OES BEACON

Newsletter of the Oceanic Engineering Society

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Protecting and utilizing the world's largest natural resource, our OCEANS
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IEEE

IEEE Oceanic Engineering Society

The OES BEACON is published four times a year as a benefit to the membership of the IEEE Ocean Engineering Society. The OES Beacon is printed and distributed from IEEE headquarters in New York City, New York, USA.

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

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From the OES BEACON Editors

Harumi Sugimatsu and Robert Wernli

Welcome to the June 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 featured reports on our upcoming OCEANS 2018 Kobe conference, newly appointed Administrative Committee members, and a large number of member, committee and chapter reports. And this issue will continue providing you with the latest OES activities and opportunities for our members.

Chapter activity continues to accelerate as reported by the Singapore; Malaysia; Porto, Portugal; Japan; and Victoria, B.C., chapters. Especially significant in our chapter activities is the SAUVC 2018 competition where 26 student teams competed using a wide range of autonomous vehicles.

EiC Harumi Sugimatsu during her balloon census of the Ganges river dolphins, February 2018.

Co-EiC Robert Wernli, joined by (L-R) Leonard Pool, Andy Clark, Alan Kenny and Jim Barbera during an OCEANS 2021 Reconnaissance Committee trip to San Diego.

Besides our many ads that provide details on upcoming conferences and events, our Vice President for Workshops and Symposia (VPW&S), Philippe Courmontagne, provides a detailed description on how, and when, our members and chapters can apply for one of these events. And Mal Heron, our VP for Technical Activities, outlines the Distinguished Lecturer program, your lecturer opportunities, and, if desired, how you can become a DL. And don't miss the article on the extensive activities of Stephen Wood, one of our newest AdCom members.

Brandy Armstrong, our Student Activities chair and Fred Maussang, our Young Professionals (YP) chair, provide the latest on opportunities and financial support options for students and YPs. In addition, Brandy has prepared a report on our social media programs and how you can become involved. You can also enjoy her work for promoting society social media at OCEANS 2018 Kobe on the front cover of this issue.

And, don't forget to vote in this year's AdCom election. The candidates and their qualifications are listed in this issue. Want to get involved in the future? Consider running for an AdCom position in 2019.

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.

Correction

The OCEANS CONFERENCES ad in the last issue had the wrong date for the OCEANS 2019 Seattle conference. As you can see in the ad in this issue, the date has moved to 27–31 October 2019.

Member Benefits—Did You Know?

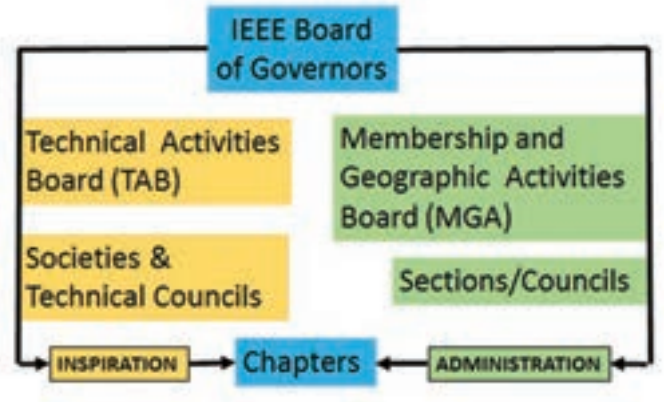
Networking Your Career

With all the social media "networking" opportunities, which OES is diligently working to expand for your benefit, don't forget the ol' fashioned "grip and grin." Yes, that face-to-face meeting or discussion that one can have when attending a society symposium, workshop, conference, branch meeting or other event. Reach out to other members during the events, whether during a technical discussion, over lunch, or just enjoying a cold one together. Enter a competition. Give a paper. Or, just attend. Build your physical network . . . your team . . . your career. Yes, if you want to make it to the top in your career, you'll need a "network team" that will help you get there. Reach out—Network! Good luck.

VPTA Report

Malcolm Heron, OES Vice President for Technical Activities

The Society Chapters sit at a dynamical stress point in the structure of IEEE. On one hand they are geographically based and are administratively connected to Sections or Councils. On the other hand they are progeny of the technical societies and get their technological inspiration from there. There is a legendary caution about serving two masters; but there are some benefits to be gained from this duality. There are also some downsides, the main one being that the 'administration' path can interfere with 'inspiration' in the structure illustrated in the schematic below.



So, the Chapters have all their financial management and appointments governed by the geographical unit, but their technical affiliation is to the Society. For most of the time this works well. The Membership and Geographical Activities Board (MGA) receive reports from the Chapters at the end of each year and, if you have had at least two technical meetings, and your officers are properly in place, the Chapter gets a subsidy of a few hundred dollars (depending on number of members and the wealth of MGA) at the beginning of the following year. The Society has nothing to do with this; it is all MGA. OES offers support to chapters in a couple of ways. There is an OES Distinguished Lecturer Program that can help with technical talks. You can see the mesh of cog wheels working here because the meetings aided by OES are eligible for reporting to MGA. OES also provides incentive funding for Chapter activity. In the recent past the criteria to be 'active' was to have held at least two technical meetings and to have successfully reported them to MGA on the L31 system and submitted an article on the activity to the OES Beacon newsletter. That means if the Chapter satisfied the MGA criteria for their subsidy, then OES provided an extra incentive of funds that varied according to the financial position of OES as the end of the year approaches.

One path in the OES Strategic Plan is to develop a more geographically spread in the Workshops and Symposia that we offer, and you can see here where Chapters are in a good position. To encourage this, the OES AdCom is looking at ways to spread the definition of 'active' to include sponsorship of workshops or symposia. With any luck some changes will have been made at the AdCom meeting in May—between me writing this and you reading it. So, you can start planning your regional workshop or symposium as soon as you have finished reading the Beacon.

Call for OES Distinguished Lecturers: Nominations for 2020–2022 Close 2400 UT February 28, 2019

Malcolm Heron, OES Vice President for Technical Activities

The IEEE Oceanic Engineering Society (OES) invites nominations for OES Distinguished Lecturers. The IEEE OES Distinguished Lecturers Program provides high quality speakers to the Oceanic Engineering Community, especially, OES Chapters, Student Branch Chapters, and Student Clubs. Appointment as an OES Distinguished Lecturer is a major Society recognition. The selected Distinguished Lecturers will be approved by the OES AdCom at their September Equinox Meeting, to commence on 1 January of the following year.

Nominations:

Distinguished Lecturers will have

- high technical proficiency in their area;
- demonstrated ability to make technical presentations that are inspiring to audiences of experts, as well as to general audiences;
- OES membership throughout the term of their appointment.

The DL nominee must be nominated by an OES member who does not have conflict with the selection process. Self-nominations are not accepted. If you are looking for a nominator we encourage

you to contact the chair of the most relevant OES Technology Committee. Nominations for a three-year term 2020–2022 close on 28 February 2019 with the Vice-President for Technical Activities. A nomination email should include a brief CV (1 page) of the nominee, contact details for the nominee, the nominator and two OES members who have heard the nominee make an oral presentation.

The Distinguished Lecturer Committee will consider nominations, taking into account the diversity of topics and geographic spread of the pool of Distinguished Lecturers, as well as the criteria given above.

Duties:

The Distinguished Lecturers will start their three-year term in January. Each Lecturer should submit topics in his/her field of expertise that will be posted on the Society Website. The Distinguished Lectures should be readily available to travel within their geographical area upon contact by the Chapters or appropriate organizations, and will be expected to add small diversions to international travel to present lectures as opportunities arise. Reasonable travel expenses will be paid by the Distinguished Lecturers Program.

Distinguished Lecturer Program: Jul–Dec 2018

Malcolm Heron, OES Vice President for Technical Activities

When Distinguished Lecturers (DLs) take long-haul flights, there is often an opportunity for the DL Program to help with stopovers or side trips to deliver lectures. In the table below we have listed such travel for each DL for the next six months. If your Chapter or Section would like to take advantage of this, simply make contact with the relevant DL to devise a Plan. You should CC VPTA (mal.heron@ieee.org) to keep me in the loop. and remember you MUST ask for any funding support and get approval from your friendly VPTA PRIOR to making any commitments. This is simply so that I do not have to arm-wrestle with the auditor. The URL for information about Distinguished Lecturers is http://www.ieeeoes.org/page.cfm/cat/16/Distinguished-Lecturers. Don't overlook the possibility of inviting a DL who is located near to you. Also, please think laterally about calling on DLs for keynotes at Workshops or non-IEEE meetings.

DL & location	Key Words (refer web site for details)	Destinations and dates	
Sandy Williams Woods Hole, Massachusetts	Technology of flow measurement; Oceanographic instrumentation; Microstructure and mixing; Bottom boundary layer turbulence and sediment transport.	Charleston South Carolina	19–29 October 2018
Mal Heron Townsville, Australia	HF Radar Technologies; HF Radar Applications; Coastal Oceanography.	Hobart, Tasmania, Australia Falmouth, MA, USA Charleston, SC, USA Houston, TX, USA Vancouver, BC, Canada	14–17 August 2018 6–11 Sept, 2018 21–25 October 2018 5–7 November 2018 15–18 Nov, 2018
Milica Stojanovic Boston, Massachusetts	Underwater acoustic communications -Statistical characterization of underwater acoustic communication channels -Signal processing for acoustic communications: synchronization and channel equalization -Multi-carrier modulation/detection for acoustic channels -Reliable transmission over acoustic channels	Lerici, Italy Croatia	August 2018 October 2018
Jim Candy San Jose, Oakland, San Francisco, California	Model-based signal processing; Bayesian signal processing; Acoustic signal processing; Nonlinear filtering; Time-reversal signal processing; Radioactive contraband detection.	Charleston, South Carolina	21–25 October 2018
Kenneth Foote Woods Hole, Massachusetts	Underwater sound radiation and scattering; Marine resource quantification; Sonar performance evaluation		

Marcia Isakson Austin,Texas	Ocean acoustic propagation and scattering in complex environments; Finite Element Modeling; Sediment Acoustics.	Victoria, BC, Canada Southampton, England	4–10 November 2018 2–6 December 2018
René Garello Brest, Bretagne, France	Ocean surface monitoring from space: sea—state, pollution and ship detection		
Paul Hines Halifax, Nova Scotia, Canada	Aural perception and acoustic classification; High duty cycle/continuous active sonar.	Portland, Oregon Victoria, BC, Canada	Summer 2018 November, 2018
Jean-Pierre Hermand Brussels, Belgium	Acoustics and acoustic ecology of marine habitats Passive geoacoustics Ocean acoustics in the Latin America and Caribbean Region Adjoint modelling for acoustical oceanography	Texas, USA Lima, Perú Guayaquil, Ecuador Santa Marta, Colombia Hobart, Tasmania, Australia	30 April-4 June 2018 August 2018 August 2018 August 2018 December 2018

The Times They are A Changin'

Jim Collins, Vice President for Professional Activities

When Bob Dylan first released this song and album in 1964, mass market digital computers were a novelty, the internet was not yet on the horizon and e-publications and Social Media were even more distant. Around 2008, the IEEE created Earthzine and was the primary supporter at its origin. Earthzine was focused on Earth Observation and GEO. NASA, with its interest in GEO, agreed to support Earthzine via a series of grants managed by IEEE.

A key vote was taken by the OES Administrative Committee in 2013 where a motion was approved by a 16 to 9 vote to endorse two existing NASA grants for Earthzine under the following conditions, "OES assumes no responsibility for any charges that may exceed the remaining grant funds or be liabilities connected to these grants. Such liabilities remain the responsibility of IEEE."

Earthzine was directed by OES need for relevance to have increasing content and focus on oceans which reduced the interest of NASA. In January 2018, NASA Earthzine funding ended and the founding Editor in Chief (EiC) resigned. The IEEE OES now must decide whether or not to continue Earthzine with a volunteer EiC and writers in its current form in these changin' times.

Indeed, Earthzine received support from OES through various initiatives over the last few years, but as warned by the EiC in 2017, the NASA grant wasn't renewed and we arrived at the current situation where IEEE OES is the sole supporting organization. It must be noted that even if NASA or other governmental organization was interested, IEEE is no longer accepting US government grants. Therefore, Earthzine found itself in an unfunded situation as of the end of April 2018.

It is interesting to note that although NASA was the primary financial support of Earthzine, and while NASA's budget went up this year from $19.6 Billion to $20.7 Billion, NASA saw fit to cease funding Earthzine. A visit to the website, https://www.nasa.gov/socialmedia , shows that one can currently follow NASA activity on eighteen different social media sites. Priorities change.

In a widely broadcast resignation email of April 16th, 2018, the former EiC solicited for interest in the EiC position: "If you are interested in either volunteering or applying for the EiC, please contact Jim Collins." Reaction has been minimal. I received four immediate responses to this email, only one from a person interested in the EiC position. There has been no further response. A repeat call for a new EiC, included in this issue of OES BEACON, may change this.

Because of this lack of financial support and the minimal response to the call for a new Earthzine EiC, I think it wise to evaluate our publications (aside from conference proceedings and the OES Journal of Oceanic Engineering) to see how they can better serve our members and how they might attract new members. The period looking for a new EiC can also serve as an opportunity to review the mix of media and publications we need.

Presently, all OES publications are available in on-line versions with only the IEEE OES Beacon Newsletter available additionally in printed form. Aside from OES conference proceedings and the Journal, the OES publications available are the OES Beacon, the www.ieeeoes.org website, e-news, and Earthzine. In addition to IEEE Collabratec and regular OES email communications, we are moving towards incorporating 3 or 4 social media links on our website. With these 8 or 9 sources of information available (plus conferences and JOE) it is time to prioritize and pick the ones most valuable to OES members.

Maybe all of this means combining the OES Beacon, the Earthzine and the e-News into one or two e-publications. While deciding this let us do our best to find a volunteer EiC for Earthzine or perhaps its successor. Please send me your suggestions.

What do you think? Let me know at j.s.collins@ieee.org. The Times They Are A Changin'.

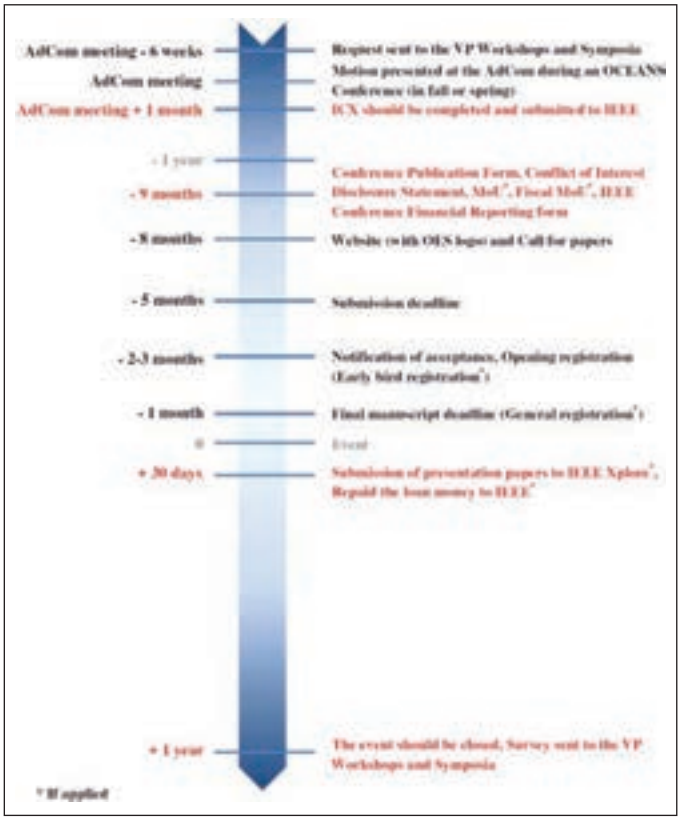
From the Vice President for W&S

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 and is looking for new workshop/symposium topics and individuals to organize them. For those interested in organizing an OES sponsored workshop/symposium, it is necessary to get in touch with the VP Workshops and Symposia and to respect the following schedule:

As you can see, this process begins far enough in advance to have approval of the event no less than one year in advance. On request, a guidebook for workshop/symposium organization can be provided.

