than 65 students from 15 schools participated in the camp. A quiz competition on Ocean Technology was conducted for students as part of the camp. Fifteen teams participated in the quiz competition.

The highlight of the event was the presentation by Deputy Commandant Ms. Upasna Kausik on Indian Coast Guard. This had kindled the interest among students to look at ocean and marine technology as a career option. A visit to Chennai port was arranged for the students during the afternoon session. The students were taken inside Chennai port and were explained about the port facilities, handling ships inside port, berthing and port related tasks. During the port visit, students were also taken to visit the recently commissioned Indian Coast Guard Vessel ICGS Shaurya.

International Representations, Awards and Recognitions

Dr. R. Venkatesan, Chairman, IEEE OES India Chapter, was elected to represent Asia Pacific on the Steering Committee of the Global Ocean Observations System (GOOS) of the UNESCO Intergovernmental Oceanographic Commission (IOC).

Dr. M. A. Atmanand, Chair, IEEE Madras Section and Dr. R. Venkatesan, Chairman, IEEE OES India Chapter, attended the OCEANS 2017 conference in Anchorage, Alaska. They chaired two sessions and presented two papers in the conference.



Student visit at Chennai Harbor.

Dr. R. Venkatesan was awarded the MTS Lockheed Martin award.

Dr. R. Venkatesan has been selected as a member of the Joint Task Force for smart cables established by the International Telecommunication Union (ITU), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC), and the World Meteorological Organization (WMO).

Dr. R. Venkatesan was elected as Chairman for the standards committee of the IOC.

Dr. M. A. Atmanand, Chair, IEEE Madras Section, has been elected as the Chair of the IOC Regional Committee for the Central Indian Ocean (IOCINDIO) of the UNESCO IOC.

IEEE-OES India Chapter General Body Meeting

The General Body Meeting of the IEEE-OES India Chapter, chaired by Dr. R. Venkatesan, was held on 8th January 2018 at the National Institute of Ocean Technology (NIOT), Chennai.



Group photo.

Table 2. IEEE OES India Chapter Office Bearers elected for the year 2018.

Name	Responsibility
Dr. G.A. Ramadass	Chairman
Dr. S.A. Sannasiraj	Vice-Chairman
Dr. R. Venkatesan	Ex-Chair
Mr. S.O. Dinesh Babu	Secretary
Mr. S. Rajesh	Treasurer
Dr. K. Murali	Executive Committee Members
Mr. Prasad Dudhgaonkar	
Dr. Deepak Kumar	
Dr. V. Sriram	

The meetings are organized to discuss the last year's activities, financial status of the chapter, way forward towards organizing the OCEANS 22 and proposal of new office bearers followed by election for the year 2018. The office bearers, as listed below, assumed charge after the mandatory period.

Technical Talks Held at NIOT

The IEEE OES India Chapter, in association with the National Institute of Ocean Technology (NIOT) and the MTS Indian section, organized an interactive session with Dr. M. Madan Babu, Program Leader, Regulatory Genomics and Systems Biology Group, Medical Research Council of Molecular Biology, Cambridge, UK on 29th January 2018 at NIOT. Dr. G.A. Ramadass,



Tech talk by Dr. M. Madan Babu.



Chairman presenting the memento to the Dignitary.



Ex-Chair presenting the Shawl to the Dignitary.



Chairman presenting the memento to the Dignitary.



Tech talk by Dr. Casey Moore.

Chairman, IEEE OES India Chapter, presented an IEEE-OES memento to Dr. M. Madan Babu on behalf of the IEEE OES India Chapter and Dr. R. Venkatesan, Group Head, Ocean Observation Network, also presented a NIOT memento to the speaker.

The IEEE OES India Chapter organized a technical talk on "Advances in long term monitoring especially in Bio-Geo Chemical Monitoring" by Dr. Casey Moore, CEO, Seabird Scientific Inc, USA on 5th February 2018 at NIOT jointly with the National Institute of Ocean Technology (NIOT) and the MTS Indian section. Dr. M. A. Atmanand, Chairmen of the IEEE Madras Section, presented an IEEE-OES Memento to Dr. Casey Moore, Dr. G.A. Ramadass, Chairman, IEEE OES India Chapter, presented an IEEE-OES memento and Dr. R. Venkatesan, Group Head, Ocean Observation Network presented the guest with Indian traditional Shawls.

Providence OES Chapter talk IEEE Fellow and OES Distinguished Lecturer, Dr. Milica Stojanovic, Northeastern University

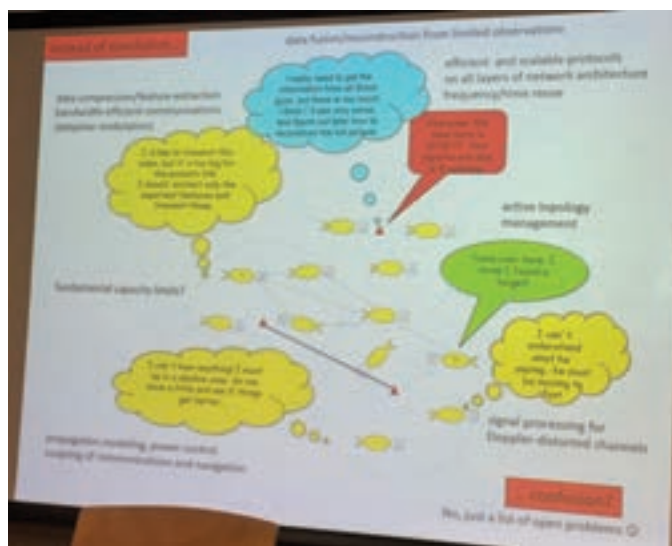
*"Underwater Acoustic Communication: Fundamentals and
New Results"*

By Sandy Williams, Chapter Chair

On November 14, 2017 at the Massachusetts Maritime Academy, Dr. Stojanovic presented a Distinguished Lecture on Underwater Acoustic Communications to an audience of 13 (8 members and 5 guests). This was the third technical meeting of the Providence OES Chapter in 2017. Her excellent presentation started with fundamentals and made the case that underwater acoustics cannot take as a model the radio communications models that work well in air. In fact, models are not yet standard for underwater acoustic communications and still require experimental verification. She presented some of the results from three experiments on the Atlantic East Coast and one in Hawaii to develop a better model for "Long Time" effects where the oceanic fluctuations are long range compared to the wavelength of the sound used and "Short Time" effects, closer to scattering, where the environmental fluctuations are short compared to the wavelength of the signal. Also, unlike radio communications where the bandwidth is quite high but the frequency of transmission is very much higher than the bandwidth, in acoustic communications the bandwidth is generally about the same as the center frequency of the signal. This leads to very different behavior. Multipath is very important as a problem to be overcome and equalization of the frequencies present in the signal is necessary or at least a vast improver of the signal to noise. Starting with such fundamentals as the history of underwater communications used in WW2 to communicate with submarines from surface ships to the need to connect with under-



Milica noted that early demands for improved underwater acoustic communications stemmed from such applications as the exploration of the wreck of the Titanic with AUVs following soon behind.



The final slide from Dr. Stojanovic's talk is a conclusion that the situation in underwater acoustic communication isn't entirely solved.



Milica Stojanovic on the left and Fred Thwaites in the center are being regaled by Marina Martini's story of her recent Professional Engineer exam.

water vehicles for such things as finding ship wrecks (Titanic), the relatively low bandwidth (single sideband at 8-11kHz) was contrasted to the very high bandwidth of optical communications, which have very limited range underwater. So you need both. Acoustic signal to noise is frequency dependent due to attenuation and to noise due to distant shipping at low frequency. Then Dr. Stojanovic presented new results that few in the audience were familiar with and finished with hopes for implementation of her predictions based upon her recently developed models with hardware seemingly showing a 15 year implementation lag in contrast to the 6 month lag in cell phone technology.