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 Student Activities Chair and Social Media Coordinator

Brandy Armstrong, OES Student Activities Chair and Social Media Coordinator

Does your Chapter or Student Branch Chapter need funds to kickstart a member drive or pay for chapter events? Do you or another member of your geographic unit need assistance with travel to the next OCEANS conference? IEEE OES has funding available this year for two NEW programs that could help raise money for your geographic unit or fund member travel to OCEANS. The first program describes how to apply for Student Branch Chapter support funding and the second program describes how to apply for Social Media Initiative funding. To participate, all proposals must be submitted before September 30th 2018, which will allow OES to disburse the funds before the end of the year. Sending in applications early will help to ensure funding is still available!

Student Branch Chapter Support Program

The IEEE Oceanic Engineering Society (OES) has begun a new Student Branch Chapter (SBC) support program. This program is designed to provide financial support to the SBCs for the following:

- Financial support to a maximum of two SBC chairs or representatives to attend each OCEANS conference where they will be involved in supporting the society, the conference and promoting student activities and participation.
- Financial support, up to a maximum of $2,000, for SBC initiatives such as technology demonstrations and/or participation in contests/competitions where OES related technologies are demonstrated.

Students mingle with Oceanic Engineer Society committee members during the OCEANS'17 Anchorage student mixer.

The financial support for travel to OCEANS and for technology initiatives will be based on the available funds and the activity of the SBCs. Funding will also be considered for activities that can "kick start" an SBC to increase its society involvement.

To participate, 90 days prior to the date funds are required, the SBC should provide the student activities coordinator, Brandy Armstrong, the name and contact information of the SBC chair or representative who is nominated to attend the next OCEANS conference.

And/or, the SBCs interested in a technology initiative can provide a not to exceed one-page request for support that indicates the following:

- Description of the initiative
- Identify who in the SBC is involved
- What the benefit to the SBC and the OES will be
- Required amount and time frame for the funding
- Existing funding (student chapter funding, local chapter funding)

In addition, both travel support and technology initiative requests will need to include:

- Description of plans to share (website, information, photos, video) the supported activity on social media (IEEE OES LinkedIn group—https://www.linkedin.com/groups/1519807, Facebook page—https://www.facebook.com/IEEEOES/, Twitter—https://twitter.com/ieee_oes)
- Timeline for submitting a Beacon article detailing the supported activity once it has been completed

Those SBCs interested should send inquiries to the student activities chair brandy.armstrong.us@ieee.org.

Supporting OES Social Media Through Member Involvement Program

The IEEE Oceanic Engineering Society (OES) has a new IEEE OES organizational units support program. This program is designed to provide financial support up to a maximum of $2,000, to the branches and chapters for the following:

1) Build a website and social media pages for their unit and maintain an active presence
2) Provide Live coverage of an OES sponsored event/conference (such as OCEANS) on their unit's existing social media pages (tagging OES) and on OES social media pages. Travel expenses for one person or a Maximum $2000 for a locally hosted event. See requirements below.
3) Contribute to themes chosen for the social media calendar by writing and submitting articles covering IEEE OES member activities to Earthzine & Beacon, recording videos of IEEE OES lectures/events, or blogging on their local chapter/branch website (this would require submitting articles to be reviewed/edited for appropriateness).
4) Run a campaign (membership drive, meme contest, video/picture contest, etc.) to bring attention and followers to OES social media.
5) Funding will also be considered for creative activities that can "kick start" OES social media presence by increasing the number of followers. Be creative and propose another way to enhance the OES social media presence.

The financial support for travel to events and for social media initiatives will be based on the available funds and the activity of the units.

To participate, 90 days prior to the date funds are required, the unit should provide the social media coordinator, Brandy Armstrong, the name and contact information of the unit chair or representative who is nominated to attend and provide live coverage of an event and/or, the unit interested in a social media initiative can provide a not to exceed one-page request for support that indicates the following:

- Description of the initiative
- Identify who in the unit is involved
- What the benefit to the unit and the OES will be

In addition, social media initiative requests will need to include:

- Description of planned schedule for sharing (website, information, photos, video) the supported activity on social media (IEEE OES LinkedIn group—https://www.linkedin.com/groups/1519807, Facebook page—https://www.facebook.com/IEEEOES/, Twitter—https://twitter.com/ieee_oes)

Follow @IEEE on Twitter for the latest OCEANS updates, society news and to get the scoop on cutting edge ocean technology.

• Timeline for submitting an Earthzine or Beacon article detailing the supported activity once it has been completed

Those geographic units interested should send inquiries to the social media coordinator **brandy.armstrong.us@ieee.org.**

Rules for Official IEEE OES Social Media Posting

1) Follow IEEE social media policy https://brand-experience.ieee.org/guidelines/digital/social-media/
2) Use relevant popular hashtags and OES tags and hashtags
   a) OCEANS
      i) #OCEANS18—For all OCEANS conferences during the year 2018
      ii) #OTO18—OCEANS techno Oceans Kobe, 2018
      iii)#OCEANSFanatic
   b) IEEE OES
      i) @IEEEOES—Facebook page
      ii) @IEEE_OES—Twitter
   c) Use relevant chapter/branch tags, cooperator tags and hashtags

Like and Follow IEEE Oceanic Engineering Society on Facebook to view live feed and update from OCEANS'18 Kobe.

Requirements to Receive Funding for Social Media Reporting at OES Sponsored Conferences/Events

1) Must be willing and able to acquire (purchase or borrow) and use a smart phone (or other multimedia device) to take pictures and recordings and post to social media during the event
2) Prior to conference, review the schedule and write out a schedule/plan for what sessions, activities and interviews will be covered each day (requirements below) and how they will be incorporated into a Beacon article or video required to be submitted following the event. This plan must be submitted 2 weeks ahead of the event to the social media coordinator Brandy Armstrong at brandy.armstrong.us@ieee.org.
   a) Sessions: Reporters must cover at least two sessions (2 posts if there is only one session) in the morning, two in the afternoon, each day that there are sessions (at least 4 post a day related to session coverage). Each post must contain 40-100 characters of text.
   b) Activities: Reporters must attend at least 2 social activities and post at least 2 photos from each mixer, reception, gala or other social activity attended. Each post must contain 40-100 characters of text.
   c) Competitions:
      i) For a competition held in conjunction with a conference, reporter must interview 3 or more competitors, quote them (40–100 characters) with photo of the competitors with their entry or do a short live interview (3–5 minutes).
      ii) If the event being covered is solely a competition (no associated conference), reporter must interview at least 4 teams for each day that the competition is taking place and record live video of the final rounds of competition. If possible, contact teams ahead of time to set up interviews.
   d) Vendors/new technology: At least once a day do a short (1–5 min) "live" interview with a vendor at their booth covering new technology/cutting edge science—use both vendor tags and OES tags
   e) Members: At least once a day do a short (1–5 min) "live" interview with an OES member or chapter (anyone who is actively involved is great) preferably in front of a backdrop with the OES logo on it
   f) Miscellaneous: other events/topics could be of interest to cover on OES social media. Please include this in the written plan for prior approval.
3) Prior to conference, ensure social media apps are installed on your smart phone to access Twitter, LinkedIn and Facebook.
4) Following the conference, submit an article to Beacon that is 1000 to 1600 words long and contains 5-10 pictures or submit a video compilation from the event that is 10 to 18 minutes long. Or some combination of the two. Submissions could cover: new technology, cutting edge research, competitions associated with the conference, member involvement, or another topic with prior approval.

For additional information please contact Brandy Armstrong at brandy.armstrong.us@ieee.org.

From your new Chapter Coordinator

Gerardo Acosta, OES Chapter Coordinator

This is my first communication with you as Chapter Coordinator (CC). I am looking forward to fulfilling the following responsibilities of the CC as mandated by the OES AdCom: Chapter development, financial oversight, evaluation of rebates and rewards for each chapter, and Regional Chapter Coordination.

Gerardo Acosta, new Chapter Coordinator.

Rebates amount to approximately $200 per year. Rewards are provided to chapters as an additional activity incentive. Chapters that have organized at least two technical meetings and met some additional requirements related to these meetings (between 1 November of the previous year and 31 October of the current year) will be eligible. Additional details regarding rewards will be presented shortly.

My efforts as CC will benefit chapters by acting as an important informational resource. I can provide guidance on how to organize successful activities and events, that will provide value to all OES members, professionals, students, academia and industry members. Additionally, the CC is available to facilitate regional coordination for our Distinguished Lecture speakers who will provide expert presentations on timely topics.

I want my tenure as CC to see substantial growth in our chapters. That will happen through an active dialogue with chapter leaders. Please let me know how I can assist your chapter. By understanding your needs and plans I can more effectively be your voice to our OES leadership. Please contact me at: gerardo.acosta@ieee.org. I am looking forward to meeting with the chapter chairs or their associates who will be attending the OCEANS Conferences on Thursday's mornings at 12 o'clock, for a working lunch.

Awards for OES members

Contact the Editors with Your Submissions

Katsuyoshi Kawaguchi Received the Prizes for Science and Technology Commendation with his Colleagues in JAMSTEC

The Prizes for Science and Technology is a commendation for science and technology achievement by the Minister of Education, Culture, Sports, Science and Technology. Katsuyoshi (OES Japan Chapter Chair) and his colleagues prized technology development category for their contribution to the "Development of Dense Ocean-floor Network system for Earthquakes and Tsunamis (DONET)". The Award Ceremony was held at Ministry of Education, Culture, Sports, Science and Technology on 17 April, 2018, in Tokyo, Japan. Katsuyoshi Kawaguchi, Yoshiyuki Kaneda and Narumi Takahashi were presented the award. Congratulations!

Katsuyoshi Kawaguchi.

Narumi Takahashi, Yoshiyuki Kaneda and Katsuyoshi Kawaguchi (from L to R).

Marinna Martini Ices the Competition!

The 70th Annual United States Women's Curling Association (USWCA) National Bonspiel was held February 14–18, 2018, at the Triangle Curling Club in Durham, North Carolina. Congratulations to Marinna Martini, OES ExCom Secretary, and her team who took home the gold, winners of the First Event, the Longnecker Rink from Cape Cod Curling Club in Falmouth, Massachusetts.

Call for Interest: Earthzine Needs a New Editor-in-Chief

Contact the Vice President for Professional Activities, Jim Collins at j.s.collins@ieee.org

Earthzine is a dynamic e-magazine based on the premise that awareness is inextricably linked to observation. By observing the Earth, society can make an informed response to rapid changes occurring in Earth's environment. To that end, we are proud of Earthzine's contribution to fostering Earth observation and raising global awareness. And, as an OES e-magazine, we will increase the awareness of Earth's oceans and waterways in future issues.

Earthzine was established by NASA and now operates under the auspices of the IEEE Oceanic and Engineering Society. It publishes articles on the web site as they become ready. Earthzine produces four seasonal themed issues per year. Themed issues are edited by Guest Editors who are experts in the particular topic being featured. As well there is a monthly focus: for example in June 2018 the focus is 'Big Data' and articles will have been solicited for that topic. Associated is a Full Moon Newsletter which is sent via email to mark every full moon. The newsletter contains summaries of recently published articles and announcements on upcoming projects. It's a great resource to find out what's happening in the Earth-observing community. We ask people to sign up for the newsletter, it is a free subscription.

OES seeks an Editor in Chief to lead this effort. It's a terrific opportunity to grow personally and professionally! If you are interested in being the EiC, which is a volunteering position, please contact the Vice President for Professional Activities Jim Collins at j.s.collins@ieee.org

IEEE OES Members from the Engineering Faculty of Olavarría Participate in Underwater Acoustics Training

Gerardo Acosta, OES Chapter Coordinator

Two researchers from the Engineering Faculty of Olavarría (*Universidad Nacional del Centro de la Provincia de Buenos Aires—UNCPBA*) participated with colleagues, in training on equipment used for underwater acoustics. Part of the training was aboard an Argentine oceanographic vessel that participated in the search for the missing ARA San Juan. The submarine has been missing in the South Atlantic since November 15, 2017 and is still missing with all 44 crew members.

Sebastián Villar and Bruno Menna, IEEE OES members and researchers at the INTELYMEC Group (Technological Research in Electricity and Mechatronics), traveled to Buenos Aires and Mar del Plata to take part in the training. The intensive training course required joining the crew of the BIP (*Buque de Investigación Pesquera*—Fishing Research Vessel) Victor Angelescu for five days. The BIP Angelescu belongs to the INIDEP (*Instituto Nacional de Investigación y Desarrollo Pesquero*—National Institute for Fishery Research and Development). This oceanographic vessel is the most modern vessel that Argentina possesses and employs the most advanced technology for fishing and environmental research available. The state of the art sonars on the ship was a primary reason that is was chosen for the ARA San Juan mission. While anchored in the port of Buenos Aires, the BIP Angelescu received the oceanographers, marine biologists, physicists, engineers and personnel from the Argentinean Navy, who will employ the underwater acoustics instrumentation. Training was guided by Lars Anderssen (Head of Development of Acoustic Technologies) and Tonny Algroy (Manager), from the Norwegian company SIMRAD, who developed and manufactured the instrumention.

Both researchers were trained on the installation of the equipment, unique features, the broadband system (EK80), and the multibeam echo sounder (ME70). Equipment capabilities permit, among other things, permit the study of the water column, various acoustic research experiments and bio-acoustic analyses. Training during this course provides the necessary fundamentals for setting up the equipment and adapting it for employing it for varied research scenarios.

Mar Del Plata

Complementary training in Mar del Plata at the INIDEP facilities was also included. While there, the engineers focused on the processing of acoustic data, in a course presented by Rolf Korneliussen, a physicist with a doctorate specializing in underwater acoustics. Dr. Korneliussen leads the working group at Fisheries acoustics/Acoustics ecology, and is a global pioneer in acoustics

IEEE OES members on-board, from left to right: Bruno Menna, the second from the left, Adrián Madirolas, the third from the right, and Sebastián Villar, first from the right. Credit: A. Dorta, OES Argentinean Chapter Chair.

research while at the Institute of Marine Research (IMR) of Bergen, Norway. With the data obtained in one of the missions on board the BIP Victor Angelescu, the scientists carried out processing and configuration exercises with state-of-the-art software. The experience gained during this training serves to strengthen and expand the work in underwater acoustics carried out by INTELYMEC at the laboratories of the Engineering Faculty, UNCPBA.

Underwater Robot Convention In JAMSTEC 2018

8/24 (Fri.) Preparation & Adjustment

25 (Sat.) Preparation & Adjustment · Presentation

26 (Sun.) Convention · ROV Free Play · JAMSTEC Tour

(This schedule is JST standard.)

Registration required→
(entrant / visitor)

Venue : JAMSTEC
2-15, Natsushima-cho,
Yokosuka-city, Kanagawa, Japan
In 20min at Oppama Sta. by bus.
URL : http://jam18.underwaterrobonet.org

Held by Underwater Robot Convention in JAMSTEC'18 Executive Committee

特定非営利活動法人 日本水中ロボネット Japan Underwater Robot Network

日本財団 THE NIPPON FOUNDATION

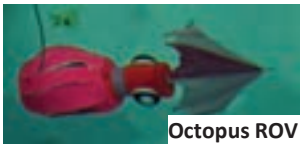
海と日本 PROJECT

Underwater Robocon has been held annually since 2007. There are three divisions: AUV Class, Free Class and Junior Class. (AUV Class is canceled in this convention and was held OCEANS' 18 in Kobe) Every year, many teams from universities to individuals register and join the convention.

Free Class

In the free class, entrants compete the originality of their robot. Evaluation is based on the total of weight points, presentation points, and competition points.
The competition points are scored during a 5 minute performance. The performance can be done twice in the morning and afternoon on the last day.

In this class, we don't impose a lot of limitations to the robots. So, many unique robots have participated. In previous entries, we have seen a penguin robot, an anomalocaris robot, an archerfish robot and a robot that supplied drinking water to divers.


Octopus ROV


Turtle ROV


Quadrotor ROV

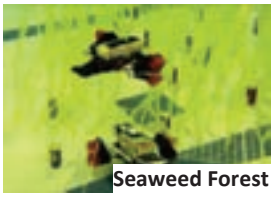

Unit-type ROV

Junior Class

The junior class is a competition for junior high, high school and technical college students.

After the team finishes the entry, the ROV kit will be provided free of charge for them. They assemble and customize the ROV and participate in the competitions.

In the competition, the pilot navigates the ROV and competes to see how many cans can be collected in 5 minutes. The competition course has two fields that are constructed as a wide field and a seaweed forest field. The seaweed forest field is difficult, but it has high points for collecting the cans.