**7th IEEE/OES Baltic Symposium
on 12–15th of June 2018, in Klaipeda, Lithuania**

[Http://balticvalley.lt/baltic2018/](http://balticvalley.lt/baltic2018/)

Clean and Safe Baltic Sea and Energy Security for the Baltic countries



We are pleased to announce that **7th IEEE/OES Baltic Symposium “Clean and Safe Baltic Sea and Energy Security for the Baltic countries”**

scheduled to be in Klaipeda, Lithuania, on 12–15th of June 2018. The event will be hosted by [Klaipeda University](#) and [Baltic Valley Association](#). This will be the fourth time the Symposium has been in Klaipeda and has always received great support from the Lithuanian government and the U.S. Embassy.

The program will include plenary talks by experienced lecturers, oral and poster presentations, round table discussions, and a field trip to the UNESCO Natural Heritage Site—Curonian Spit. Basic topics for the Symposium will be **Energy Security and Independence, Hazard Planning and Mitigation, Handling of the Extensive Ammunition and Ordinance** that have been disposed of in the Baltic Sea and **Ecosystems and socio-economic impacts**.



Important dates

February 23, 2018—deadline for abstract submission

April 25, 2018—deadline for registration and full research paper submission

June 4, 2018—final announcement (including a programme)

June 12, 2018—beginning of the Symposium



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Welcome to OCEANS'18 Kobe MTS/IEEE/Techno-Ocean2018, May 28–31, Kobe, Japan

Local Organizing Committee for OCEANS'18 Kobe

OCEANS'18 Kobe provides a chance to foster a dramatic increase in marine-related science and Technology, and marine industries in Japan. It is also an opportunity to meet new aspects of our “OCEAN Planet” home. Here, we introduce the Ocean-related facilities and historical sites around the Kobe city for the conference attendees to visit there before/during/after the conference for better understanding the Kobe city.

Welcome to Kobe!

1. Kobe Maritime Museum & Kawasaki Good Times World

With its characteristic white space frame roof giving the impression of a sailboat racing across the vast ocean under the concept of “Born from the sea and port, sailing into the future with Kobe”. Visitors can experience the history and future of the seas, ships, and ports. Through resources including actual navigation instruments, riggings, and ship records, diorama models, videos, and graphics, visitors are introduced to the past, present, and future of the seas, ships, and ports around Kobe.



Kobe maritime museum.



Kawasaki good times world.

Kawasaki Good Times World can also be found right nearby. This corporate museum is operated by Kawasaki Heavy Industries, which has helped the city advance since the Port of Kobe first opened.

Open Hours 10:00 to 17:00 (admittance until 16:30 p.m.)

Days closed Closed on Mondays (or the following day if Monday is a national holiday) New Year's Holiday (Dec. 29 to Jan. 3)

Address 2-2, Hatoba-cho, Chuo-ku, Kobe, Hyogo 650-0042, Japan

<http://www.kobe-maritime-museum.com/language/english.html>

2. The Maiko Marine Promenade, a Circuit-style Promenade on the Akashi-Kaikyo Bridge

It was constructed on the Kobe side of the bridge as an additional facility and was opened on April 5th, 1998. Situated approximately 47 meters above the sea and 150 meters above the ground, it has a total length of approximately 317 meters looking over the Akashi Strait.

You can have a relaxing break looking at the bridge at the observation lounge on the 8th floor, where there is an observation camera system which makes you feel like you're on top of the bridge's 300-meter-high main tower. If you want an additional thrill, try the “log-bridge 47 meters above the sea.”



Akashi Kaikyo Bridge.



Arima hot spring.



Circuit-style promenade.

Address 2051 Higashimaiko-cho, Tarumi-ku, Kobe-City
655-0047 Japan

Open Hours 9:00 a.m. to 6:00 p.m. (admittance until: 5:30 p.m.)

Days closed April to September: none
<http://hyogo-maikopark.jp/en/facility/f01/#ad-image-0>

3. Arima Onsen (Hot Spring)

Surrounded by nature and tranquility at the northern foot of Mt. Rokko in Kobe, Arima Onsen is one of the three oldest hot-spring resorts in Japan. It is well-known for its two types of springs: Kinsen, or “Gold Spring,” which is brownish-red water rich in iron and salinity, and Ginsen, or “Silver Spring,” which is transparent water containing radium and carbonate. This traditional town attracts 1.8 million visitors every year. One of the characteristics of the spring water of Arima is its high salt content. With a salinity concentration 1.5 times higher than seawater, Arima’s hot springs are top class within Japan. The reason why this type of spring exists in Arima despite the absence of a volcano is due to the movement of ocean plates.



Geisha at Arima Onsen.

When the ocean plates shift, sea water and limestone come in contact with the mantle which heats the water, pushing it towards the surface as it takes on iron. Arima Onsen’s water is a blessing from the sea.

For more information: <http://visit.arima-onsen.com/>

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A Blast from the Past!

Bob Wernli—Beacon Co-Editor-in-Chief

Is there fun at an OCEANS conference...see for yourself in this **A Blast from the Past!** from OCEANS '04 Kobe.



John Watson, Steve Holt, Norm Miller, Ken Ferer, Bob Wernli, and Ken Foote enjoy the banquet.



OTO 2004 General Chair Tamaki Ura addresses the Plenary Session.



Tom Wiener, Joe Vadus and Tamaki Ura at the Ribbon Cutting Ceremony.



Plenary Session Orchestra from Kobe University.



Kobe at Night.

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October 22-25, 2018

For more information, visit:
www.oceans18mtsieeecharleston.org



Stan Chamberlain and a Japanese Dancer at the Banquet.



Naochika Namba Presents Joe Vadus with an Image of the City of Kobe.



Earthzine Writing Fellowship Dives into the Ocean, One Story at a Time

Jenny Woodman, IEEE Earthzine



NOAA's Ocean Ship Okeanos Explorer is one of several vessels conducting seafloor mapping and ocean exploration missions.

We have better maps of Mars and the moon than of our own home planet—70 percent of the Earth's surface is covered with water, which poses unique challenges for exploration and imaging. As ambassador for all things ocean-related, in 2017 IEEE Earthzine

partnered with Shell Ocean Discovery xPrize to help our annual Writing Fellowship deliver stories that engage the public with ocean exploration and highlight the technologies in development to deliver us to places we've never been before, right here on Earth.

Why is Earthzine Mentoring Writers?

Significant scholarship suggests that mentoring is integral in developing in one's career, and writing is no exception to this rule. From medical (Flaherty, 2016) to legal (Kawalski, 2011) to creative writing—early career writers perform better when mentors are available to share best practices and guide the development of instincts that will serve the writer for the long haul.

Fostering opportunities for growth and training among young professionals is an important activity for IEEE Earthzine. In 2015, thanks to support from NASA's Applied Sciences Program and IEEE Oceanic Engineering Society, a Writing Club was established to build capacity among students and early-career science professionals for communicating the benefits of using Earth information to support decision-making. With a newly renamed Writing Fellowship, IEEE Earthzine hoped to encourage and develop aspiring writers who are interested in Earth observation and scientific communication.

How Does it Work?

The 10-week, online program includes a series of workshops and presentations led by professional writers and experts from the scientific community. Weekly readings, presentations, and activities focus on developing the skills needed to find story ideas, conduct research, interview sources, write articles, and move through the editorial process toward publication.

In addition to required coursework and discussions, which are facilitated remotely, IEEE Earthzine volunteers and staff provide one-on-one mentorship on the writing and peer review process to help participants reach the final goal: publication.