Seaweed Forest


Wide Field

Schedule(JST Standard)

4 / 1	Official Website open
6 / 1	Entrant registration begins (Free/Junior)
6 / 1	Visitors registration begins
7 / 13	Entrants deadline for registrations
7 / 20	Junior ROV Kit be offered (estimate)
8 / 17	Underwater Robot Seminar and Visitors deadline for registrations
8 / 24	Preparation and adjustment (Free part)
8 / 25	Free Part: Adjustment / Presentation Session Junior Part: Adjustment / Workshop Underwater Robot Seminar
8 / 26	Convention / JAMSTEC Tour

*The Schedule is subject to change on account of the host.

Underwater Robot Seminar and Tour

We also hold a seminar on new topics of underwater robots. And, In the tour, you can also see JAMSTEC which is rarely seen usually. Don't miss it !

See the Official Website !

URL: http://underwaterrobonet.org/jam18/

Underwater Robocon

"NPO Japan Underwater Robot Network" is looking for a sponsoring organization. Please contact us by the official website!

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 symposium 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 (but not limited to) 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 | IEEE / OES Portugal Chapter

OES IEEE Oceanic Engineering Society

LSTS

U.PORTO FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO

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

auv2018.lsts.pt

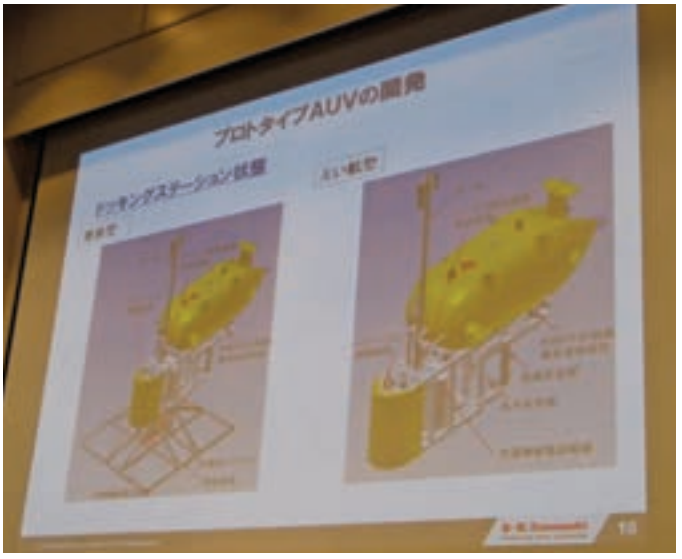
Chapter News

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

Japan Chapter—61st Underwater Technology Forum at IIS, the University of Tokyo on April 13, 2018

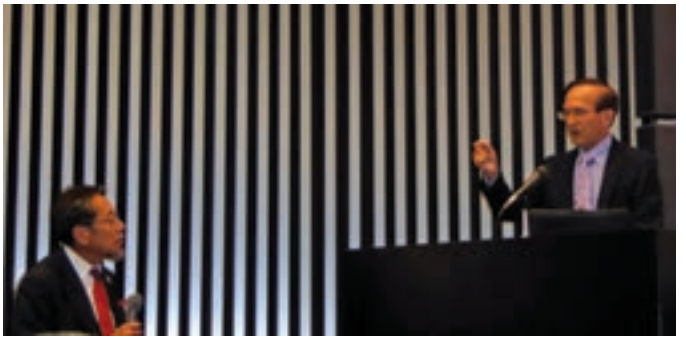
Reported by Harumi Sugimatsu, Vice Chair

The "Underwater Technology Forum" has been held twice a year, i.e. once in April at the Institute of Industrial Science (IIS), and the second in October at the Atmosphere and Ocean Research Institute (AORI), the University of Tokyo. For cross communication and collaboration between the engineers and scientists, the steering committees organizes every forum for the audience to share the time with discussions and refreshments during the forum and the reception. The latest "61st" forum was held with over 200 attendees in IIS, on April 13, 2018 (ULR: http://seasat.iis.u-tokyo.ac.jp/UTforum/). It covers

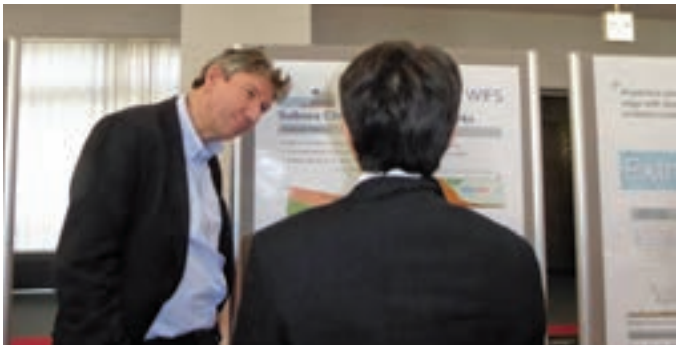


A prototype docking AUV by Kawasaki Heavy Industries, LTD. (above) by Mr. Minehiko Mukaida.

Lecturer Prof. Akira Asada of University of Tokyo and audience.



Discussions after the lecture, Prof. Tamaki Ura, the chair of the forum and the lecturer, Prof. Akira Asada (from L to R).



Mr. Brendan Hyland of WFS technologies Ltd from UK attended the forum with poster presentation.

The forum supports the activities of Team KUROSHIO as an Ocean discovery Xprize challenger.

Enjoying the discussion during the forum. Lecturer Dr. Shiho Suzuki Mr. Kaname Ikeda (Director of Remote Sensing Technology Center of Japan) and an audience (L to R).

the wide areas across the research fields, such as unusual metabolic diversity of hyperalkaliphilic microbial communities (can you image what?), Acoustic/Geophysical Exploration, AUV docking, the new generation of rechargeable batteries and so on. The "61st" means, it has over 30 years history and the Japan Chapter has been working with the event as one of the technical co-sponsors since the chapter establishment in 1995 by Prof. Tamaki Ura. Similar to the "Kanreki" of Sixtieth birthday's tradition in Japan, the forum turns over to the "Zero" and restarts the new step. Our future is just starting.

Singapore Chapter—A Workshop on Autonomous Marine Systems

Prepared by Hari Vishnu, Venugopalan Pallayil, Bharath Kalyan with inputs from SAUVC committee

The IEEE OES Singapore chapter organized its second annual workshop on Autonomous Marine Systems on 12 March, 2018, at the Singapore Polytechnic, following the Singapore AUV Challenge 2018 event. The workshop idea was started in 2017 with an objective of complementing the hands-on experience that the students had gathered through the competition, with further insights from experts in the field. The workshop was aimed at motivating the students to continue to pursue the field of autonomous marine technology and enhance their knowledge

Talks at the workshop.

Intense discussions at the workshop.

through a sharing and learning session. We invited international experts, three from overseas and one from Singapore, in the field of underwater technologies to share their experiences at the workshop in the form of talks. This event also facilitated excellent networking amongst the AUV experts and the attendees, which included both student team members and external attendees. The talks were followed by a panel discussion, which was targeted specifically at answering questions posed by the student attendees via an online poll taken prior to the workshop. The panel discussion was a new aspect of the workshop this year, which was very well-received by the attendees.

The guest speakers included Dr. Thomas Curtin, Dr. Hayato Kondo, Mr. William Kirkwood (Bill) and Dr. Roland Bouffanais. Dr. Tom Curtin is a senior principal research scientist at the Applied Physics Laboratory, University of Washington. He spoke on the 'Lessons learned from twenty years of student AUV competitions. He is considered one of the originators of the RoboSub competition which has now grown into a prestigious world event in the field of AUV technology. His insights gained from organizing RoboSub AUV competitions and his take on SAUVC 2018 were an interesting learning experience for the attendees. He noted the increasing participation in such competitions around the world and that all AUV competitions share the same positive spirit and energizing social dynamics. His tips on what message to take home from such competitions touched a chord with the participants. Dr. Hayato Kondo, an Associate Professor at the Tokyo University of Marine Science and Technology, spoke on AUV development during the last decade at his university. His talk was peppered with videos showing some of the latest capabilities being spotted on AUVs and their current applications, which captivated the audience. Mr. Bill Kirkwood, a senior R&D engineer from Monterey Bay Aquarium Research Institute, spoke on the topic of 'How competitions, workshops, conferences and membership, can advance your maritime career'. He delivered a clear message to the students on how technical awareness and networking with peers and experts could help their career, and how membership in technical societies, such as IEEE OES, could facilitate this. The final talk was delivered by Dr. Roland Bouffanais, Assistant Professor at the Singapore University of Technology and Design. He spoke on his experience using swarm robotics for pervasive monitoring of the marine environment. The video recordings of these talks can be viewed at https://www.youtube.com/user/ARLTMSINUSChannel/videos. All the talks were well-received by the attendees, largely consisting of the SAUVC participating teams.

In the afternoon session of the workshop, a panel discussion by the experts on autonomous marine systems and competitions and careers in underwater technologies was organised. The questions taken up for discussion by the panel members, were collected via a student participant's poll, the Pigeonhole App. The questions are summarized here.

Some questions posed by students, discussed by the panel included:

- "What are the research areas in underwater robotics where innovation will lead to disruption in development of the technology"
- "Tethered (ROV) or autonomous (AUV) the way of the future?"
- "What underwater communication technologies are available to manage tethering ?"
- "How to make cheaper and cost-effective AUVs, especially for competitions"
- "Why are sensors used for underwater applications so expensive, and how can I repurpose existing technologies for use underwater"
- "What are the options to obtain sensors which are unavailable in my country easily?"
- "What other algorithmic improvements can I use to circumvent sensor availability?"
- "Is LIDAR an option for underwater robotics in general?"
- "What are the available careers in underwater robotics, and how can I go about entering such a career?"

The panel was moderated by Dr. Mandar Chitre, Associate Professor at National University of Singapore. Dr. Fikret Ercan, Senior Lecturer at Singapore Polytechnic, joined the guest speakers for the panel discussion on invitation. All the questions posed via the poll were pertinent to student involvement in AUV

Panel discussion by experts on AUV technologies and underwater robotics competitions.

An appreciation dinner for the guests from OES.

technologies and competitions. They included queries on the future of AUVs, the benefit and career opportunities for students in this field, how to tackle some commonly faced issues in constructing AUVs, and questions on real-world applications of AUVs. The questions saw some very animated involvement from the panel members, who all chipped in to give a well-rounded take on the students' queries. Overall, the workshop turned out to be a useful learning experience for all the participants.

The workshop was very beneficial for the students, specifically for the teams who participated in the SAUVC event. This was evident from the excellent feedback we obtained through a survey. We propose to continue with organization of similar workshops alongside future SAUVC events. Our special thanks to Bill and IEEE OES for supporting the workshop through a special sponsorship, which helped to bring in the speakers. We also acknowledge our speakers who travelled a long distance to support this event.

Victoria Chapter Technical meeting

Prepared by Nick Hall-Patch

Following OES Victoria Chapter's Annual General Meeting on 11 April 2018 at the University of Victoria, Krista Trounce, PEng gave a presentation entitled "The ECHO Program: working to reduce the impact of shipping on whales." Krista is the Project Manager for the Enhancing Cetacean Habitat and Observation (ECHO) Program at the Vancouver Fraser Port Authority (https://www.portvancouver.com/). The Authority's role is to responsibly facilitate Canada's trade through the port of Vancouver, British Columbia, overseeing, among other things, commercial marine traffic that passes through the inland waters of Georgia Strait.

She started her presentation by pointing out that the shipping routes in and out of the Port of Vancouver coincide with the critical habitat for endangered southern resident killer whales (orcas), and that those whales rely on the underwater acoustic environment to echolocate prey, as well as for communication.

The ECHO program was founded in 2014 with a goal of working towards voluntary mitigation of threats to whales due to shipping activities. It is led by Port of Vancouver, but it is in fact a collaboration of interested groups from shipping industries, government, First Nations individuals and environmental groups, with the realization that shipping must continue, but that environmental consequences should be minimized. Its current emphasis is on the effect of underwater noise from shipping on the southern resident whales.

With ever increasing shipping traffic, it was necessary to establish a baseline of the present underwater noise environment, both in amplitude and in frequency. The VENUS network's east node (http://www.oceannetworks.ca/observatories/pacific/strait-georgia) is an underwater observatory at 170 m depth located in the waters of Georgia Strait, south and west of the Port of Vancouver; the node includes a four hydrophone direction finding array. It was proposed to set up a "shipping corridor" near that node, with the request that the pilots that guided ships in and out of the Port of Vancouver would use this corridor.

From the first two years of the project (currently in its third year of operation), it was possible to derive median source levels for ships using that corridor, ranging from 190 dB for large container ships down to 161 dB for naval vessels. Vessel speed and frequency of their passage affected the overall noise level, but it was also realized that a vessel with an otherwise "quiet" noise signature might still generate significant underwater sound in the frequency range used by killer whales.

It was already suspected that the large ferries between Vancouver Island and the mainland of British Columbia would be a major contributor to the overall underwater noise level as they transit the area so frequently; the ferries were in fact, the most frequent users of the corridor. The BC Ferry Corporation was an enthusiastic participant in the project, and continues to be interested in reducing the noise produced by their vessels.

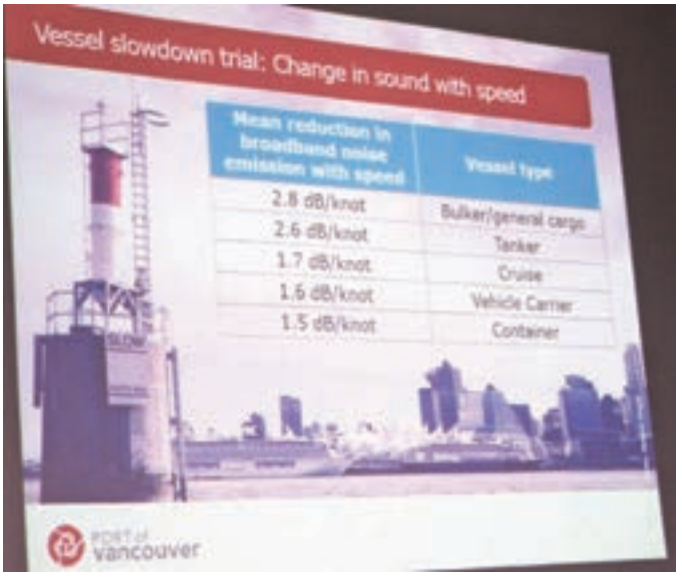
Krista then described another major initiative of the ECHO Program, a two month voluntary vessel slowdown trial past specially placed hydrophones in the major shipping lane through Haro Strait, as well as a hydrophone at a key killer whale feeding area near shore, to gauge the effect on noise generated by slower vessel speed. That shipping lane has strong currents and tricky navigation, so 11 knots was the minimum speed deemed possible. 44% of the vessels were in fact able to maintain speeds below 12 knots when passing through Haro Strait. The results in source level reduction for

Krista Trounce's presentation about the ECHO Program.

classes of vessels are shown in Figure 1. Once corrected for small boats passing very close to the hydrophones, a 2.5 dB overall reduction was found in the underwater noise level at the near shore hydrophone during the trial period.

This data was added to a noise model previously created by Jasco Applied Sciences, and a killer whale behavioural response model generated by SMRU Consulting North America, to help understand the potential benefit to killer whales by the increase in foraging time allowed by lower noise levels.

Krista pointed out that the Port of Vancouver offers reduction in harbour dues for lower noise vessels as a long-term incentive for ship owners to invest in noise-mitigating improvements to their fleets, and that the Port makes efforts to educate ship's pilots and mariners in general about minimizing the impact of their activities on whales in the area.



Changes in ship noise levels due to vessel slowdown.

In the future, the ECHO Program plans to use the data they have been gathering to further determine what characteristics make a vessel noisier. It is also planned to use the data to better understand what causes observed underwater ambient noise levels to change significantly at various locations with no ships nearby. In addition, it is planned to investigate the effects on underwater noise levels by lateral displacement of vessel paths within shipping lanes.

The two question periods during this presentation illustrated the high level of interest from the attendees. Further information about the ECHO program is available at https://www.portvancouver.com/environment/water-land-wildlife/marine-mammals/echo-program/

Malaysia Chapter—Meeting Report and Activities

Prepared by Rosmiwati Mohd Mokhtar and Mohd Rizal Arshad

Dinner with IEEE OES Headquarters

2018 has marked another remarkable moment for the IEEE OES Malaysia Chapter when we received a visit from IEEE OES HQs. The get together dinner was held on the 19th of March, 2018, at the Grand Hyatt Hotel, Kuala Lumpur. We are honoured to meet the OES President, Christian de Moustier, who is from the USA, Jerry Carroll also from the USA, William Kirkwood from MBARI, USA, Venugopalan Pallayil from OES Singapore and Malcolm Heron from Australia.