Participants are awarded a \$200 honorarium for successfully participating in this rigorous program, which is conducted much like an upper division college-level course. Students are expected to provide meaningful peer feedback and show growth in their writing skills over the course of the program. The 2017 honorarium is sponsored by Shell Ocean Discovery xPrize—IEEE Earthzine is grateful for their generous support of our Writing Fellowship.

2017 Fellows are hard at work on stories that will transport our readers to the deep ocean with explorations of the technology, research, and people currently changing our understanding of dynamic Earth processes. At the end of the program, we will run a two-part series examining how ocean data is used and who is collecting the data for scientists around the world. Readers can also look forward to reading about satellites measuring sea ice, intelligent devices designed to sniff out biological hazards and ocean features, ocean exploration in space, and the future of aquaculture.

Plans are in the works for another session of the writing fellowship program in 2018. Visit www.earthzine.org for details and, if you don't already, subscribe to our monthly newsletter.

Meanwhile, here is the 2017 Writing Fellowship Cohort:

Catherine Foley is a Ph.D. candidate in the Department of Ecology and Evolution at Stony Brook University, where her research is focused on the spatial ecology and biogeography of Antarctic mesopredators. Catherine is particularly interested in



ways to get citizens invested in environmental issues through science communication and policy.



Jenny Gessaman is a rural Montana journalist who's passionate about delivering information in a relatable way. She loves helping people understand the science affecting their lives, working it into every relevant beat, from infrastructure to agriculture. When she's not meeting deadlines, Jenny enjoys biking, hiking, horror stories and petting her flat-faced cat.

Sara Lubkin is an Earth scientist. She earned her Ph.D. in geology from Cornell University and recently completed a graduate certificate in Geospatial Information Science from Northern



Virginia Community College. She teaches geology courses at the University of Mary Washington and is completing her fifth term with the NASA DEVELOP National Program.

Veronica Padula is the science education and communication specialist for the Ecosystem Conservation Office of the Aleut Community of St. Paul Island in Alaska. She is also a graduate student in the College of Fisheries and Ocean Sciences at the University of Alaska Fairbanks, in collaboration with the University of Alaska Anchorage. Her research investigated the impacts of marine debris on seabirds in the Bering Sea, and the movement of plastic-associated chemicals through Bering Sea food webs.



Jennifer Parilli is a recent graduate of the University of Georgia, where she studied ecology and anthropology. She works on one of the state's barrier islands, feeding and caring for ring-tailed lemurs. In her free time, she enjoys writing about ecology on her personal blog and running on the beach.



Peter Sinclair is an astrophysics graduate student at the University of New Mexico who plans a career of science and astronomy outreach.



Erica Spain is a first-year Ph.D. candidate at the Institute for Marine and Antarctic Studies, in Hobart, Australia. Her research focuses on using Autonomous Underwater Vehicles to map extreme marine environments, including methane seeps, hydrothermal vents and under Antarctic sea ice. She will investigate how we can better understand these remote places by integrating

a suite of acoustic data and mapping approaches in a three-dimensional space.



Andrew Urevig works as a writer and fact checker for Ensia magazine, and as a beekeeper with the University of Minnesota's Bee Squad, where he is pursuing a bachelor's in scientific interpretation and communication.

Jenny Woodman is a science writer, editor and educator for IEEE Earthzine; she lives and works in Portland, Oregon. Follow her on Twitter @JennyWoodman

The French Cable Building

Ross Chapman



This article adds a Canadian connection to Rene Garello's piece about the IEEE commemoration of the French Transatlantic Cable that appeared in the last issue of the Beacon (*'The French Transatlantic Telegraph Cable, 1898'*, OES Beacon, volume 6, #4, 30–32). It's also a personal perspective that links folks in two society chapters, one in Victoria and the other in Halifax. The story I'll relate here is about a building that was constructed as part of the French Transatlantic Cable system and lives on today as a research lab and Heritage site in Halifax: the French Cable Building.

When I worked at the Defence Research Establishment Pacific in Esquimalt many years ago, we had yearly visits with colleagues from our sister lab, Defence Research Establishment Atlantic (DREA), in Dartmouth, Nova Scotia. The exchange visits were in February, so in one year a few of us would go east, in the February depths of a Nova Scotia winter, and in alternate years, a fortunate few from DREA came out west to visit us in Victoria and enjoy a few days break from the same Nova Scotia winter (and perhaps go skiing at Whistler Mountain). These exchanges were always very useful in getting a new perspectives on our work from the many discussions that were crammed into the two or three days of the visits. In some of the discussions in the early times at the start of my career, I heard the DREA folks talk about doing work in the 'French Cable Building'—as though it was quite a natural part of the things they did. Eventually, after a few times hearing about this strange reference that suggested something more intriguing beyond just a government research laboratory, I asked 'what is this building?' That's when my real interest in this unique site developed. And the more I learned about it, the more interesting it became. The story of the French Cable building starts with its role with the transatlantic communication cables, passes through one of the most serious disasters in

Canadian history, and finally comes to the present time as part of a research laboratory in defence science.

The article that appeared in the Beacon last year celebrated the transatlantic cable built in 1898 by the French Telegraph Cable Company (La Compagnie Française Des Câbles Télégraphiques) that established a direct link between Brest and Cape Cod. Figure 1 shows the 1898 cable route, and also an earlier more northern line built in 1869 by a different French agency, *La Société du Câble Transatlantique Française*. The 1869 cable connected Brest to the United States via the French island of St. Pierre, on the Grand Banks south of Newfoundland. In 1873, a spur line was built between St. Pierre and Canso Nova Scotia, thus providing a link with Canada. However, the *Société* later sold its interests in the transatlantic line. At the turn of the century, French interests in transatlantic communications were represented by the French Telegraph Cable Company. The company set up its Canadian operations in Halifax harbour, where it established a wharf and cable storage building in 1916 to handle maintenance and repair of the submarine cables.

The French cable building, shown in Figure 2 as it stands today, is a simple, two-story, square structure of reinforced concrete and classical design. The building features an elaborate moulded cornice with the inscription "COMPAGNIE FRANÇAISE DES CABLES TELEGRAPHIQUES" detailed in concrete. It was located at the site of the French Cable Wharf on the Dartmouth shore of Halifax harbour that served as the base for the company's cable ship, *CS Édouard Jéremec*. The building originally was thus known as the 'French Cable Wharf Building' but the label was subsequently shortened by my DREA colleagues to simply the 'French Cable Building'. It was the administrative centre of operations at sea with the *Édouard Jéremec*, and a place for preparing new cable for frequent



Figure 1. The lower red line shows the route of the 1898 transatlantic cable connecting Brest and Cape Cod. (By permission, J. Bodénès, *'La grande aventure des câbles télégraphiques'*, L'Association Locmaria Patrimoine.)

repairs to the submarine cable. This was done in three large concrete wells inside the building that were used to store coiled cable. However, within a year of its construction, the building was at the centre of a tragedy that destroyed most of the city.

On the morning of 6 December 1917, two ships that were preparing to join a wartime convoy to England collided in the narrows in Halifax harbour. A fire started on one of them, the *SS Mont Blanc*, and the ship drifted toward the city as it burned. Unknown to the local population, many of whom had stopped to watch the fire on the ship in the harbour, the *Mont Blanc* carried a cargo of munitions destined for use by the allies at the western front. Within minutes of the collision, the cargo exploded, sending a shock wave that levelled buildings on both sides of the harbour within a 2.6 km radius. Over 25,000 citizens were instantly homeless and about 2000 were killed. It was at the time the largest man-made explosion.

Astonishingly, although the French Cable building was at the shoreline within a kilometre of the blast, the building survived intact owing to its exceptional workmanship with reinforced thick concrete walls. Its neighbours, including the Oland Brewery, a rowing club and an encampment of the Mi'kmaw First Nations were totally destroyed

The French Telegraph Cable Company continued operations from the building and the wharf until 1929 when it sold its interests after an earthquake on the Grand Banks caused extensive damage to the submarine cable.

During WW II, the Royal Canadian Navy took over the site, and used the wharf and French Cable Building to maintain Fairmile-B motor launches that patrolled coastal areas for submarines. In 1975 the site was absorbed by DREA as part of the research facility. My colleagues at the laboratory used the building for storage and fabrication of sensitive hydrophone arrays for submarine detection during the cold war. The building itself, now officially renamed with the unromantic designation of 'Building Number 4', was renovated in 2002 with offices and new labora-



Photo Credit: The Griffin.

Figure 2. The French Cable Building as it stands today. The letters in the inscription on the cornice were originally painted white.

tory spaces. Two of the original concrete wells that stored the submarine cables are now used as tanks for testing new underwater equipment. One is lined with a large cedar barrel and is fresh water filled, and the other salt water filled.

Over the years, the French Cable Wharf gradually fell into disrepair and was demolished in the mid-2000's following an extensive remediation of contaminated materials that had accumulated during its use. However, the French Cable Building endures as a research facility and a Federal Heritage property, recognized in 2000 for its links as a survivor of the Halifax explosion, and the development of telecommunications in Canada.

For further reading about the building, see the article and references by Vincent Myers in the December 2017 issue of *The Griffin*, A Quarterly Publication of Heritage Trust of Nova Scotia: 'Building #4: the French Cable Wharf Building on the Dartmouth Waterfront'.

Bringing It All Together—Toward A Sustainable Capability For Ocean Best Practices

Jay Pearlman, IEEE; Mark Bushnell, U.S. IOOS; Pier Luigi Buttigieg, AWI; Juliet Hermes, SAEON/JCOMM; Emma Heslop, SOCIB/JCOMM; Johannes Karstensen, GEOMAR; Cristian Muñoz, SOCIB; Francoise Pearlman, IEEE; Pauline Simpson CCMI/IODE

When you get ready to take your sensor to sea in a ship or on a float, do you ever review common Best Practices (BP) or standard operating protocols in advance to see what others have done and why? Where would you even go to look for a comprehensive source of Best Practices? Of course, if you have made the same measurements for years, then maybe you are the source of Best Practices. How do we bring together all sources of Best Practices in support of the observing community?

Ocean observing systems rely on robust and stable instruments integrated into equally robust platform and information infrastructure. The Best Practices associated with observing systems cover all elements of the end-to-end process ranging from observatory design and sensor handling to the deposition of quality data in archives. For example, large observing infrastructure programs such as the U.S. Ocean Observatories Initiative (OOI) or the U.S. Integrated Ocean Observing System (IOOS)

for coastal observations, or ocean observing networks operated under the auspice of the WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) document and share Best Practices and urge their propagation. These valuable documents are often affiliated to international organizations such as the IOC/UNESCO IODE or GOOS. Despite the quality of these efforts, best practice documentation is still fragmented and its impact is difficult to sustain over time.

To address the fragmentation challenge, an international initiative has been created to provide the ocean observing community with a sustainable compendium of ocean observing peer-reviewed. They can be used in training new oceanographers and engineers, to provide references for experts, and to ensure inter-comparability across observations. Where practical, a solution

should reach across the science and engineering communities and support multi-disciplinary applications.

But let's step back a minute and ask "What is a 'Best' Practice?" Many experts have practices, but don't know if they are "best." Some standard operating procedures are Best Practices. The stories told can show simple steps—"put the sensor in the water right side up" or "remember to turn the sensor on." You might say this could never happen. But, So what is a Best Practice? At the international workshop on ocean observing Best Practices held in Paris, November 2017, a Best Practice was defined as:

A community Best Practice is a methodology that has repeatedly produced superior results relative to other methodologies with the same objective. To be fully elevated to a Best Practice, a promising method will have been adopted and employed by multiple organizations.

A Best Practice may come in any number of format types—Best Practices, standard operating procedures, manuals, operating instructions, etc.—with the understanding that the document content is put forth by the provider as a community Best Practice.

What are the issues in bringing together practices that are useful for research and operations? In some cases, it is actually creating the documents and convincing community members to contribute to them. Then there are cultural, technical and financial issues. Challenges reaching across disciplines arise because each of the ocean disciplines (chemistry, biology, etc.) has its own culture and vocabulary. Another challenge lies in automation.

Many of the Best Practices are textual, typically in pdf format, and hard to read by machines. Another challenge is in the diversity of best practice metadata formats that hinder comprehensive searches. Finally, the cost of creating and sustaining the Best Practices System must be accounted for. In addition, there are training needs and the challenge of complying with Best Practices that require costly fielding techniques and equipment.

The strategy for creating a useful and sustainable repository is to leverage existing capabilities whenever possible, both in the repository infrastructure and the content of Best Practices. Then, expand the infrastructure with new search mechanisms based on ontologies that can service the different ocean research and engineering disciplines. The long-term goal is to provide



Figure 1. Reviewing protocols for sampling.



Figure 2. Process flow for Ocean Best Practices enhancement and archiving (from paper by Pearlman, et al, MTS/IEEE OCEANS Conference Anchorage 2017).



Figure 3. Discussions of best practices for glider operations continue as the NeXOS team carries out a mission.

repository users with the ability to reach across many aspects/elements of observing systems from their own perspective.

While existing best practice documents will be included in the repository in their native formats, it may be necessary to add metadata elements to support improved discovery and access. As a strategy, the best practice repository will identify three levels of document processing to indicate the completeness of the documentation to users. At the highest level, the Best Practices will have comprehensive metadata and have been peer reviewed by the community or through a repository expert panel. The figure below shows the flow process.

The flow works as follows: documents created by expert groups, agencies, or other stakeholders are allocated a persistent URL when they are deposited in the IODE OceanBestPractices (OBP) repository: <https://www.oceanbestpractices.net/>. Within the repository, the document may be at one of several levels depending on the levels of metadata, completeness of information and peer review. BP documents that are already peer-reviewed and have complete metadata are automatically assigned the highest level of internal repository status after validation. Templates for Best Practices have been defined and beta tested to further uniformity of submission. Use of such templates is recommended but is not required.

All documents will be exposed as web pages and users may access a web portal that would convert their requests (e.g. “Retrieve all BPs that are about measuring oxygen in coastal water”) into semantic queries that would be processed using ontology.

All BP methods will be encouraged to go through peer review, either in their originating community, through the repository expert panel or through a journal peer review system. A Research Topic “Best Practices for Ocean Observing” within the Frontiers in Marine Science Journal (Ocean Observations Section) will provide a sustained publication media for peer review and for Best Practices. In addition, a Peer Review Panel populated by community volunteers will be established within the OBP Repository.

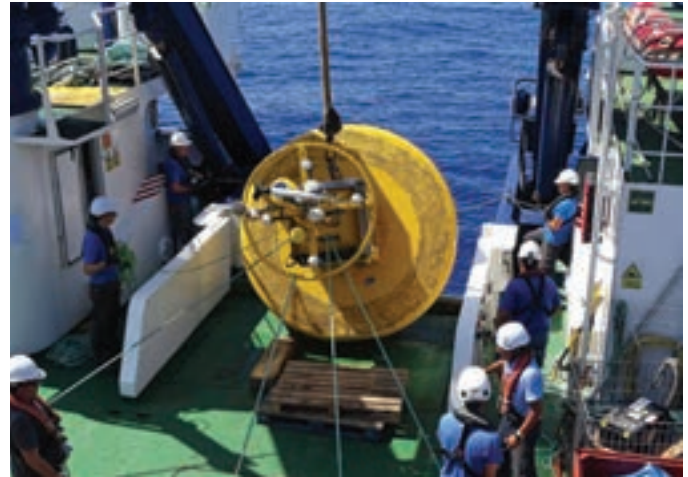


Figure 4. Many best practices are involved in the creation of an integrated ocean observation platform. In the photo, the European Station for Time series in the Ocean Canary Islands (ESTOC) float is ready for release.