During the dinner many insightful things have been discussed, especially on how to increase the membership and bring the OES Malaysia Chapter to be more active at the international level. One of the main things also discussed was on sponsoring the USYS conference (a conference that is organized by the IEEE OES Malaysia Chapter) to be under the IEEE OES global.

Dinner at Grand Hyatt Hotel.

Offshore Technology Conference 2018

OTC Asia 2018 was held from 20 to 23 March, 2018. The conference took place at the Kuala Lumpur Convention Centre (KLCC), Kuala Lumpur. This biennial OTC Asia event is where energy professionals meet to exchange ideas and opinions to advance scientific and technical knowledge for offshore resources and environmental matters. The event includes various keynote speeches from distinguished speakers as well as exhibitions.

IEEE OES booth at OTC Asia 2018.

The IEEE OES Malaysia Chapter has participated in the conference by manning the IEEE OES exhibition booth. In addition, the OES Malaysia Chair, Prof. Ir. Dr. Mohd Rizal Arshad, also presented a technical speech at the conference. He delivered a talk on title robust tracking control for underactuated autonomous underwater vehicle in horizontal plane.

Participation in Singapore AUV Challenge 2018

Reported by Mohd Shahrieel Mohd Aras

The IEEE OES Malaysia Chapter representative via the Universiti of Teknikal Malaysia Melaka (UTeM) has participated in the Singapore AUV Challenge 2018. The competition was held from 9 to 12 March, 2018, in Singapore. SAUVC 2018 is a distinguished competition and discussion platform among underwater robotics teams worldwide. The event was organized by the IEEE Oceanic Engineering Society, Singapore Chapter, with support from Singapore Polytechnic.

UTeM AUV Panther and Tuah at SAUVC 2018.

The competition is a great learning ground for the participating teams to experience the challenges of AUV system engineering and develop skills in the related fields of mechanical, electrical and software engineering. The goal is for each team to develop an Autonomous Underwater Vehicle (AUV) that can negotiate the tasks put forth under a prescribed time. The tasks involved four widely faced challenges underwater such as AUV navigation, visual identification, acoustic localization and robotic manipulation.

The 2018 SAUVC received 46 participations from all over the worlds and Malaysia was one of them. Two teams (UTeM AUV Panther and Tuah), which were led by Dr. Mohd Shahrieel Mohd Aras and Dr. Ahmad Anas Yusof, participated in the

competition. Team AUV Panther has won the second fastest AUV in the qualification rounds, finishing the 10-meter qualifying range in 10.3 seconds. Having completed the first task in the final round, the team has been ranked 7th place from 46 competitors around the globe. Team Tuah faced a technical error in the qualification round, thus unable to proceed to the next round.

Train of Trainers for Maker Uno Workshop 2018

Reported by Khalid Isa and Herdawatie Abd Kadir

TOT Maker Uno workshop was jointly organized by FKEE UTHM, IEEE Ocean Engineering Society (IEEE OES) Malaysia Chapter, IEEE Robotic and Automation Society (IEEE RAS) Malaysia Chapter and IEEE Signal Processing Society (IEEE SPS) Malaysia Chapter. This training was held on 15 April, 2018. In total, 26 UTHM lecturers voluntarily participated in the TOT program. Activities were focused on hands-on sessions using the MAKER UNO and Ardublock, which is a Graphical Programming Language for Arduino. Overall, the program was successfully organized and received very good feedback from all the participants.

Participants of TOT Uno Workshop 2018.

Maker Uno Workshop with Primary Schools 2018

Reported by Khalid Isa and Herdawatie Abd Kadir

"MAKER UNO WORKSHOP" was organized at Sekolah Rendah Islam Hidayah Batu Pahat (SRIH BP), Johor, Malaysia. Maker Uno workshop was jointly organized by SRIH BP, FKEE UTHM, IEEE Ocean Engineering Society (IEEE OES), IEEE Robotic and Automation Society(IEEE RAS) and IEEE Signal Processing Society (IEEE SPS).

This four days of training was held on 23 April 2018, 25 April 2018, 30 April 2018 and 2 May 2018. In total, 84 primary school students took part with 34 UTHM lecturers who voluntarily participated in the program. Activities were focused around hands-on sessions using the MAKER UNO and Ardublock, which is a Graphical Programming Language for Arduino.

The objectives of the event are to educate the students of primary schools about graphical programming language for Arduino by using Maker Uno and to foster and attract primary and secondary school students to the field of electrical and electronic engineering. The program was successfully organized and received very good feedback from all the pupils, teachers, and parents. Eight excellence pupils are selected to compete in a RERO robot competition.

Uno Workshop with Primary School Students.

RERO Short Course

Reported by Khalid Isa and Herdawatie Abd Kadir

The RERO (Reconfigurable Robot) short course was held on 7 May 2018. The event was jointly organized by Sekolah Rendah Islam Hidayah Batu Pahat (SRIH BP), IEEE Ocean Engineering Society (IEEE OES) and Faculty of Electrical & Electronic Engineering (FKEE), UTHM.

Future roboticist!

This event provides the platform to transfer knowledge to the community and to mentor the next generation of engineers and technologists. The modules were based on the RERO basic guide book, which covers 10 lessons. In each lesson, learners will receive input on an aspect of robotics through an informative and animated video. This is followed by a robot-building challenge based on the topic. Upon completion of this course, learners were equipped with the knowledge and skills needed to design their robots.

OES Portugal Chapter Creation and News

Aníbal Matos, OES Portugal Chapter Chair

The OES Portugal Chapter joins researchers from multiple institutions that have been intensively involved in ocean-related research and development activities. These institutions are part of a network of national organizations with extensive expertise in ocean-related activities, that collectively carry efforts to develop novel tools that make sustainable ocean explorations and exploitation a reality. The large number of researchers in Portugal addressing ocean-related problems is

certainly linked to the unique characteristics of the vast Portuguese Atlantic territory, both along the water column and on the ocean floor.

Examples of multiple research activities and results of these researchers in the last months can be found below. The extent of these activities underscores why the 2018 IEEE OES Autonomous Underwater Vehicle Symposium and the OCEANS 2021 conference will be coming to Porto, Portugal.

A Glimpse into the Future of Marine Research, May 2017

The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) from Porto University was one of the research partners involved in MBARI 2017 CANON experiments https://www.mbari.org/a-glimpse-into-the-future-of-marine-research/. The LSTS contribution was powered by the LSTS open-source software tool chain https://www.lsts.pt/toolchain.

Operations with NTNU in Mausund, Norway, May 2017

A team from the Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) participated with one Light Autonomous Underwater Vehicle (LAUV) https://www.lsts.pt/vehicles/lauv in a field study for the ENTICE project https://www.sintef.no/en/projects/entice/ in which other LAUVs from NTNU's AUR laboratory https://www.ntnu.edu/aur-lab were also used. The field study took take place in open waters 10km north of Mausund with the goals of collecting data regarding the temporal variance of physical characteristics of the water column and studying abundance and biodiversity along the vertical structure.

LSTS team performing maintenance on LAUV-Xplore-1.

MEDUSA DEEP SEA AUV, EEA Grants project, May 2017, Lisbon, PT— testing of an indigenous AUV with the capability to operate down to depths of 3,000 m and perform seabed mapping tasks. The vehicle was developed by a consortium of partners from Portugal and Norway, under the coordination of CEiiA. For the first time in May 2017 the vehicle successfully dived to 1,500 m and showed excellent performance of its navigation and control systems. The new platform, entirely developed in Portugal, is due to play an important role in mapping vast regions of the extended continental shelf of the country in cooperation with the EMEPC, the organization responsible for the studies supporting the request for extension of Portugal's continental shelf.

MEDUSA DEEP SEA AUV being launched.

MarinEye EEA Grants project, May 2017

The innovative multi-trophic monitoring system developed within this project combines a range of technologies capable of providing data that gives an integrated view of the different compartments of the ocean (physical, chemical, biological) at different levels of knowledge (from genomics to biogeochemistry and from micro to macro community dynamics). The project was led by CIIMAR (Interdisciplinary Center for Marine and Environmental Research) and counted with the participation of the Polytechnic Institute of Leiria, IPMA (Portuguese Sea and Atmosphere Institute), and INESC TEC.

EU MARINE UAS Innovative Training Network (ITN), 19–29 June, 2017, IST, Lisbon, PT—Organization of the 1st MARINE UAS Summer School of the *EU MARINE UAS Innovative Training Network (ITN) on Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring*, in cooperation with the 2nd EC WiMUST project Summer School and the NETSyS doctoral program, 19–29 June, IST, Portugal. The School included the participation of 30 invited speakers—from academia and the industry—and 25 doctoral students from across Europe and represented an excellent forum for the presentation and discussion of theoretical and practical issues with a special focus on the interaction between UAV, ASV, and AUV systems and the dual use of space and ocean-related technologies—*https://www.itk.ntnu.no/marineuas/Marine%20UAS.html*

Oil-spill Incident Response Exercise, Cartagena, Spain, June 2017

The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) is a partner in the Expanded Underwater Robotics Ready for Oil Spill (e-URready4OS) project. The 2018 March issue of Marine Technology Reporter had an article about the e-URead4OS project and the oil-spill incident response exercise that took place

URready4OS Systems used in the experiment at Cartagena (AUVs and ASV).

in Cartagena, Spain, June 2017. https://magazines.marinelink.com/nwm/MarineTechnology/201803/#page/26

Thematic Workshop on Sensing the Deep Sea, June 2017

Within the scope of the EU funded STRONGMAR project, INESC TEC together with partners from the University of Aberdeen (School of Engineering, Optical Research Group), organized the Thematic Workshop on Sensing the Deep Sea, that took place on the 20th of June 2017, within the OCEANS'17 MTS/IEEE Aberdeen conference. The program focused on subsea sensing, subsea optical sensing, instrumentation and optical imaging, remote sensing, optics, imaging, vision and E-M system.

Sensing the deep-sea workshop.

Rapid Environmental Picture Atlantic Exercise 2017 (REP17-Atlantic), July 2017

REP-Atlantic is a yearly exercise organized by the Portuguese Navy, the NATO Centre for Maritime Research and Experimentation and the Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) targeted at advancing the state of art in networked vehicle systems through large scale experimentation in real-life operational scenarios. The 2017 edition of this exercise took place in July 2017 off Tróia, Portugal. The participants in the exercise also included the Norwegian University of Science and Technology (NTNU), the University of Hawaii, the University of Aveiro, the Belgium Navy, Carnegie Mellon University, Czech Technical University in Prague and Hidromod.

Participants in REP17 Atlantic.

EMSO-PT Research Infrastructure Kick-Off, July 2017

Coordinated by IPMA (Portuguese Sea and Atmosphere Institute), the EMSO-PT research infrastructure joins together the Portuguese ocean-related research community. EMSO-PT observatories will merge "off-the-shelf" technology, which will ensure that they will meet the International standards, with novel approaches (based on networked, autonomous observation platforms) that will contribute to more sustainable monitoring operations and will create the basis for the development of new marine products and services, creating value and qualified jobs. In the mainland, two sites will be considered, one deep (Cadiz) and another shallow (North Portugal). The site to be developed in North Portugal will be a test bench for emerging monitoring strategies. In the Azores, two main areas have been the focus of EMSO-PT: LuckyObs, mainly driven by the French colleagues and the CondorObs focused on seamount ecosystems.

Mapping the Plume of the Douro river, August 2017

A team from the Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) from Porto University mapped the plume of

Xplore 1 and Xplore2 LAUVs used to autonomously detect and track the Douro River Plume.

the Douro river with coordinated Light Autonomous Underwater Vehicles (LAUV). These experiments were synchronized with overpasses of different satellites with the goal of validating remote sensing data with in-situ measurements.

FLEXUS Unmanned Vehicles, September 2017

A multidisciplinary team from INESC TEC conducted a training session for some researchers and operators of the RAWFIE consortium that took place from 5 to 7 September, 2017, at the Navy Base of Skaramagkas, near Athens, Greece. The training addressed the use of the FLEXUS USV fleet, a set of 10 USVs developed at INESC TEC and provided to the RAWFIE consortium. The session covered a set of technical topics, including USVs handling, deployment, operation, recovery and maintenance. Additionally, a demonstration of the FLEXUS USVs capabilities was performed using several vehicles in a typical outdoor environment. Hands-on experience was also provided to the attendees. Further to training, the FLEXUS solution was successfully integrated in the testbed where the USVs will execute missions (experiments) to collect data for researchers within the scope of the RAWFIE project.

TEC4SEA Research Infrastructure Kick-Off, September 2017

The TEC4SEA research infrastructure is a unique and pioneer platform in Europe to support research, development, and test of marine robotics, telecommunications, and sensing technologies for monitoring and operating in the ocean environment. Its characteristics, geographic location allowing fast access to deep sea, and support of multidisciplinary research, enable full validation and evaluation of technological solutions designed for the ocean environment, allowing researchers to evolve from simulation/lab experiment to field trial. It is coordinated by INESC TEC and also counts with the participation of CINTAL from University of Algarve.

ERL Emergency Robots, September 2017

INESC TEC aerial robotics teams, besides having won multiples prizes in specific challenges, integrated the team that won the Grand Challenge competition ERL Emergency Robots, 2017, that took place in Piombino, Italy, in September 2017. The winning team was also constituted by elements of the terrestrial robotics team TELEROB and the underwater robotics team from the University of Girona.

ERL Emergency Robots 2017 winning team.

Mapping the Belinho Shipwreck, September 2017

Researchers from the Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) from Porto University were part of an international team involved in the discovery and mapping of a shipwreck from the 16th century found in Esposende, north of Porto, Portugal. http://www.omare.pt/en/atividade/belinho-16th-century-shipwreck/. The team included researchers from Instituto de Arqueologia e Paleociências/Instituto de História Contemporânea da Universidade Nova de Lisboa IAP/IHC FCSH-UNL, Câmara Municipal de Esposende, SHIPLAB, Texas A&M University, LSTS, OceanScan—Marine Systems and Technology, ForSEADiscovery project and CANAL—Centro de Arqueologia Náutica do Alentejo Litoral (IAP/IHC--FCSH and Câmara Municipal de Alcácer do Sal).

LAUV vehicles equipped with side scan sonar and magnetometer to search for the shipwreck.

¡VAMOS! Project Live Demonstration, October 2017

In October 2017, the EU funded project ¡VAMOS! organized a live demonstration of technologies for operations in flooded mines at the Imerys Minerals Ltd. test site in Lee Moor, Devon, UK. EVA robot, a hybrid ROV/AUV system developed at

EVA hybrid ROV/AUV at Lee Moor test site.

INESC TEC, that collects multimodal information to provide situation awareness data in mining operations, was one of the novel technologies presented at this event.

Maritime Technology in Conference, November 2017

Entitled "A Sea of Technology", the annual scientific conference of the STRONGMAR project was held on 16 November, 2017, at the Almeida Garrett Municipal Library, Porto, Portugal. Organized by INESC TEC, this initiative counted with the participation of about 100 researchers, and several renowned speakers talking about "SMART cables", "Subsea 3D laser imaging", "Underwater mining", "Offshore Oil and Gas Operations", "Subsea Digital Holography" and "Underwater acoustics".

"A Sea of Technology" conference, Porto, PT, November 2017.

Raia.co Award, November 2017

The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) was a partner in the RAIA.co—Oceanographic Observatory of the Iberian Margin and the Nearshore, an INTERREG project in which the first WAVY drifters were developed by LSTS. The project has received the 2016 award for the Development of International Cooperation delivered at the 4th Atlantic Stakeholders Platform Conference that took place in November, 2017, in Glasgow.

Wavy drifter buoy was designed to be deployed in coastal waters.

H2020 Meloa Project Kick-Off Meeting, December 2017

The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) is a partner in the H2020 MELOA project funded by European Funding for Research and Innovation https://www.ec-meloa.eu/. Running from December 2017 to February 2021, MELOA is targeting the development of an innovative family of drifters, based on the LSTS WAVY drifters, allowing for a low-cost, easily deployable, high versatility, and low maintenance system for in-situ measurements for marine environments.

MELOA Kick Off Meeting was held in Lisbon, December 14th and 15th, 2017.