Starting a new process/capability for sustaining Best Practices must address two subjects: 1) first, a sufficient quantity of best practice documents must be aggregated to effectively serve the community and 2) an enhanced resource for the efficient archiving of, discovery of, and access to these practices must exist. The Best Practices Working Group collaboration (<https://www.atlantis-h2020.eu/project-information/best-practices/>) is addressing the first challenge by drawing together a range of methodological documents endorsed by communities of ocean observing practitioners. This is being done both by manual submission and machine-assisted web crawling. The collection is then being used as the material with which to address the second challenge: a best practice repository is being created with technologies to persistently archive, systematize, expose, index, version, and cross-link collected Best Practices. As this is a multidisciplinary and constantly evolving space, technologies, which are capable of sustainably, yet flexibly linking material across domain-specific terminologies are being deployed, as well as mechanisms for quality management and review. Efforts are being made to ensure even novice ocean observers can use the resource effectively, with little to no training.

We are inviting OES members and others to participate through contributions of Best Practices to the OceanBestPractices repository and by volunteering to be reviewers of Best Practices. For further information, please contact Jay Pearlman (jay.pearlman@ieee.org) or Pauline Simpson (psimpson@reefresearch.org)

This project has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 633211 (AtlantOS). Funding has also been received from the European Union’s Horizon 2020 research and innovation program under grant agreement No: 654310 (ODIP). Funding has also been received from the NSF Ocean Research Coordination Network under grant 1143683. In addition, support by the European Research Council Advanced Investigator grant ABYSS 294757 to Antje Boetius and the HGF Infrastructure Program FRAM of the Alfred Wegener

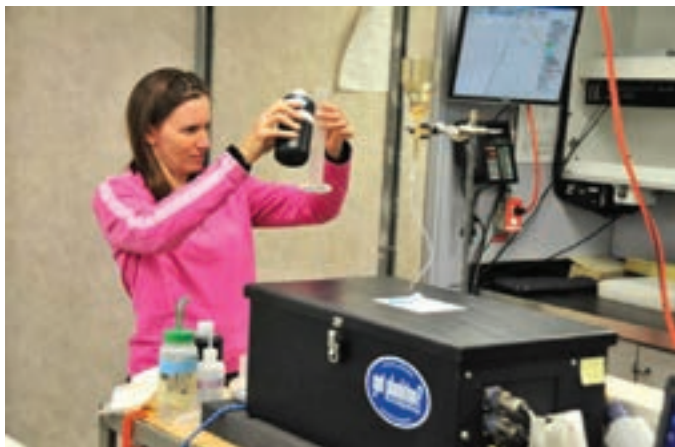


Figure 5. Dr. Nicole Poulton from Bigelow Laboratory for Ocean Sciences aboard AE1319 cruise aboard the R/V Atlantic Explorer uses one of the older FlowCam models for data collected in August 2013. (Photo by Wayne H. Slade and courtesy of FIT).

Institute for one of the authors (PLB) is gratefully acknowledged. We also acknowledge the support of IEEE, IODE, JCOMMOCG, SOCIB, U.S. IOOS, and GOOS.

ACRONYMS

AtlantOS	Optimizing and Enhancing the Integrated Atlantic Ocean Observing Systems
AWI	Alfred-Wegener-Institute

BP	Best Practices
EMSO	European Multidisciplinary Seafloor and water-column Observatory
EuroGOOS	European Global Ocean Observing System
GOOS	Global Ocean Observing System of UNESCO/IOC
ICES	International Council for the Exploration of the Sea
IEEE	Institute of Electrical and Electronics Engineers
IOC	Intergovernmental Oceanographic Commission of UNESCO
IODE	International Oceanographic Data and Information Exchange of UNESCO/IOC
IOOS	U.S. Integrated Ocean Observing System
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JERICO	Joint European Research Infrastructure Network for Coastal Observatories
OBP	OceanBestPractices (Repository)
ODIP	Ocean Data Interoperability Platform
SAEON	South African Environmental Observation Network
SOCIB	Sistema d'observació i predicció costaner de les Illes Balears
UNESCO	United Nations Educational, Scientific and Cultural Organization
URI	Universal Resource Identifier
WMO	World Meteorological Organization

Newly Appointed Administrative Committee Members

The following two members were elected to the OES Administrative Committee for a term of two years (from 2018–2019).

- STEPHEN L. WOOD
- JOÃO ALVES

In addition, the following member was elected to the OES Administrative Committee for a term of one year (2018).

- M. A. ATMANAND
- Congratulations!



STEPHEN L. WOOD (AM'01-M'01) Florida Institute of Technology Professional Engineer—Mechanical Engineering, License # 58815, Florida, June 2002–Present
Formal Education:
Oregon State University—Mechanical Engineering—Ph.D. 1994 (Dissertation: “An Architecture for a Function Driven Mechanical Design Solution Library”)

University of Miami—Ocean Engineering—M.S. 1987 (Thesis: “Architecture of an Expert System for Oceanographic Mooring Design”)

University of Rhode Island—Mechanical Engineering—B.S.—1983

Appointments:

04/15–Present—Department Head, Department of Ocean Engineering and Sciences

05/09–Present—Ocean Engineering Program Chair, Department of Ocean Engineering and Sciences

01/99–Present—Associate Professor—Florida Institute of Technology College of Engineering—Department of Ocean Engineering and Sciences: Ocean Engineering, 150 West University Blvd., Melbourne, FL 32901, USA.

2016/17 IEEE-OES ADCOM Interim Board Member

08/15–Present—MTS Marine Archaeology Committee Chair

A Few Publications:

- Bahr, G.S., Allen, W.H., Bernhard, P., Wood, S.L., “The Artificial Memory of Mr. Polly: Memory Simulation in Databases

& the Emergence of Knowledge,” Submitted & accepted: MIT Press, Leonardo Journal, Vol. -, Issue -, 2016.

- Wood, S., Hendricks, A., Corbet, M. “Automated Buoyancy Control System for a Remotely Operated Underwater Crawler,” Oceans’15 MTS/IEEE Genoa, Italy May 18–21, 2015.
- Wood, S., Cañedo, D., Le Merdy, T., “Application and Effectiveness of a Portable Hydrodynamic Testing Facility,” Oceans’15 MTS/IEEE Genoa, Italy May 18–21, 2015.
- Patent US 8,806,865 B2: Ocean Wave Energy Harnessing Device. Inventors: Kelly Dunn, Deric Hausmann, Stephen Wood, Aug. 19, 2014.
- Wood, S., Mierzwa, C., “State of Technology in Autonomous Underwater Gliders,” in “The State of Technology in 2013,” MTS Journal, Vol. 47, Num. 5, September/October 2013.

Synergistic Activities: Development of research tools: M.S. & Ph.D. research focused on the development of computer algorithms to support physical oceanography and mechanical engineering research, design and development.

Courses Developed and Taught at Florida Institute of Technology:

OCE 1001—Introduction to Ocean Engineering (robotic and sub-sea section)

OCE 2002—Computer Applications for Ocean Engineering

OCE 3030—Fluid Mechanics/OCN 3430 Fundamental Geophysical Fluid

OCE 4541—Ocean Engineering Design

OCE 4542—Ocean Engineering System Design (team & real-life design situations)

OCE 4545—Hydroacoustics

OCE 4561—Fundamentals of Offshore Engineering (robotics & underwater technology)

OCE 5903—Underwater Robotics I



JOÃO ALVES (M’09) MSc. in Electrotechnical Engineering, Control and Robotics by the Technical University of Lisbon.

He has been working in underwater robotics and associated technologies since 1995.

He had a key role in the development of the hardware and software architectures for the MARIUS AUV and DELFIM ASV developed at the Technical University of Lisbon.

These were fully distributed and networked architectures including more than 30 processors in charge of the different components of the vehicles. This work was the base for his MSc. dissertation.

In 2003 he co-founded a private start-up company—Blue Edge Systems Engineering, offering services and conducting R&D activity in the maritime domain. In 2007 he took scientific leadership for the underwater communications activities of the EC project GREX where pioneering maritime cooperative robotics was demonstrated. In late 2009 he joined the NATO Undersea Research Centre (NURC), now Centre For Maritime Research and Experimentation (CMRE) as a scientist to work

on underwater communications. He led studies in support of establishing the first underwater communications standard and developed innovative protocols for underwater ad hoc networking. In 2014 he took a leadership role as Principal Scientist responsible for the underwater communications activities at CMRE. He conducted several trials as scientist in charge, leading teams of several tens of people during long sea-going campaigns. During this period he also served as PI for different European commission projects (like MORPH and SUNRISE) and was co-general chair for the IEEE OES UComms14 and UComms16 conferences. He is an invited lecturer for the Masters in Ocean Engineering offered by the University of Pisa (ITA) and a guest editor of the *IEEE Journal of Oceanic Engineering*. He currently serves as an active member of the AUVSI subcommittee for the international regulations for preventing collisions at sea, dealing with the challenging issues of adding robots to our Oceans.



M. A. ATMANAND (M’97-SM’07) obtained his B.Tech. degree in Electrical & Electronics Engineering from University of Calicut in 1983. He took his M.Tech. and Ph.D. from Indian Institute of Technology, Madras in 1985 and 1997 respectively. From 1985 to 1997 beginning, he worked in the area of fluid flow measurement and control at Fluid Control Research Institute, the standard laboratory for

flow in India. From 1997, he has been working at National Institute of Ocean Technology (NIOT), in the area of deep sea technologies at various levels and currently as Scientist G. He held the position of Director, NIOT from 2009 till 2015. During his tenure as Director, he was responsible for all projects being executed by the Institute in the areas of Desalination, Ocean Energy, Deep Sea Technologies, Ocean Observations, Marine Sensors and Marine Biotechnology. He is currently involved in policy making, preparation of Deep sea mission program of the Government of India in the area of Ocean Technology to lead India as a major player internationally. He received the IEEE Oceanic Engineering Presidential Award in 2016, team National Geoscience Award 2010 from the Ministry of Mines, Government of India, for the work on Remotely Operable Vehicle under the category of Oil and Natural Gas Exploration.

He is elected as Chair of Intergovernmental Oceanographic Commission Regional Committee for the Central Indian Ocean (IOCINDIO) of Intergovernmental Oceanographic Commission (IOC) of UNESCO in 2016.

He has to his credit two patents (one Indian and one German) and more than ninety research publications included in IEEE and other international refereed journals.

He is currently an IEEE Senior Member of the Oceanic Engineering Society (OES), and the Instrumentation and Measurements Society (IMS). He has been active with the IEEE Madras Section as an Executive Committee member, Secretary, and Vice Chair and currently he is the Chair of that Section. He is the founding Chair

of IEEE OES in India and organised this new OES Chapter under the India Council in May 2008. He has given technical talks on “Ocean Technologies in India” as part of IEEE OES Chapters at WHOI and Scripps institute of Oceanography in 2014, and at University of Rhode Island in 2016, which were well received.

It was under his Co-chair ship that the IEEE Symposium on Underwater Technologies was held in India in 2015 successfully. The Student Autonomous Underwater Vehicle

(SAVe) competition started under his leadership and has continued successfully for the past 5 years. The winners in this competition have been sent to compete in the AUVSI competition held annually in San Diego. He is currently one of the Associate editors of *IEEE Journal of Oceanic Engineering*. He is also Technical Committee Chair of Underwater Cables and Connectors.

Member Highlights

Contact the Editors if you have items of Interest for the Society

The World Ocean Council (WOC'2017) in Halifax, Canada

Dr. Ferial El-Hawary, Life Fellow IEEE

About the World Ocean Council (WOC)

The World Ocean Council (WOC) is the only international, cross-sectoral alliance for private sector leadership and collaboration in sustainability, stewardship and science. Companies from a broad range of industries worldwide are distinguishing themselves as leaders in “Corporate Ocean Responsibility,” including: shipping, oil and gas, tourism, fisheries, aquaculture, mining, renewable energy, ocean technology and investments. WOC members are a part of the WOC Network including more than 34,000 ocean industry stakeholders from across the globe.

The WOC is a registered not-for-profit organization in the US and the UK/Europe.

The WOC-Sustainable Ocean Summit (SOS)' 2017 was held in Halifax, Canada, November 29–Dec. 1, 2017 and it was declared a solid success. This event brought together over 230 Ocean leaders from across the Ocean industry sectors and stakeholder communities. The summit's program included 22 parallel sessions and panels attended by participants representing 28 countries from across the World.



The following list of the Summit's parallel sessions demonstrates the multi-disciplinary scope of the program:

- Aquaculture: Advancing Sustainable Aquaculture in a Multi-Use Ocean
- Maritime Clusters: Innovation and Collaboration for Ocean Sustainable Development
- Coastal Infrastructure, Extreme Weather Events, Green Infrastructure, and Blue Carbon
- Biofouling and Invasive Species: Addressing the Threat through Industry Collaboration
- Synergies in Shipping and Sustainability: International Collaboration on Green Shipping Programs
- Ocean Energy: Scaling Up Low Carbon Energy Sources from the Sea
- The Law of the Sea: New Legally Binding Instrument on Biodiversity in Areas Beyond National Jurisdiction
- Arctic Sustainable Development: Vessel Traffic and Maritime Infrastructure Projections and Scenarios
- Marine Sound: Tackling a Global Problem through Industry Leadership and Collaboration
- From Local Enterprise to Global Seafood Markets: Real Business Solutions for Fishery Sustainability
- Ship Strikes and Marine Mammals: Practical Solutions for Ocean Industries
- Smart Ocean-Smart Industries: Advancing Ocean Industry Data Collection
- Dark Ships: Advancing Ocean Governance and Maritime Security
- Addressing Cross-Sectoral Conflicts/Developing Synergies: Offshore Wind Energy and Fisheries

A major plenary session on “Ocean 2030: Ocean Industry Projections and the Future of the Ocean Economy”, expert members of the panel discussed the issues involved. It was generally acknowledged that achieving ocean economy's long-term potential growth and job creation requires that action is taken to include ecosystem preservation in an enhanced integrated ocean management approach.

In a related plenary session, a high-level panel of senior investment professionals discussed their perspectives on financing ocean sustainable development including advancing the collaboration of



investors in identifying opportunities for financing ocean sustainable development, identifying how the Ocean Investment Platform can best evolve as a global structure and process for facilitating and accelerating investment in ocean sustainable development.