2017 IEEE Transactions on Control Systems Technology Outstanding Paper Award

Collaborators and researchers of the Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) co-authored this paper: Walter Caharija, Kristin Pettersen, Marco Bibuli, Pedro Calado, Enrica Zereik, José Braga, Jan Tommy Gravdahl, Asgeir J. Sørensen, Milan Milovanović, and Gabriele Bruzzone, Integral Line-of-Sight Guidance and Control of Underactuated Marine Vehicles: Theory, Simulations, and Experiments, IEEE Transactions on Control Systems Technology, Vol. 24, No. 5, pages 1623–1642, September 2016.

+Atlântico Project, 2017, Lisbon, PT—Launching of a new project entitled *+Atlântico*, following approval by the Portuguese Funding Agency FCT of a proposal submitted to the Carnegie-Mellon-Portugal Program. The project addresses a number of topics with a focus on: Research, Engineering and Industry (Subsea Technologies, Specialized Platform Support Vessels and Offshore Platforms, Sustainable Ports, Risk Governance, and "Smart Fields") Commercialization, and Observations. The project brings together a large number of promoters and partners from academia and the industry that include the *EMEPC, ONIP, GALP ENERGIA, Technip/ Lusotechnip, CEIIA, WAVEC, MARETEC), Univ. Madeira (OOM and MITI), and CMU*.

EU WiMUST project, January 2018, Sines, PT—for the first time worldwide, in the scope of the **EU WiMUST project** (*http://www.wimust.eu/*) coordinated by ISME, Italy, a demonstration was done at sea in Sines, Portugal, with a fleet of seven autonomous surface and underwater vehicles developed by ISR/IST, ISME, and GraalTech, capable of performing geotechnical seismic surveys cooperatively, in fully autonomous mode, exchanging data and commands over an acoustic communications

Autonomous vehicles in formations in WiMUST project trials.

The EUMR Kick Off Meeting took place in Porto, March 1st and 2nd, 2018.

network. In the tests, two surface vehicles carried powerful acoustic sparkers for seabed and under the seabed insonification, while a group of five surface and underwater robots pulled streamers equipped with hydrophones to acquire geophysical data. This landmark will be instrumental in the development of a new breed of autonomous systems for geotechnical surveys with a high potential for commercial applications.

Winter School on Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring, Porto, Portugal, January, 2018

The winter school of the Marine Unmanned Air Vehicles project funded by the EU Horizon 2020 Framework programme, under the Marie Sklodowska Curie Innovative Training Network program, had over 30 participants. The programme of this winter school had approximately twenty talks (including four keynotes) covering several subjects in the scope of Autonomous Unmanned Aerial Systems for Marine and Coastal Monitoring and work sessions targeting algorithm development, software integration, and simulation https://marineuasws.lsts.pt/home

Marine Robotics School, NIO, Goa, India, 12–17 February, 2018—Co-organization, together with partners from India, of a "***Marine Robotics School***" at the National Institute of Oceanography, Goa, India. The school targeted an audience of app. 80 graduate students and research engineers from across India and covered a large spectrum of theoretical and practical issues pertaining to single and multiple vehicle navigation, guidance, and control of marine robots including humans in the loop. There was a special focus on the use of acoustic networks for multiple vehicle navigation and control. The school included experiments with real vehicles and acoustic equipment provided by Evologics, Germany. This concerted action paved the way for the strengthening of on-going cooperation links between ISR/IST, NIO, and other partners in India, Korea, and Europe.

http://www.nio.org/index/option/com_eventdisplay/task/view/tid/4/sid/24/eid/260

EUMarine Robots Kick Off Meeting, March 2018

The kick-off meeting of the H2020 Marine robotics research infra-structure network project https://www.eumarinerobots.eu/ (EU Marine Robots), funded by European Funding for Research and Innovation and coordinated by Porto University through LSTS, took place March 2nd, 2018 in Porto. The partners are: University of Porto; University of Bremen; Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento; University of Genoa; Faculty of Electrical Engineering and Computing, University of Zagreb; University of Girona; University of Limerick; Oceanic Platform of the Canary Islands; Centre for Maritime Research and Experimentation; Heriot-Watt University; Norwegian University of Science and Technology; Marine Institute; Distretto Ligure delle Tecnologie Marine; Natural Environment Research Council; and, Institut Français de Recherche pour l'exploitation de la Mer. The main objective of the project is to open up key national and regional marine robotics research infrastructures (RIs) to researchers worldwide and establish a world-class marine robotics integrated infrastructure.

Oceanology International, London, March 2018

The H2020 Marine robotics research infra-structure network project https://www.eumarinerobots.eu/ (EU Marine Robots) coordinated by Porto University through LSTS had a booth at this event. The booth was targeted at disseminating the project and at engaging the marine robotics community in the calls for transnational access to EU marine robotic infra-structures. The calls will start opening by the end of 2018. https://www.eumarinerobots.eu/tna.

EU Marine Robots' stand at Oceanology International 2018.

Shell XPRIZE Ocean Discovery Finalists, March 2018

The Portuguese team PISCES, led by INESC TEC, and also counting with researchers from CINTAL/University of Algarve, is one of the nine finalist teams moving forward to Round 2 testing of the Shell Ocean Discovery XPrize international competition. The PISCES team has been developing DART—a deep water portable AUV, that together with complementary systems for underwater navigation and mapping, will be able to map deep ocean areas with high accuracy. More information at http://pisces.inesctec.pt/

H2020 BRIDGES Project Ultra-Deep Glider Vídeo, April 2018

The Laboratório de Sistemas e Tecnologias Subaquáticas (LSTS) is a partner of the H2020 BRIDGES project funded by European Funding for Research and Innovation http://www.bridges-h2020.eu/. A video released recently describes BRIDGES' (Ultra) Deep Glider capabilities https://youtu.be/lIOPDwlJ30U

Acknowledgment. This article received valuable contributions from the following members of OES Portugal section: Alfredo Martins, António Pascoal, João Sousa, and Nuno Cruz.

DART AUV being carried by mother USV.

BRIDGES' (Ultra) Deep Glider.

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IEEE Oceanic Engineering Society, Singapore Chapter The Singapore Autonomous Underwater Vehicle Challenge (SAUVC)

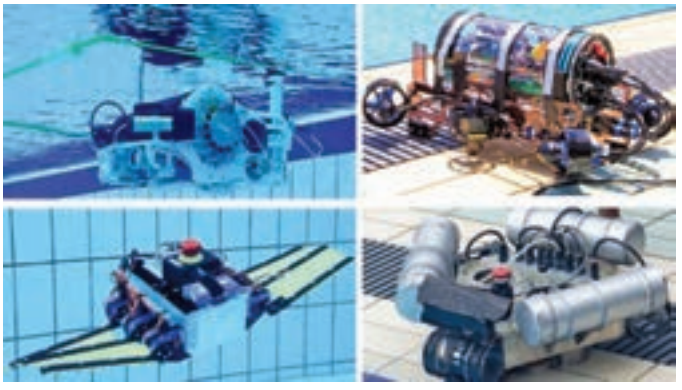
Prepared by Hari Vishnu, Venugopalan Pallayil, Bharath Kalyan. with inputs from SAUVC committee

The Singapore AUV Challenge (SAUVC) 2018

The sixth edition of the SAUVC was organized from 9 to 12 March, 2018, jointly with Singapore Polytechnic. This edition of the event was the largest ever in terms of team participation, continuing the trend set by past years of the event. This year, a record-breaking 54 teams registered for the event, of which 27 teams were selected and 26 competed at the event. Like in the previous year, a workshop on AUV related topics was also organised and details of the same has been covered in a separate report.

Student Teams

To manage the unexpected turn out of the number of teams, we introduced a criterion for the teams to qualify for participation in the event. The teams were required to submit a video of their AUV swimming without any tether attached to it for at least 10 seconds. 27 teams, of which five were local, submitted the videos and 26 teams competed at the event. In total, there were 300 student participants. This was the largest contingent of participants in the history of SAUVC. A list of teams who participated in the SAUVC 2018 and their country of origin is given below. A staggering representation of teams from all across South Asia and South East Asia was evident at this event. There were many newcomers and some familiar faces in the participating teams.



Novel AUV designs spotted at SAUVC 2018.

The teams exhibited creativity and uniqueness in the design of their AUVs. The designs varied in many aspects such as size, shape and weight and also in the propulsion mechanism. The team from Singapore University of Technology and Design came up with a soft-robotics based AUV, which caught the attention of many.

Team Name	Country
BRAC University	Bangladesh
Northwestern Polytechnical University	China
The Hong Kong Polytechnic University	Hong Kong
City University of Hong Kong	Hong Kong
The Hong Kong Polytechnic University	Hong Kong
Bogor Agricultural University	Indonesia
K. J. Somaiya College of Engineering	India
National Institute of Technology Calicut	India
Mukesh Patel School of Technology, Management and Engineering	India
Delhi Technological University	India
National Institute of Technology Rourkela	India
Sri Venkateswara College Of Engineering	India
Zakir Husain College of Engg. & Tech.	India
Vishwakarma Institute of Technology	India
Sri Sairam College of Engineering	India
Institute of Technology, Nirma University	India
University of Peradeniya	Sri Lanka
Universiti Teknikal Malaysia Melaka	Malaysia
Universiti Teknikal Malaysia Melaka	Malaysia
Center for Advanced Studies in Engineering	Pakistan
Far Eastern Federal University	Russia
Singapore Polytechnic	Singapore
National University of Singapore	Singapore
Singapore University of Technology and Design	Singapore
Ngee Ann Polytechnic	Singapore
Nanyang Technological University	Singapore
Kasetsart University	Thailand

Qualification and Final Rounds

The challenge consisted of two tiers—qualification round and final round. Qualification involved swimming the AUV for 25 meters from a start line to a finish line, while staying within the water column without touching the pool boundaries. Only the top 15 teams, who cleared the qualification round, would be

Woohoo ! An AUV nearing completion of task 3 as our divers watch keenly.

allowed to participate in the final round. In the final round, the AUV would accumulate points by completing a series of tasks aimed at testing its acoustic and visual navigation capabilities, positioning, actuation and robotic manipulation. The table below provides the different functional capabilities of the AUV being tested and the related tasks.

No	Task	Aspect of operation
1	Passing through a gate.	Navigation
2	Locating a particular bucket amongst 4 options, and dropping a ball into it.	Target acquisition and manipulation
3	Moving out of the bucket arena, returning and reacquiring the ball dropped.	Target reacquisition and manipulation
4	Bumping against a flare holding a ball to drop it.	Localisation
5	Resurfacing at the end of the run.	Controls

Each task carried a certain number of points, depending on the challenge and the difficulty involved in performing the said task. There was also a timing bonus, and a bonus associated with the static testing of AUVs. The tasks were similar to the past year's competition, but made more challenging through randomization of positioning of buckets, flare and gate and its orientation. A complete description of the tasks, static judging criteria and award of points are covered in the competition rule book available at https://sauvc.github.io/rulebook/.

15 teams, out of the 26 that competed, made it to the final round, which is a record within the SAUVC event. This demonstrated the improving quality of participating teams, and their increased level of preparedness. This could partly be attributed to prior participation by the teams in similar competitions held locally or regionally.

Final Round Performance

One striking observation this year was that many finalists were able to complete the first task, passing through the gate with relative ease, despite the randomness introduced in the gate position and its orientation. Six teams were able to resurface at the end of their run at a designated position. This is in stark

Winners of SAUVC 2018 from Northwestern Polytechnical University, China.

contrast to the numbers in the past few years, reflecting the improving team performance.

However, what separated the wheat from the chaff in the final round, was the ability to do tasks 2 and 4. Task 2 required the AUV to drop a ball in a designated bucket, out of the four, kept on the pool floor and task 4 was hitting a flare and dropping the ball held by it Two teams successfully completed task 2, and two teams performed task 4. Only the winning team was able to complete both task 2 and 4 in the same run. The runner-up team from NIT Rourkela was able to find the bucket with the acoustic pinger in two of their successive runs. Though two of the teams attempted, none of the teams, were able to perform task 3 of reacquiring the ball from the bucket. We hope that teams would be able to accomplish this task in a future SAUVC event.

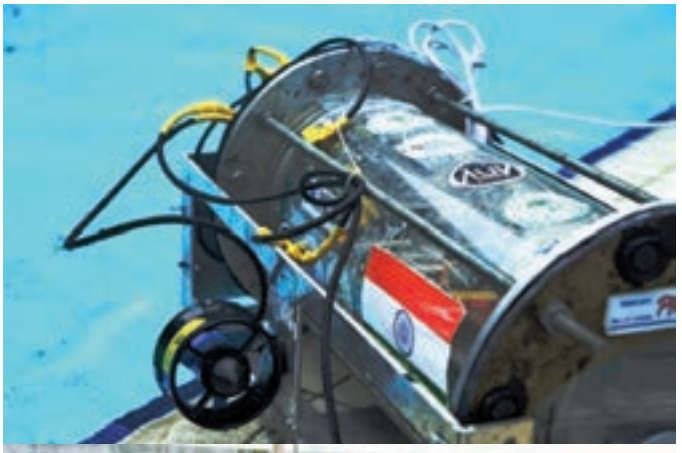
The team from Northwestern Polytechnical University, China, who were also the defending champions, emerged as the winner for completing the largest number of the tasks. They have been doing consistently well because the team has passed on the expertise gained over the years effectively to junior teams. The team from FEFU, Russia, has also been consistently in the top 3 for the last 4 years. The top 3 teams in the finals are as follows:

1) Northwestern Polytechnical University, China
2) National Institute of Technology, Rourkela, India
3) Far Eastern Federal University/Institute of Marine Technology Problems, Russia

Award Presentation Ceremony

The final winners were announced at an award presentation ceremony on the 12th of March, which was followed by a networking dinner. This saw about two hundred students come together with the guest speakers, SAUVC committee members and volunteers, for an eventful evening to close the competition. The award presentation saw some fun-filled and high-adrenaline moments when each of the prizes were announced. Loud cheers erupted when video summaries of the competition days were played, one by one, while participants rejoiced over the memories of the past 4 days. The networking dinner was hosted to show our appreciation to the participating student teams and our sponsors and volunteers, as well as facilitate good interaction

Students, invited guests, sponsors and the committee members at the prize presentation ceremony.



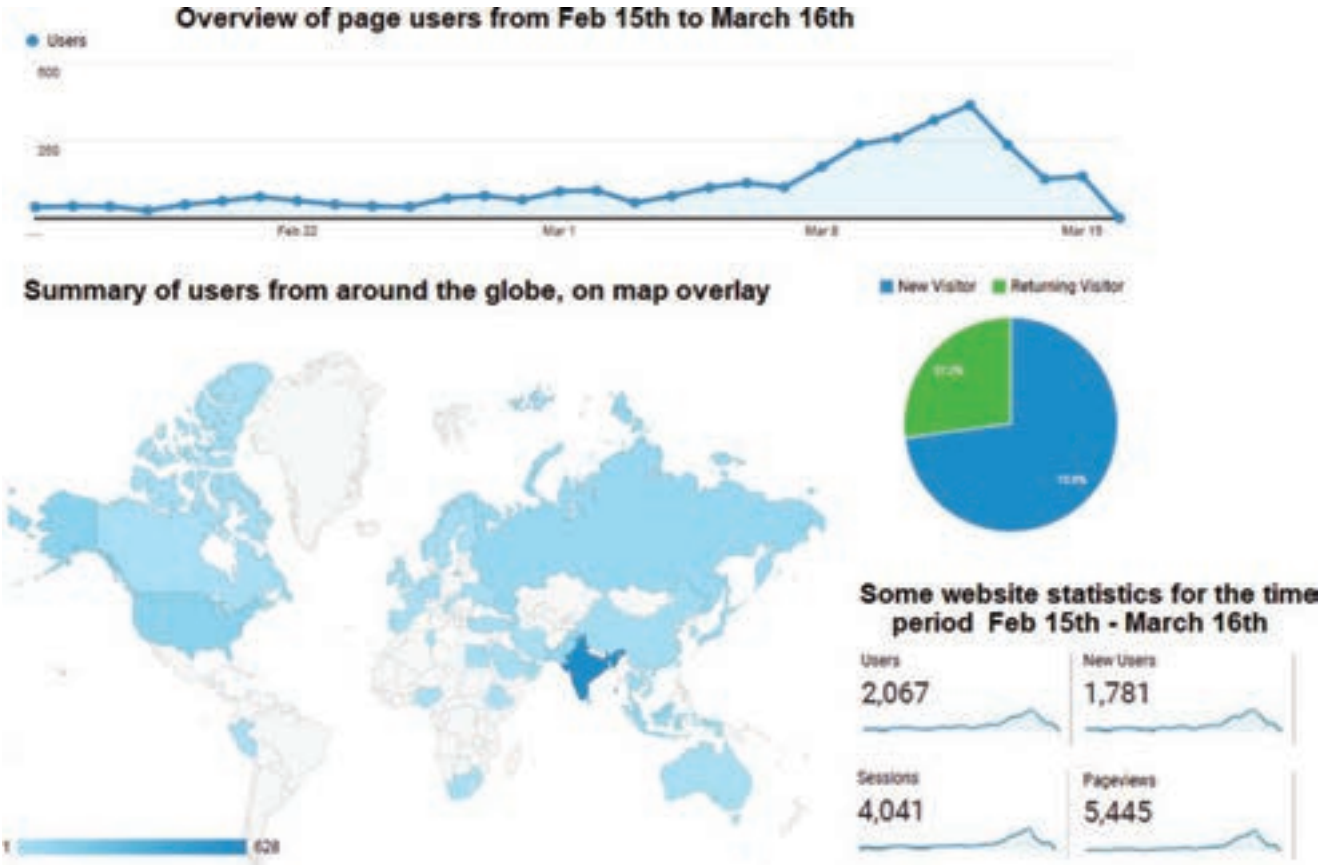
The two most liked photos in the Facebook photography competition, with 26000 and 21000 likes respectively.

IEEE OES presenting a plaque to the committee in appreciation of efforts in organizing SAUVC 2018.

Dinner and discussions, that's the way we do it.

to bring the curtains down on the event. A plaque was presented to the SAUVC 2018 committee by IEEE OES, in appreciation of their efforts in organizing the event successfully with such a large outreach.

We continued with the photo competition, which was started in 2016, to engage more students, including non-participants on the competition. This has also helped to get more visibility of the event. This year, the numbers for the



Info-graphic on SAUVC website usage statistics.

competition went through the roof. The top two photos, which got 26,000 and 21,000 likes, are shown below. They were from the Zakir Hussain college of Engineering and technology, India and Bogor Agricultural university, Indonesia respectively.

Media Coverage, Publicity And Website Visibility

The publicity stats this time were impressive. The competition was extensively covered on social media (Facebook, Twitter and YouTube) by our social media team. The SAUVC Facebook page saw very high activity, from the numbers we obtained from Facebook page statistics. The viral reach of the page from 8 to 13 March, which was the number of people who had any content from our page enter their screen, was 74,838 Facebook users. The total number of times any content from the SAUVC page entered a user's screen was 245,834 times from 8 to 13 March.

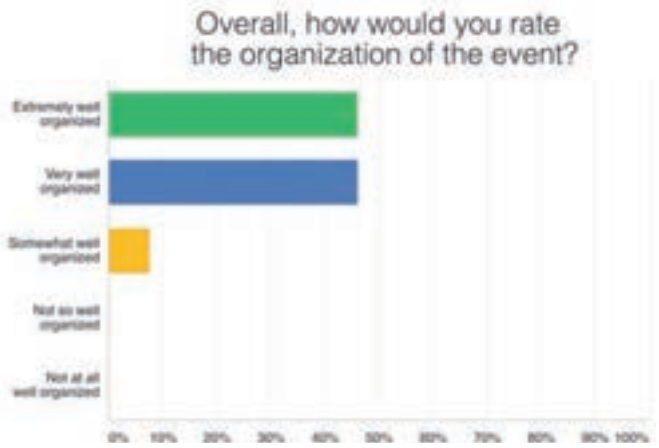
We undertook extensive video coverage this time. This included video interviews with all the teams who participated at the event, getting their views on the competition and their experience at the event. There were also video interviews with the guests who attended. Interviews of the teams and guests, and daily highlights from the event, are available at https://www.youtube.com/user/ARLTMSINUSChannel/playlists

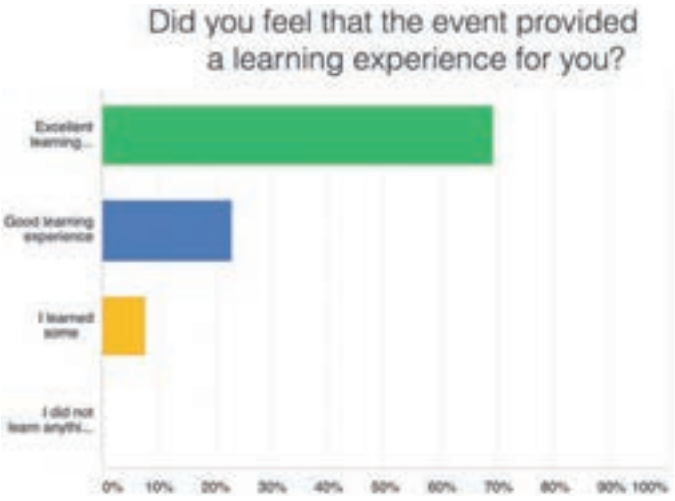
The website www.sauvc.org was revamped for this year's event and sported a trendy look. It also saw a very high activity. Some statistics on the website usage are shown here. The highest usage seems to be from India, where most of the participating teams came from. However, it is surprising to see that the event page was accessed from 6 continents around the world. The event also saw good media publicity, especially in Bangladesh and India, where it was covered in national newspapers such as 'Telegraph India' and 'The Daily Star'.

Feedback

We sought post-event anonymous feedback from the teams through an online survey. The feedback was excellent. Some statistics on the feedback are shown in an infographic here.

Some testimonials we received are as follows:





"I loved that everyone was very friendly and they were ready to help me whenever I needed some assistance. And other teams were also very cooperative. Learnt a lot in these 4 days."

"Come to learn, not to win. There's more to learn from this competition than anywhere else about Oceanic Engineering. I would love to come back over and over again."

"It's the best competition for first timers. And most of the teams also come through all the difficulties as you've gone through...so participate and learn..."

Sponsorship

The SAUVC event is run solely using sponsorship money. IEEE OES has been the biggest supporter of this event since its inception in 2013. One of the other regular academic sponsors was the National University of Singapore. As in past years, a number of companies supported the event, including some returning sponsors and some new ones. The company logos were displayed at standees located around the event venue, and announced throughout the event. Social media publicity was also given for the sponsors. One of the sponsors, Sonardyne also set up a booth at the competition venue displaying some of their products and related catalogues.

Membership Drive

Like previous years, we organized a membership drive during SAUVC 2018. This involved spreading awareness on the benefits of membership via leaflets, pamphlets and poster standees. A membership recruitment talk for IEEE OES was also delivered at the opening of the workshop on autonomous marine systems, by Dr. Hari Vishnu, chair of the IEEE OES, Singapore chapter. Students were asked whether they were interested in a free one year student membership offer, and many students signed up for the same expressing their interest.

Acknowledgements

SAUVC 2018 was graced by several eminent underwater robotics experts from around the world. This includes Dr. William Kirkwood from Monterey Bay Aquarium Research Institute, a familiar face at SAUVC, who has been very supportive and encouraging of the event. His presence at the event has always been a morale booster for the teams and organizers. Dr. Thomas Curtin from Applied Physics lab, Washington, joined the party this time, helping out in judging at the event, and also sharing some very helpful words with the teams from his years of experience in organizing the Robosub competition. Dr. Hayato Kondo from Tokyo University of Marine Science and Technology was also a constant presence amongst the teams, and could be seen discussing with students on their AUVs.

Guests walkabouts at SAUVC 2018.

SAUVC has been running for six years successfully now, growing each year and becoming possibly the largest underwater robotics events for students in Asia. One aspect of SAUVC is that it does not charge a registration fee for teams to participate. This is a policy aimed at promoting fledgling teams to compete, and generate interest in underwater robotics. SAUVC is also popular for its outreach, and we also try our best to provide mentoring for teams. It was encouraging to see that there was very good information sharing amongst the teams. Most teams took home the message that SAUVC is all about learning and sharing rather than just competing. As far as we, the SAUVC committee are concerned, this is the biggest win of all.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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**!

Social hour for Mal and Beth Heron, Bob Wernli, Harumi Sugimatsu, Beverley Wernli, Bill Kirkwood, Jim Collins—OCEANS '11 Santander.

Exhibitor's Reception—OCEANS '17 Anchorage "Mmmmmmmmm…"

Student Poster Winners—OCEANS '07 Vancouver.

Flying Dragons—Gala Dinner, OCEANS '14 Taipei.

Night Safari—OCEANS '06 Singapore.

And the ribbon is cut!—OCEANS '08 Quebec.

Future Vision for Autonomous and Remote Observing Technologies

Malcolm Heron, OES Vice President for Technical Activities

OceanObs is a decadal exercise to focus on how Ocean Observations will develop in the next decade. The anchor sponsor is NASA, and OceanObs'19 will be the third in the series. The main goals are "to further develop effective strategies for a sustained, multidisciplinary, and integrated ocean observing system, and better connect user communities and observers". In other words, predict how ocean observing technologies will develop in the '20s decade and figure out how to get the best advantage for humanity. The *modus operandus* is to invite short abstracts from people and then a review panel will form cognate groups on theme topics. Then each group would be asked to write a White Paper about one year before the OceanObs'19 meeting in Hawai'i for broad discussion and publication in Frontiers in Marine Science. At the meeting, the papers (which will now be black-and-white) will be consolidated into a plan for global management and governance.

We thought that would be easy for OES people, so we asked the OES Technology Committee Chairs where they thought they would be going in the next decade. The result was that a team of 17 co-authors from OES wrote the abstract that you see in the box. This is probably your first vision into the future.

On the basis of this abstract, we have been invited by the review panel to take the lead with two other abstract-groups to produce a paper titled: **Future Vision for Autonomous and Remote Observing Technologies.** This White Paper is due on 30 September—almost one year ahead of the OceanObs'19 conference.

People who contributed to the abstract were (in semi-random order):

Mal Heron, Rene Garello, Bill Kirkwood, Jay Pearlman, Alain Maguer, Marcia Isakson, Frank Caimi, Ananya Sen Gupta, SiriJodha Khalsa, M.A. Atmanand, R. Venkatesan, Bishwajit Chakraborty, Shyam Madhusudhana, Maurizio Migliaccio, Andreas Marouchos, Marco Lanzagorta, and Christopher Whitt.

Ocean Technologies in the Next Decade

The ocean is a harsh environment for instrumentation, and operations are much more expensive than those on land. This will energize the development of remote sensing, automation and robotics in the next decade, and will bring a focus on the supporting technologies of communications, data processing and visualization. Autonomous vehicles, intelligent sensors, and Artificial Intelligence in ocean sensors and systems are predicted to take fast development paths. The next decade will see innovations in some technology areas, and continued improvement in others.

- Autonomous maritime systems will be interconnected in swarms with real-time data collection;
- Sub-sea optical imaging technologies are becoming more widely used on ROV and AUV platforms for asset inspection and mapping of benthic species. Image processing and visualization techniques will continue to be developed.
- Sensors for physical parameters (waves and currents) will provide real-time information for shipping and port management. Data assimilation into circulation models will become quicker to provide warnings for the impact of surges and tsunamis on the coasts;
- Environmental sensors will be linked and automated for improved spatial and temporal data for modeling and management;
- Observations to improve pollution management will assist understanding of pollution transport and diffusion/aggregation;
- Ocean acoustics technologies will be developed to improve underwater communications and sonar imaging;
- Ocean energy and storage will continue its development path towards economic efficiency;
- Observation technologies in the polar oceans will become more robust and automated to cope with the extreme conditions and remoteness.

A sustainable future of the oceans, seas and coasts is paramount for humankind. We need to have the technologies for observations, integrated ocean observing systems, data management systems, and appropriate models and services. This paper addresses the technologies that will enable that goal.

Member Highlights

Contact the Editors if You Have Items of Interest for the Society

Stop-over of the Volvo Around-the-World Ocean Race, Newport, Rhode Island, USA

Stan Chamberlain

The Volvo Ocean Race (VOR) is often called the longest and toughest professional sporting event in the world (45,000 nautical miles, across 4 oceans, touching 6 continents, and 12 landmark host cities).

The 7 ocean racing boats arrived in Newport under cover of darkness and heavy fog on May 8. They will not be under sail again until May 19 & 20, when I'm hoping to capture them while they're sailing. I will report this in the next issue!

Volvo Ocean Race-Newport.

Volvo Around-The-World Race.

Stan Chamberlain with Volvo Racing Boats.

Ocean Racing Boats and US Coast Guard Tall Ship EAGLE.

Vestas 11th Hour Racing Boat.

Who's who in the OES

Stephen Wood, PH.D., P.E, Associate Professor in Ocean Engineering at Florida Institute of Technology

Stephen Wood is one of our newest Administrative Committee members and is highly involved in areas, such as autonomous vehicles, a technology area that OES is actively promoting. The following covers his goals and thoughts regarding his passion—research and teaching.

Dr. Wood and his team deploying a Bluefin AUV.

Background

My research passion and expertise are in robotic underwater vehicles, with add-on investigations in ocean energy, material coatings, and design engineering. What ties these diverse areas together is my background in mechanical design engineering (URI and Oregon State) and in ocean engineering (U-Miami). I am the founder and director of the Underwater Technology Lab at Florida Tech which is the primary research and teaching home for over 50 graduate and undergraduate students every year. Currently, my primary research focus is on underwater ordinance recovery and stealth vehicles.

Before getting into the systems I developed, let me provide a little background about myself. Of course, there is the scuba diving, where you will find me during the summer months diving with Seafarer Exploration where we are mapping and soon recovering and conserving artifacts from the 1715 Spanish Galleon, the Santisima Trinidad y Nuestra Señora de la Concepción. Then there is the mountaineering where I head to the pacific northwest to climb various mountains such as Mt. Rainier, Mt. Hood, Mt Olympus or hike various parts of the Pacific Crest Trail. Also, during the summer, I take students on multi-week research training cruises to the Dry Tortugas and around the Florida Keys. Of course, I must mention that I am writing text books on Underwater Acoustics, Ocean Engineering, and Underwater Archaeology Engineering. To top it all off, I am writing a series of STEM novels for eleven and twelve-year-old girls based on the oceans and ocean engineering. Once these books are done I plan on a series of "For Dummies" books with respect to ocean technologies.

Underwater Vehicles

My underwater vehicles research has developed the following systems: 1 crawler system, 2 surface autonomous/remotely

Underwater Sea Crawler.

Autonomous Underwater Glider.

operated vehicles (ASVs/ROVs), 3 standard ROVs, a combination remotely operated pontoon boat with and attached remotely operated ordnance recovery ROV, 2 standard torpedo AUVs, 2 gliders, 2 flume test systems.

Ocean Eneregy

In ocean energy, with direct involvement of my senior undergraduate students, we developed 3 different types of ocean energy systems. The projects resulted in several deployments that culminated in our current energy harvesting prototype, the Wing Wave (see following figure). In addition to generating industry funding (Clean-and-Green Ltd. & SebaiCMET Ltd. are local companies taking my ocean energy research and putting it into commercial viable systems), the Wing Wave has drawn the attention of National Geographic as well as MSNBC news. Currently, I am investigating the optimum propeller that should be used to harness low velocity ocean currents, while also being environmentally friendly and not harming endangered animals such as whales and sea turtles. I am currently preparing an NSF grant proposal for twin counter-rotating turbines to be developed and deployed in the Gulf Stream based on the propeller studies. I have secured continuous funding of these projects through various corporate grants, supporting the development, construction, and testing of these systems for the last 10 years.

Underwater Technology Lab (UTL)

As the director of UTL, I consider it paramount to engage graduate and undergraduate students in my two primary research interests: Ocean Energy and Autonomous / Remotely Operated Underwater Vehicles. As head of the Underwater Technology Lab, I am currently mentoring 30 students: 10 graduate students on theses and dissertations (AUVs, Gliders, ASVs, Instrumentation, and Ocean Energy systems) and 20 undergraduate students. It has been observed that graduate students are attracted to my lab in high numbers because UTL offer opportunities in marine robotic and ocean energy research development that are not available at other institutions. My graduate students are hired into prominent industry and government positions because of their electrical, mechanical and software engineering knowledge in addition to their ocean engineering skills. For example, one is a manager at Bluefin Robotics, one at the Naval Underwater Warfare Center in Rhode Island, three students are at the American Bureau of Shipping, five students at NAVSEA and the Columbia Group in Panama City, two with Oceaneering and many more throughout the country. On the industry side, Harris corporation, Northrup Grumman and the Hunter Foundation have invested 10's of thousands of dollars in pilot projects/studies for my research that involves primarily undergraduate students. https://www.mtsociety.org/education/competitions.aspx

IEEE Oceanic Engineering Society Election of Members to the Administrative Committee Nominees for the Term 1 January 2019–31 December 2021

René Garello, OES Junior Past President

The OES Administrative Committee election closes on 25 June. Be sure to cast your vote. The photos and bios of our excellent slate of candidates follows. You can see their statements on the voting site.