I had the opportunity to be among this international group as an invited Panel Speaker in “The Digital Ocean” Session including Big Ocean Data and Ocean Cloud Computing: The Future of Ocean Sustainable Development. I observed from the session:

- What are the status, trends and forecasts for the development of the Digital Ocean, Big Ocean Data and the use of Cloud Computing for Ocean Sustainable Development?
- What are the benefits (economic, sustainability, maritime security, etc.) from a Digital Ocean that produces Big Ocean Data and harnesses Cloud Computing in support of Agenda 2030 and what are the challenges to achieving these benefits?
- What are the opportunities for industry leadership and collaboration in advancing the most beneficial progress in the Digital Ocean, Big Ocean data and Cloud Computing for Ocean Sustainable Development—at national, regional and global scales—and what should industry do to best engage other Ocean Stakeholders? This Panel concluded that the most economical way of benefit to all is action towards sharing Ocean Data among stakeholders.

I also attended some of the parallel sessions that are of interest to me, including: “The Marine Pollution”, which was Addressing the Threat through Industry Collaboration. I learned from the session:

- How can diverse Ocean industries understand and address the shared problem of biofouling and the introduction of invasive species? For example, the (Plastic dumping in the Ocean and the use of Underwater Vehicles that can support the detection of size and location of harmful waste)
- What opportunities exist for scientists, government and industry to create a common research and development platform on the causes, prevention and removal of biofouling?
- What are the proposed and new regulations regarding the potential importation and spread of non-indigenous marine species and can a pan-industry platform be developed to minimize business risks of biosecurity problems?

I participated in a Workshop on: “**WOC Young Ocean Professionals (YOP) and MIT Solve – Identifying Innovation Challenges for Ocean Sustainability**” and it was the highlight of the event by many



Ferial El-Hawary

participants who shared their experience in dealing with issues, opportunities and challenges that YOP will have in a future requiring implementing Ocean Sustainability mandates.

These discussions were sparked by the different SOS presentations and the cross-sectoral panels emphasized the unique role of WOC in bringing together the diverse Ocean Business Community (and other Stakeholders) to focus on the challenges and opportunities of Ocean Sustainable Development. Also, it was instructive to learn different perspectives of Ocean leaders around the world and exchange knowledge during the Conference.

I note that, the Conference Theme “The Ocean Sustainable Development Goal: Business Leadership and Business Opportunities” and discussions truly complement our traditional MTS/IEEE-OES OCEANS Conferences which suggests future cooperation between WOC and MTS/IEEE-OES.

The main focus was on the Marine Industry and WOC Young Ocean Professionals program—a growing global network of up and coming Ocean Professionals interested in sustainable development. Mr. Paul Holthus—CEO of WOC issued this invitation to young professionals from IEEE and MTS networks to join us. I also hope to see IEEE and MTS at the 6th Sustainable Ocean Summit (Hong Kong, 14–16 November 2018), which is already shaping up to raise the bar further on international business leadership and collaboration for Ocean Sustainable Development. Yes, it is indeed a step forward and beneficial to all.

Get more information on the Website:

www.oceancouncil.org

<https://sustainableoceansummit.org/>

On a Personal note: Wishing the readers Best Wishes for 2018

**Dr. Ferial El-Hawary, Life Fellow IEEE,
IEEE/OES–AdCom Member
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Panel Speakers from L. to R. Marc Fagan, CEO, EOS Data Analytics; Ferial El-Hawary, Dalhousie Univ.; Peter Mabson, president, ExactEarth; Melissa Garren, Chief Scientist, Pelagic Data Systems; Chris Coyle, Chief Strategy, Exocetus Autonomous Systems; and Graham Stickler, President, Beyond One Eighty.

Who's who in the OES and what they do....outside OES

John Watson, OES Student Poster Chair, OES AdCom Member, JOAB Member

Well first of all what do I do in OES? After joining the IEEE in 2002 I stood for and was elected to the Administrative Committee (AdCom) of OES for two terms between 2006 and 2011, and was re-elected from 2013 until 2018. I am also a co-opted member (from 2012) of the OES RECON (Reconnaissance) committee whose remit is to select and evaluate future OCEANS venues. I was recently appointed to OES Student Poster Chair, taking over from Phillippe Courmontagne (a hard act to follow!) and have been asked to stand on the Joint OCEANS Advisory Board (JOAB). I was elevated to Senior Membership of IEEE in 2005.

Perhaps my best claim to fame (notoriety) within OES circles is twice acting as General Chair of the OCEANS conference—Aberdeen'07 and Aberdeen'17. Why do it twice you might ask? Good question—it is well documented that after Aberdeen'07 I said “never again”, then the minute my back was turned.... there I was doing it again. But this time.... NEVER AGAIN! However, I should point out that on reflection chairing an OCEANS conference is a very worthwhile, enjoyable and challenging (although a bit frantic) experience. I was particularly proud to have been able to bring both these conferences to Scotland for the benefit of the subsea engineering community in Aberdeen and to the local community in general. It is significant that both OCEANS conferences that have come to the UK were held in Aberdeen. Both meetings were hailed by delegates, patrons and exhibitors as resounding successes.

So when I'm not doing OCEANS, what is my real job? I am Emeritus Professor of Optical Engineering at the University of Aberdeen and I guess from a professional point-of-view, it is my work on the development of optical holography and its application to subsea imaging, and in particular to the imaging



Figure 2. Working on HoloCam prior to its launch in Loch Etive.

and analysis of marine plankton, that is most relevant to readers of the Beacon. My optical engineering research group in the School of Engineering has developed several subsea holographic cameras, ranging from the classical analogue *HoloCam* to two radically new digital “holocameras”, *eHoloCam* and *eHoloCam2*; they were variously deployed in Loch Etive (west Scotland), the North Sea, the Faroes channel and, most recently, in the Okinawa Trough (off Japan).

The first of these, *HoloCam*, was designed to record simultaneous in-line and off-axis holograms of large sampling volumes (3,500 cm³ and 50,000 cm³ respectively) on holographic photoplates so that large opaque organisms and smaller semi-transparent organisms could be captured *in situ*. *HoloCam* was deployed in Loch Etive on the west of Scotland to a depth of



Figure 1. John opening the MTS/IEEE OCEANS'17 Aberdeen Conference.



Figure 3. HoloCam in the 2002 edition of the Guinness book of World Records!

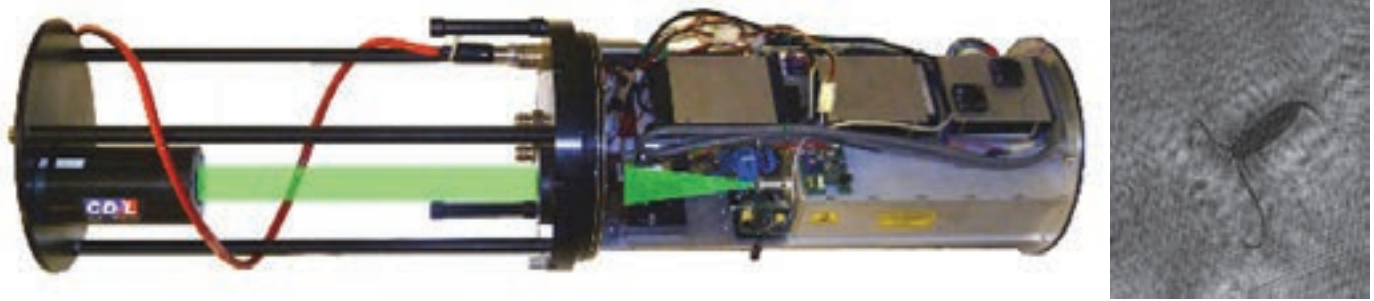


Figure 4. *eHoloCam* (showing beam path) alongside a reconstructed image of a calanoid copepod recorded in the North Sea.

100 m. However, this was a very large and heavy instrument (2.4 m long x 1 m diameter and weighing 2 tonnes) and not easy to deploy from a vessel; and it wasn't long before we turned to the development of smaller more user-friendly holocameras based on digital recording of the holograms.

By replacing the photoplate with an electronic sensor, holograms can be recorded and stored in a computer and replayed by numerical simulation of the propagating reference wave without the need for chemical processing of the holograms and complex laboratory replay facilities. Holographic videos could also be recorded. However, because of the limited pixel size (down to 3 μm), which is a factor of 100 bigger than the grain size of holographic photofilm, digital holography is generally deployed in the in-line mode. Our holocameras utilise a collimated (parallel) illumination beam to record water-column volumes of up to 40 cm^3 and are able to capture the larger and sparser zooplankton species at depth. *eHoloCam* was successfully operated to a depth of 450 m in the North Sea during 2005/06.

We constructed a second digital camera *eHoloCam2*, with a new laser, control electronics and subsea housings, which was deployed in the Okinawa Trough, Japan, to 1,000 m depth in September 2017. This was carried out in conjunction with The Institute of Industrial Science (IIS) of the University of Tokyo in September 2017.

Although technically retired from my University position, our work on subsea digital holography continues and I find myself drifting in to the lab two or three times a week. But when I'm not doing that my wife Joyce and I retreat to our



Figure 5. Our cottage in Arran and a view along the beach.

seaside cottage on the Isle of Arran on the west coast of Scotland as often as possible; but our children and 10 grandchildren usually find us quite easily! What else? Hill walking—which I don't do enough of! Indulging in Scotland's national drink—which I do too much of! Acoustic guitar playing—of which I should practice more—and photography.

Welcome New and Reinstated Members

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Andrew James Bates
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Chris Carpenter
Keifer Edelmayer
Ethan Glenwright
Peter Lambert
Keira Lane
Colin Ross
Lyden Matthew
Carvalhal Smith
Proteus Serralbo Virk

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Maria Greco

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Masato Kawai
Tadatsugi Okazaki
Jun Yamabayashi

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Malaysia

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Ahmad Anas Yusof

Netherlands

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Pakistan

Rabia Qadar

Portugal

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Upcoming OES Sponsored and Co-Sponsored Events

SAUVC2018, Singapore, March 9–12

<http://www.ieeeoes.org/pubs/newsletters/oes/html/fall17/SAUVC2018.html>

OTC ASIA 2018, Kuala Lumpur, Malaysia, March 20–23

<http://2018.otcasia.org/>

OTC 2018, Houston, TX, April 30–May 3

<http://2018.otcnet.org/>

OCEANS 2018 Kobe/Techno-Ocean 2018, Kobe, Japan, May 28–31

<http://www.oceans18mtsieekobe.org/>

BALTIC, Klaipėda, Lithuania, June 12–15

https://www.aconf.org/conf_130806.html

ISIE2018, Cairns, Australia, June 12–15

<http://www.ieee-isie2018.org/>

OSSES2018, Ningbo, China, July 4–6

<https://www.osessociety.com/oses2018>

UComms 2018, Lercici, Italy, August 28–30

<http://www.ucomms.net>

SeaTech Week, Brest, France, October 8–12

<http://www.seatechweek.eu>

OCEANS 2018 Charleston, Charleston, SC, USA, October 22–25

<http://charleston18.oceansconference.org/>

ATC2018, Houston, TX, November 5–7

<http://www.otcnet.org/>

AUV2018, Porto, Portugal, November 6–9

<http://auv2018.lsts.pt/>

From the Student Activities Chair

Brandy Armstrong

I was selected as the Student Activities Committee Chair in January of 2018. I am an elected member of the IEEE Oceanic Engineering Society (OES) Administrative Committee (AdCom) and work with the U.S. Geological Survey at Stennis Space Center in Mississippi where I manage the hydraulics laboratory and evaluate new instrumentation.

In 2016 I began volunteering with IEEE OES as the liaison to Women in Engineering and have since been elected to AdCom where I have been active in the Membership Development and Promotion & Outreach committees.

As chair of the student activities committee, I can put my interest in mentoring students and young professionals to good use. My involvement in creating a more prominent social media presence for OES lends itself to encouraging students and young professionals to be more active in the society.

I hope to encourage more women, students and young professionals to follow my example and build their careers through volunteering with OES. Programs like the student poster



Brandy Armstrong,
summer of 2017.

competition, OCEANS student social, student travel scholarships and the student council, help students to make contacts, build their resumes, and build their confidence, which ultimately will lead to their success.

I would like to see more opportunities created for students to publish through the OES JOE, Beacon and Earthzine. I would also like to see more opportunities for students and Young Professionals to network and get involved at OCEANS conferences. One way to do this would be to organize a career forum, mentorship workshop and job fair at OCEANS. OES is working to increase the number of student

branch chapters at universities with ocean related programs and to provide tools that facilitate student chapter participation and outreach.

I have lots of ideas and I will do my best to work with the Executive and Administrative committees to increase opportunities for students. If you would like to get more involved in the society, please contact me at brandy.armstrong.us@ieee.org.

From the President *(continued from page 3)*

passport photo of the nominee, plus a brief (not to exceed one page) OES vision and action statement by the nominee.

Another relatively simple way to become involved (a few hours of your time) is to volunteer to review abstracts of papers submitted for presentation at OCEANS conferences, or at Off-shore Technology Conferences (OTC Houston, OTC Asia, OTC Brazil, ATC). If you feel so inclined, do offer your services to the Vice President for OCEANS (oesvpc@ieee.org) and the Chair of the OES OTC Committee (jerrycortez@charter.net).

If you are looking for more challenging assignments with higher networking potential (a few weeks of your time in aggregate), contact the Vice President for Workshops and Symposia (philippe.courmontagne@isen.fr) and/or the Vice President for Technical Activities (mal.heron@ieee.org) to learn about opportunities to help organize and run OES events.

On behalf of OES, I would like to thank all of you who have generously donated your time and talents to help run the Society. Special thanks go to:

- N. Ross Chapman who has served as Editor in Chief of the Journal of Oceanic Engineering (10–2012 to 12–2017) and now serves as Chair of the OES Fellow Evaluation Committee;
- Shahriar Negahdaripour, who has served as Chair of OES the Fellow Evaluation Committee for the past five years;

- Albert (Sandy) Williams III, who served as Vice President for Conference Development (2014–2017) and continues to serve as co-Chair of the Joint OCEANS Administrative Board (JOAB);
- William Kirkwood, who served as OES Treasurer (2014–2017) and continues to serve as Assistant to the President while OES faces external budgetary challenges;
- Robert Wernli, who served as Vice President for Professional Activities (2014–2017) and continues to serve as co-editor of the OES Beacon newsletter.
- Robert Bannon, Ferial El Hawary, Barbara Fletcher, Stephen M. Holt, Harumi Sugimatsu, and Stephen Wood, the six AdCom members whose term ended in 2017.

Welcome aboard to the new Editor in Chief of the Journal, Mandar Chitre; the new OES Treasurer, Elizabeth Creed; the new Vice President of Professional Activities, James S. Collins; the new Vice President for Workshops and Symposia, Philippe Courmontagne; the three 2017 AdCom candidates appointed to replace the newly elected ExCom members above: João Alves, M. Atmanand, and Stephen Wood; and the 2018–2020 AdCom class with some new and some returning members: Gerardo Acosta, Jean-Pierre Hermand, William Kirkwood, Venugopalan Pallayil, Harumi Sugimatsu, and Robert Wernli.

Christian de Moustier

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OCEANS 2018 Charleston is the annual joint conference of MTS and IEEE, and will be held October 22–25, 2018. The theme – *Healthy Oceans, Resilient Communities, Robust Commerce... Strong Nations* – will draw strongly on local and regional to international issues of interest, including how science and technology must inform and enable the challenges of a 21st Century where environment, society, and economics are highly interconnected.

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