M. A. ATMANAND (M'97-SM'07) Vote for me, I will be your OCEANS 2022 Chennai Co-Chair, and I need to be on AdCom to make this most successful.

M. A. Atmanand, Director of National Institute of Ocean Technology (NIOT), India 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 fluid 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 is Director for the second term. He held the position of Director, NIOT during his first term from 2009 till 2015. He is 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. During the period July 2015 till February 2018, he was involved in policy making, preparation of vision document, preparation of Deep ocean 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 three patents (two Indian and one German) and about hundred research publications included in IEEE and other international refereed journals and conferences.

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, Vice Chair, Chair and currently he is the immediate past 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 6 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. He is a member, Editorial Board of the academic journal *Underwater Technology* of the Society for Underwater Technologies (SUT), UK. He is serving as an elected member of OES AdCom for 2018.

Tasks to be undertaken: India is the largest democracy in the world by population and OES in India is one of the largest Chapters. As an advisory committee member, he proposes to enlarge the IEEE network of ocean engineers in India and neighbouring countries. In view of the large potential in terms of shipping, oil and gas and other offshore industries, it is essential to have a strong IEEE Oceanic Engineering Society in the Indian Ocean area. It is proposed to contribute on Blue Economy, which is being encouraged by the Government in India.

He has successfully bid for the IEEE Oceans conference for India to be held in 2022 and is a Co-chair for the same. It is all the more important that he is elected as an AdCom member to steer the conference through, being the first one to be held in India. It is also proposed to hold more workshops, technical symposia and co-sponsored conferences with an additional motive of attracting new members to the OES. The specific problems in this part of the world with regard to ocean engineering will also be addressed. The SAVe competition is to be extended to the region beyond India and a separate competition to be held at the regional level to motivate students in the region.

Finally one of the main programmes to be undertaken is to strengthen technology development between the Indian Ocean rim countries in order to warn against Tsunami and other natural disasters, with the additional advantage of being the Chair of IOCINDIO of IOC, UNESCO. To this end he intends to work closely with neighbouring OES Chapters and members.

He seeks your support for election to AdCom to achieve these important goals.

FERIAL EL-HAWARY (M'82-SM'85-F'99-LF'13) received the B.Eng. from University of Alexandria, and the M. Sc. from the University of Alberta, Edmonton, Canada, in Electrical Engineering; and the Ph.D. in Oceans Engineering from Memorial University of Newfoundland, Canada. Dr. El-Hawary is President of BH Engineering Systems Ltd. and former Professor, Faculty of Engineering at Dalhousie University, Canada where she established and directed the Modeling & Signal Analysis Research Laboratory. Sustained research contribution devoted to OCEANS Application with significant impact on defense, navigation and Oil & Gas exploration. She has published widely in IEEE Journals. She is the Editor-in-Chief of *The Ocean Engineering Handbook* CRC Press, Year'2001 and 2nd. Edition in 2004. Served as Associate Editor of *IEEE Oceanic Engineering Journal*. With more than twenty five years experience in teaching courses in Electrical and Signal Processing for Oceanic Engineering applications, she has made significant and sustainable contributions in promoting and developing Advance Studies. As a founder of BH Engineering Systems Ltd., she established professional development courses, linking academic innovations to industrial needs. She is a Fellow of Marine Technology Society (MTS), Fellow of the Engineering Institute of Canada (EIC), and Life Fellow of IEEE.

Contributions to IEEE Other Societies: Served on IEEE Board of Directors and IEEE-Canada (Region-7) as Director 2008-09, IEEE Conferences Services Committee Member, 2007–2008, IEEE History Committee member, 2005-2007. Member of TAB and Liaison Division IX (AES, GRS, IT, ITS, OE, SP, VT). Ferial served IEEE Section Congress'08 as Organizing Committee Chair, Quebec Served IEEE Canada as a Chair of International Humanitarian Technology Conference (IHTC'2014), Montreal, (IHTC'2015), Ottawa and (IHTC'2017), Toronto Organizing Committees. Fellow Evaluation Committee for IEEE/Systems and RFID Councils.

Contributions to IEEE/Oceanic Engineering Society (OES):

- IEEE/OES Fellow Evaluations Committee 2010- to date
- Member of the IEEE/OES (AdCom) (2015–2017)
- Member of the IEEE/OES (AdCom) (1989–93) and (1997–2007)
- Vice-President International Activities IEEE/OES, two terms, (1990–1996)

- Chair of the IEEE/OES Membership Development Committee (2015)
- Chair of the IEEE/OES Membership Development Committee (1994–1998)
- Associate Editor of *IEEE Oceanic Engineering Journal*
- Member Board of Reviewers OES Conference Proceedings—to date
- Ferial has been instrumental in establishing IEEE/OES Chapters in (Region-8), France, Norway, Tunisia and Portugal. Also, R-7 Joint Chapter in Quebec City, Founder and Chair IEEE/OES Canadian Atlantic Chapter in Halifax, Canada
- Chair of the Tutorials Program Committee for many of the IEEE/OES International OCEANS Conferences
- Served as IEEE/OCEANS'08 General Co-Chair, IEEE/OCEANS'07, IEEE/OCEANS'11, IEEE/OCEANS'97 and IEEE OCEANS'87s, Organizing Committees.

Ferial is the recipient for many awards recognizing her contributions with devoting services to IEEE:

- 2017—"Murugan Memorial Award" for her contributions to the Canadian Atlantic Section and IEEE.
- 2008—The IEEE-Systems Man & Cybernetics Society Outstanding Contribution Award.
- 2007—IEEE- Educational Activities Board (EAB) Meritorious Achievement Award in Continuing Education.
- 2005—Marine Technology Society (MTS) Ocean Engineering Compass International Award.
- 2002—The J.J. Archambault IEEE/Eastern Canada Council Merit Award.
- 2001—The IEEE Canada Wally Read Service Award for Outstanding Service & contribution to IEEE-Canada.
- 2000—IEEE Third Millennium Medal.
- 1999—IEEE/RAB Achievement Award.
- 1997—IEEE/OES Distinguished Service Award.
- Fellow of MTS, 1985, Fellow of the Engineering Institute of Canada (EIC), 1997 and Life Fellow of IEEE, 1999.

Statement:

- My association with OES has been a rewarding experience developing excellent relationships with volunteers, and contributing to OES's Membership, Conferences and Publications. The challenge for OES is finding and expanding offerings (products and services) that members truly value globally and leverage the benefits that the society contributes to their professional career aspirations.
- Focus on OES Members needs and help Chapter Activities to grow our Membership.
- There is general agreement that the future of IEEE and its Societies depends on membership growth which in turn relies on the next professional generations. There is a need to challenge leaders of the OES in strengthening and expanding the role of the Young Professionals and Graduate Students organizations within the OES. We need to be proactive in strengthening and fostering loyalty to the profession and the technical community.
- We must continue to grow as a truly global organization and embrace membership from IEEE ten Regions around the world.
- In order to attract and engage the next generation represented by young professionals, graduate and undergraduate students to OES related "Technical Field of Interest" is by developing high quality Tutorials, Webinars, encourage more of Student Paper Competitions, and Workshops as part of an integrated Educational Program that must be a High Priority Investment for OES.
- Encourage establish some carrier development sessions for young professionals during OES Conferences.
- Recommend more of Sponsored Industrial Scholarships in our areas of interest to encourage Students & Graduate Students memberships.
- It is important to recruit for more volunteers and have fair participation from different Oceans Organization Societies which will benefit OES membership and considered as an added value to its Conferences and Publications.
- Encourage more collaborations between the seven societies of Division IX to focus and promote the overlapping advanced technology for the benefit of Humanity and support the mission for Better Quality of Life.
- Consider a Special Networking Event between Division IX Societies.
- Promote efforts to make OES more attractive to new future members.

I am pleased to serve and continue my commitment to OES.

STEPHEN M. HOLT (M'00-SM'01) received his B.S. in Mathematical Physics from Wilmington College (Wilmington, Ohio), and his B.S. in Electronic Engineering from Franklin University (Columbus, Ohio). He also completed his M.S. in Engineering (with emphasis in Ocean Engineering and Underwater Acoustics) and his Graduate Certificate in Engineering Management from The Catholic University of America (Washington, DC).

Steve is currently employed with SGT, Inc. of Greenbelt, Maryland, USA as a Senior Systems Engineer working with National Aeronautics and Space Administration (NASA). He has also supported the National Oceanic and Atmospheric Administration (NOAA) with many meteorological and oceanic programs. He joined the IEEE Oceanic Engineering Society (OES) and was first elected to its Administrative Committee in 2000. He was later elected to the grade of Senior Member to the IEEE in 2001. He was also one of three Executive Co-Chairs for the MTS/IEEE OCEANS 2005 Conference in Washington, DC and was the Secretary for the MTS/IEEE OCEANS'15 Conference in Washington, DC. Steve was the elected member to the OES Executive Committee as its Secretary for ten years, from the beginning of 2001 to the end of 2010. In 2007, he was awarded the IEEE OES Distinguished Service Award (DSA).

Steve presently serves as the IEEE OES Webmaster, where he maintains the integrity of and implements new technology initiatives related to the web site. He also serves as the Co-Chair, Data Standards for the Environment and Observation Systems Technology Committee. Additionally, Steve is the Chair for the OES Promotions Committee. His technical interests include image, radar,

and sonar signal processing, optical systems engineering, as well as the remote sensing of the atmosphere and oceanic environments.

Statement: If elected, my goal is to stay engaged with OES activities as a Member of the Administrative Committee. As the OES Webmaster, I will continue to strive to make our web site a strong and effective tool for conducting our business efforts, as well as conveying the importance of our Society to the global oceans community. With our web site, I would like to expand our promotional activities to more effectively advertise and sell our brand and increase our membership. I would also like us to more effectively use the latest tools in social media to expand our message to a more diverse, younger and international audience. I am especially interested in expanding our outreach activities whereby we become even more effectively engaged with educators and students alike. In addition, I would like continue to expand our efforts in the area of Promotions with a variety of oceanic engineering magazines that I interface with on a wide range of oceans related topics. Thus, if elected, again my hope is to continue these efforts for the Society to strengthen the activities of the OES Administrative Committee in any way I can!

BRIAN WILLIAM HORSBURGH (AM'04-M'10) Born: Dundee, Scotland, UK

Education: University of Dundee, Honours M.A. degree in Geography

My early work career was in various roles in the transportation sector—marketing, operations and planning of airports and buses. From London's largest airport, Heathrow, to the smaller remote airports in the Highlands and Islands of Scotland, with all their challenges. Following this, I joined a large bus and coach company based in Aberdeen, as their Marketing Manager.

The development of marketing skills took me into a new role as Sales and Marketing Manager for a large conference, exhibition and events venue in Edinburgh. This was to be the start of 25 years in this industry, spanning 3 venues in Scotland, including the commissioning of one new build venue, and its operation over 4 years. The final venue was the Aberdeen exhibition and Conference Centre, where I remained for 15 years, with the final 6 years as its Managing Director. I saw turnover increase 4 fold during that time, managed the period of a major expansion and build programme, then was involved in the planning of a new replacement venue of twice the capacity, which will open in 2019.

During my time in the conference and exhibition venues business, I held several directorships and committee posts, most notably as a member of the LOC of OCEANS 2007 in Aberdeen, as Exhibition and Patronage Chair. After the successful outcome of the 2007 conference, it was a great priviledge to act as Deputy Chair of the LOC for the second Aberdeen conference of OCEANS, in 2017, where again I took responsibility for Exhibition and patronage, with another successful event. It has been a great opportunity to merge my career experience and apply it to these two OCEANS conferences.

In December 2017, I took up the position as Secretary of the new UKRI Chapter of OES, and look forward to working with my colleagues in OES to grow and develop a successful Chapter, and look forward to continuing my contribution to OES.

Society Memberships:

- IEEE Oceanic Engineering Society. (Current)
- Past member of Chartered Institute of Transport (MCIT)
- Past member of Chartered Institute of Marketing (MCIM)
- Past member of Institute of Travel & Tourism (MITT)
- Past member of Professional Congress Managers Association

Statement: I have been involved with OES since 2003, when I worked with Professor John Watson to bid to bring the Oceans conference to Aberdeen, Scotland in 2007. This would be the first time it would be held in the UK. When Aberdeen was accepted, I served on the LOC as Exhibits/patronage member. The 2007 conference was a great success.

Over the years I have attended a number of the Oceans conferences, including San Diego (x2), Biloxi, Providence R.I, Washington D.C., Vancouver, St Johns, Singapore, Kobe, Sydney and Aberdeen (x2). When it was agreed to host Oceans again in Aberdeen in 2017, I served on the LOC again, this time as Deputy Chair, again with responsibility for Exhibits and Patronage. The 2017 conference was again a great success, both in terms of technical content and financially.

Since December 2017, I have taken the position of Secretary on the committee of the newly formed U.K. and I Chapter of OES.

My professional background is primarily in the conference and exhibition industry, both in conference and exhibit organisation and venue management. I have valuable experience and insight in these fields at both UK and global levels. I was a member of the global board of ICCA (International Conference and Congress Association) for 2 years, and served as Chair of the UK & I Chapter of ICCA for 4 years.

I welcome the opportunity to bring this experience to the OES AdCom, and if elected my priorities would be as follows:

- To work to expand the membership, both of students and experienced engineers/scientists, globally through key events and at chapter level.
- To raise the awareness of OES as a professional society and its activities. (The Oceans conference brand is well established, but the other society activities must be better known.)
- To establish a comprehensive database of potential exhibiting organisations, globally, and create improved value and attention to our exhibitors and their people.

DEBBI KILL (AF'07-AM'15-M'17) is a CPA, CMA with 30+ years financial management experience. Her strengths in the areas of financial management, analysis, planning and reporting are combined with a solid background in computerized information systems and general accounting management. Her oceans engineering industry experience began in 2001

when she accepted the position of Controller at International Submarine Engineering Ltd. As Controller, Debbi provided financial leadership in the design and build of unmanned submersible technologies.

From 2009–2015, Debbi served on the board of the Marine Technology Society (MTS) as the Treasurer and VP Budget and Finance and as Financial Liaison on the Joint OCEANS Administrative Board. She also served as MTS Liaison for OCEANS 2016 Monterey CA and Finance Chair for the OCEANS 2015 Washington DC and OCEANS 2007 Vancouver BC conferences. These annual conferences bring 2,000+ marine technology professionals together for 3 days of subsea technical presentations, exhibits and networking.

Debbi has now turned her sights to the MATE ROV competition as Treasurer on the inaugural board of MATE Inspiration for Innovation (MATE II); a newly formed non-profit spun off from Monterey Peninsula College's MATE Centre. She has also served for the last five years as the Official Scorekeeper at the Regional MATE ROV competition event in Seattle and the International competition held in various locations throughout North America.

She is a member in good standing of IEEE OES, the Marine Technology Society and the Chartered Professional Accountants of British Columbia and holds a business certificate in Computer Systems Technology from the British Columbia Institute of Technology.

She is a long time resident of the West Coast of British Columbia.

Statement: IEEE OES's stated purpose is to promote close cooperation and the exchange of technical information among its members through publications and meetings and to foster the technical and professional growth of its members. I believe my formal training in financial and business management combined with my service on various boards and committees within the oceans community have culminated into a skill set that will enhance AdCom's ability to deliver on these very important objectives.

As with all professional societies, IEEE OES must strive to remain relevant to its membership and such relevance is vital to member recruitment. The delivery of quality conferences, workshops and publications, both at the society and chapter level, are key to keeping the society vibrant within its community. I'd like to bring the value of my professional background and commitment to the oceans community and STEM education through my involvement with MATE II to assist AdCom in its mission to fulfill the society's intended purpose.

MARINNA MARTINI (M'98-SM'07) As the lead engineer for sediment transport instrumentation and field operations at the U.S. Geological Survey in Woods Hole, MA, USA, I provide technical services to USGS scientists in support of physical oceanographic and sediment transport studies. This work includes systems design of moorings, bottom landers and data loggers, software development, project management and leadership (for example: http://soundwaves.usgs.gov/2011/11/fieldwork2.html). At the national level I have served on steering committees to develop USGS technical capabilities and helped to run workshops. Internationally I have contributed to field work and scientific meetings. My credentials include an M.S. from the University of New Hampshire, (ocean engineering, instrumentation), a B.S. from the, United States Merchant Marine Academy, (marine & systems engineering), and professional engineering licensure in the state of Massachusetts. In the past I have held a U.S. Coast Guard Merchant Marine License, 3rd Assistant Engineer, unlimited horsepower.

Statement: I have been attending OCEANS conferences since 1989, and have found these meetings invaluable to my effectiveness at work and to my professional development. I would be honored to continue to be part of an organization that has helped me so much. I can contribute effectively in either a leadership or support role.

Since 2015, I have been serving as OES Secretary. During my 2007–2012 AdCom tenure I have served on the organizing committee for the Current, Waves and Turbulence Measurement Workshop (CWTM) as the treasurer two times, helped with student poster competitions and scholarships, and experimented with a "lost instrument" web site at my own expense. I published the monthly *OES eNewsletter*. I started the OES group on Linked-In. I have served as the OES liaison to IEEE Women in Engineering (WIE).

Having seen the OES as a member and from the administrative side, I am convinced that OES is uniquely positioned as an international bridge between academia, government and industry. Like many other volunteer organizations, one of the challenges facing the OES is to encourage younger members to get more involved, in spite of family and work commitments. If re-elected I will continue to concentrate my time on efforts that provide tangible benefit to the OES by helping with outreach on social media, working towards better visibility of the OES on and offline, and continued service to workshops and meetings such as OCEANS, and the CWTM. I see online visibility and social media tools as particularly useful to networking with a diverse membership who are spread across the globe.

JAY PEARLMAN (M'84-SM'02-F'08-LF'15) is technical director of J&F Enterprise and an adjunct Professor at the University of Colorado. He received a BS from Caltech and a Ph.D. from the University of Washington. He has worked in both government and industry. He was Chief Engineer of Network Centric Operations at Boeing and a Boeing Technical Fellow, guiding development of advanced information systems.

Jay is active in ocean research and information systems in projects in the US and Europe. He is PI for the five-year NSF Ocean Observations Research Coordination Network which is focused on advances in engineering and science over the next

decade. He was a work package lead for the recently completed European FP7 research project, NeXOS, which developed a new generation of in-situ ocean sensors and he is an active participant in the Ocean Data Interoperability Platform (ODIP) and the North Atlantic Observations System Project, AtlantOS. For AtlantOS he is a co-lead on a Work Package for technology and observation system innovation. He is also leading an international team to allow much improved access to best practices for ocean observation and information with the creation of a sustainable, operational system in 2019.

Jay's interest in ocean research and engineering started in 2000 with the launch of EO-1 satellite. Jay was co-lead of the EO-1 international science team that included ocean research. In 2004, he formed the OES GEOSS Technical Committee that has become the Environment and Observation Systems Technology Committee, which he still chairs. As a result of this work, he was a keynote speaker at Oceans 2005 in Brest and received an IEEE Special Recognition Award 2006.

During the last decade, Dr. Pearlman served six years on the National Academies Ocean Studies Board. Jay was a member of the UNESCO GOOS Science and Technology Steering Committee and a member of IOC JCOMM panel on Industry. He served for five years as a member of the US national committee of the Scientific Committee on Ocean Research (SCOR).

Jay has been a long time supporter of OES. He has been an active participant at AdCom meetings for more than a decade. In addition to his service as a technology committee chair, he is currently serving as lead for the OES Policy and Global Concerns affinity group. Over the last decade, he has organized workshops, sessions and been a reviewer for Oceans conferences with a focus on ocean observation systems. In Aberdeen, he organized a workshop on Oceans of Tomorrow, connecting sensor system development with industry applications needs. His emphasis on both ocean systems and on outreach continues also in his contributions to OES Earthzine and the OES Beacon, In 2017, he lead the formation of outreach strategy for OES, which was adopted in June 2017. He plans to take an increasing role in OES outreach as well as activities in standards and observing system innovation.

Jay is a Fellow and a Life Member of the IEEE and has more than 80 publications and 25 US and international patents.

Statement: It has been a privilege to be a member of OES AdCom for the last three years. I have seen exciting evolution in the formulation of a new strategy and its initial implementation. OES is a dynamic organization with a financial base in its conferences and publications. It is important to continue and build on this success. According to its constitution, OES focuses on "the creation of new capabilities and technologies from concept design through prototypes, testing, and operational systems …". If elected, I will continue the work to expand the Society's role in end-to-end observations from sensors to data. In the last year, I created a technology committee in this area as a base for this direction, which can be important in attracting new research and industry partnership opportunities for OES.

If re-elected as an AdCom member, I will continue working to expand three areas—*increased focus on integrated observing systems, support of standards and best practices to improve interoperability and the engagement of young professionals and new members through an expanded outreach program.* The role of oceans in grand challenges such as climate and food resources is now better appreciated. Improved monitoring of the oceans is a grand challenge in itself. Yet changes in technology are creating significant opportunities. I believe OES is in a position to make important contributions though its members and as a forum for the community. It should foster a broader environment of collaboration for technology and systems.

I will work with the OES and the AdCom to leverage new tools for outreach, based on the recommendations of an OES team I led last year, to increase use of social media and the new IEEE communication platforms for community building. Here I emphasize young professionals along with senior members in engineering and science. There are special opportunities in OES for young professionals and I will encourage both their participation and roles in leadership.

Interoperability in ocean measurements has been a challenge. For standards, I will work to expand the OES standards activities to include access to best practices for sensors and ocean observing. I will work with the Technology Committees to identify key requirements and opportunities. Programs that I am working on such as Oceanus RCN, AtlantOS and other international projects have efforts in these areas including standards and best practices that we can leverage to identify OES contributions.

With your support, as a member of the AdCom, I will work with the OES team to expand these focus areas and more.

CHRISTOPHER WHITT (S'95-M'03-SM'16) is a project engineer and project manager at JASCO Applied Sciences in Halifax, NS, Canada. Over the span of his career has been involved with many wide-scale ocean acoustic monitoring projects, particularly those involved with arctic programs, from equipment design and mooring preparation to participating in many arctic cruises.

Christopher is a registered professional engineer (P.Eng.) in Nova Scotia. He completed his undergraduate (B.Eng. 2000) and graduate degrees (M.Eng. 2010) at Memorial University in St. John's, NL, Canada. Christopher's early academic training started in digital communications and software engineering and continued to signal processing and broadband beamforming for acoustics. A long-standing interest in acoustics saw application to ocean technology upon joining JASCO in 2007.

With JASCO Christopher has designed and deployed moorings for everything from near shore to deep ocean basins. Significant projects include multi-year arctic measurements with acoustic dataloggers, measuring biological and shipping noise using cabled observatories (such as VENUS) and wireless systems (using Wi-Fi and Iridium), and integrating acoustic sensors into gliders and other autonomous platforms. A common theme through all these projects is automating the analysis of

multi-terabyte datasets. Christopher is now the field support lead for JASCO worldwide, supervises training of all field staff, as well as mentoring engineering students. Currently, Christopher is focusing on long-term soundscape studies and ambient noise statistics.

An IEEE member and volunteer for over 20 years, he was a VOLT graduate in 2014 and uses his strong IEEE knowledge to train other section and region volunteers. He was on the organizing committee for the Canadian Conference of Electrical and Computer Engineers (CCECE2015) and is currently a member of the OES OceanObs'19 Working Group. He is past Section chair for Canadian Atlantic Section, and current Area East chair for Region 7.

Statement: The Oceanic Engineering Society (OES) should lead the way into the next decade of ocean technology and beyond. OES has unique potential to connect government, industry and research communities. Serving on AdCom, I will keep focused on maximizing future opportunities to meet the OES Vision, and the IEEE Mission of advancing technology for humanity.

I believe the pace of innovation in ocean technology is going to continue to increase. I'm particularly interested in the power of ocean observation using buoys, networked observatories and autonomous systems. This calls for better standardization and the application of big data techniques. There is an increasing need for exchange of technical information to implement comprehensive and complementary observing systems, to store and manage ever-increasing datasets, and to turn large volumes of data into useful information for sciences, industry and policy-makers.

To build technical connections within our communities and foster the next decade of innovation, OES should work on parallel fronts:

- Keep conferences and publications strong.
- Support development of local ocean technology communities around the world.
- Engage students and young professionals with networking and mentorship.
- Engage in the implementation and standardization of sound as an essential ocean variable for future observing systems.
- Engage the wider ocean science and technology community (events such as OceanObs'19).

If elected to AdCom, I will work diligently on all these parallel fronts.

Welcome New and Reinstated Members

Australia
Pascal A Craw
Alan L Harvey

Canada
Wayne M Butner
Gabriel Green

China
Danfeng Chen
Wei He
Lixin Liu
Lei Wang
Yang Yu
Guilin Zheng

France
Philippe Forjonel

Germany
Erik Jung

Hong Kong
Botao Liu

India
Bipin Ku, Ar
Raja Kumar Kontham
H R Mohan
Praveen Naresh
Prejol Hulda Sheena P
Srinivasan Rangan
Manishika Rawat

Italy
Paolo Andrea Gemelli

Japan
Hiroumi Horimoto
Yukiyasu Noguchi
Mehul Naresh Sangekar

Korea (South)
Jae-Weon Choi
Mauritius
Narendra R Hurdowar

Netherlands
Eduard Satoshi Malotaux

Nigeria
Tamunotonye Israel Deresoma
Peru
Jose Luis Torres De La Piedra

Russia
Aleksandr Nikolaevich Grekov
Aleksey Aleksandrovich Kabanov
Elena Levchuk

Singapore
Saima Ahmed

South Africa
Robyn Anne Verrinder

Spain
Eduard Vidal Garcia
Francisco J Velasco

Thailand
Mahadeva B Ellepola

United Kingdom
William Allan
Alberto Consensi
Abubakar Malam Dala
Domenico Dorsi
Filip Florek
Kalvin Mark Fraser

USA
Shaik Khurram Ahmed
Thomas G Beck
Lucian B Birdsong
William Rene Calder
Jared Carter
Deborah M Cooper
Vladimir Djapic
Charles Dove
Armin Ellis
Magnus Alexander Farr
James P. Howard
Steve Keohane
Kurt Kramer
Nicholas Laws
Kevin Lyons
Amin Mivehchi
Yannick Monye
John P R Noll
Lance A Page
Seth Parker
Paul C Ramos
Hugh John Roarty
Rendhy Moreno Sapiie
Britney E Schmidt
Ted L Simpson
Adolfo Anibal Torres
Fran Turner
Christopher Uken
Adela Wee
Clark Alvin Weitkamp
Jacqueline Worley
Juergen Johann Zach

Meet Our New YP-BOOST Program 2018 Winners!

Frederic Maussang, OES Young Professional Rep., Brandy Armstrong, OES WIE Rep.

Dear OES Young Professional Members

At the beginning of this year, two candidates were chosen for the inaugural year of the new YP-BOOST program. In competition with 21 active IEEE Oceanic Engineering Society members who applied, the candidates were selected based on past participation in IEEE OES activities and on a letter of application showing their motivation and describing how they would like to be involved.

Congratulations to our two selected YPs!

Fausto Ferreira.

FAUSTO FERREIRA (M'09). He obtained his Master Degree in Electrotechnical and Computer Engineering from Instituti Superior Técnico, Technical University of Lisbon, Portugal, in 2008 and his Ph.D. in Electronic Engineering, Information Technology, Robotics and Telecommunication from the University of Genoa, Italy, in 2015.

Previously he was in the SPC in OCEANS'13 Bergen and organized a double special session at OCEANS (2015) on "Education and Competitions Initiatives in Marine Robotics" and has worked closely with IEEE OES to collaborate on numerous robotics competitions. He is involved with the IEEE OES Autonomous Maritime Vehicle Student Competition International Coordinating Committee under the Technical Committee for Unmanned Marine Vehicles and Submersibles.

In 2014, he joined NATO STO CMRE, La Spezia, Italy, as a scientist working on sonar mosaicking and the organization of marine and multi-domain robotics competitions. His research interests include underwater computer vision, robotics competitions, educational robotics and marine law.

Shyam Kumar Madhusudhana.

SHYAM KUMAR MADHUSUDHANA (M'08). He obtained his Bachelor degree in Computer Science & Engineering from Visvesvaraya Technological University, India in 2005. He obtained his Master degree in Computer Science from San Diego State University—California State University in 2010 and his Ph.D. in Applied Physics from Curtin University, Australia in 2016.

Previously, he participated (and won) in the Student Poster Competitions at OCEANS Kobe (2008) and Bremen (2009). He was part of the organizing committee for OCEANS'13 San Diego. At present, he serves as the Coordinator of OES Technology Committees.

Over the past few years, he worked as a Research Associate at the Centre for Marine Science and Technology (CMST), Australia and at the National Institute of Oceanography (NIO), India. At present, he is starting a new episode in his career as he joins the Bioacoustics Research Program at Cornell University as a Postdoctoral Research Associate.

As YP-BOOST laureates, they will be fully included in the leadership of the OES for the following two years. They will be particularly active at **OCEANS'18 Kobe**, as judges for the Student Poster Competition, as social media reporters, and as participants in society meetings, among other activities. They will also both present their papers at the conference.

Do not hesitate to seek them out at OCEANS and introduce yourself. They will be busy but you'll be sure to find them participating in the **IEEE OES YP BYO lunch meeting** held during each OCEANS conference.

See you soon in Kobe!

Fred and Brandy
Email:frederic.maussang@imt-atlantique.fr,
brandy.armstrong.us@ieee.org

IEEE OES Supports COL's 2018 National Ocean Science Bowl Competition

For the 16th consecutive year the OES provided financial support to the Consortium for Ocean Leadership's (COL) National Ocean Sciences Bowl (NOSB). The support was used to help pay for the 3rd through 8th place prizes and operational expenses.

A U.S. based competition, the NOSB is for pre-collegiate students. Generally, there are 25 regional competitions held in the late winter with the winners of the regional events gathering the end of April to vie for top honors. This year, due to the strong hurricanes that hit Texas, only 23 regional events were held. However, in the NOSB spirit of good sportsmanship, respect for others and all participants are family, the Texas teams were invited to participate in the regional competitions held in surrounding states. In all, 351 teams (involving ~1600 students) competed in the regional events in 2018.

The finals competition was held in Boulder, Colorado, April 19–22, 2018. The event was kicked off with a Career Night hosted by the National Center for Atmospheric Research (NCAR). In a speed dating style setting, small groups of students circulated between mentors from government, industry and academia (including UCAR, NCAR, CIRES, NOAA, Kongsberg and CU Boulder), spending 10 minutes with each representative. In each 10-minute session, the mentors discussed their education, career path, a typical work day and answered the student's questions. (Fig. 1)

On Friday, the students and their faculty mentor(s) spent the day participating in one of several field trips. The trips ranged from planting trees along a damaged stretch of a creek to participating in an unmanned aircraft systems flight school; contributing to citizen science projects (CrowdMag and GLOBE Clouds Protocol observations), maintaining trails near Lily Lake, and visiting Dinosaur Ridge and Triceratops Trail.

On Friday evening, RDML Tim Gallaudet, Ph.D., USN Ret., Assistant Secretary of Commerce for Oceans and Atmosphere and Acting Under Secretary of Commerce for Oceans and Atmosphere, provided the Keynote address at the Opening Ceremony. Within the first 30 seconds of his talk, he had the full attention of all in the room by mentioning a number of the team biographies included in the program and asking questions of the team members. The biographies range from serious to whimsical and the line of questioning by Dr. Gallaudet followed suit. His presentation then described the variety of jobs available at NOAA and mentioned some employees by name and described their present duties as well as the career path that each had taken to get to their current position.

Figure 2. RADM Tim Gallaudet, Ph.D USN Ret. and RADM Jon White, USN Ret., COL President talking with students after the Keynote Address.

The actual competition was held on Saturday and Sunday—starting with double elimination rounds and ending with the final match between Santa Monica High School, Los Angeles, CA and Montgomery Blair High School, Silver Spring, MD—which Montgomery Blair won (Fig. 3).

At the awards ceremony on Sunday afternoon, each team received a plaque. The 3rd through 8th place teams received Amazon gift certificates to purchase text books and other training materials as well as items made from recycled plastics such

Figure 1. Career Night at NOSB.

Figure 3. NOSB First Place Team, Montgomery Blair High School, Silver Spring, MD with COL President, Jon White at left.

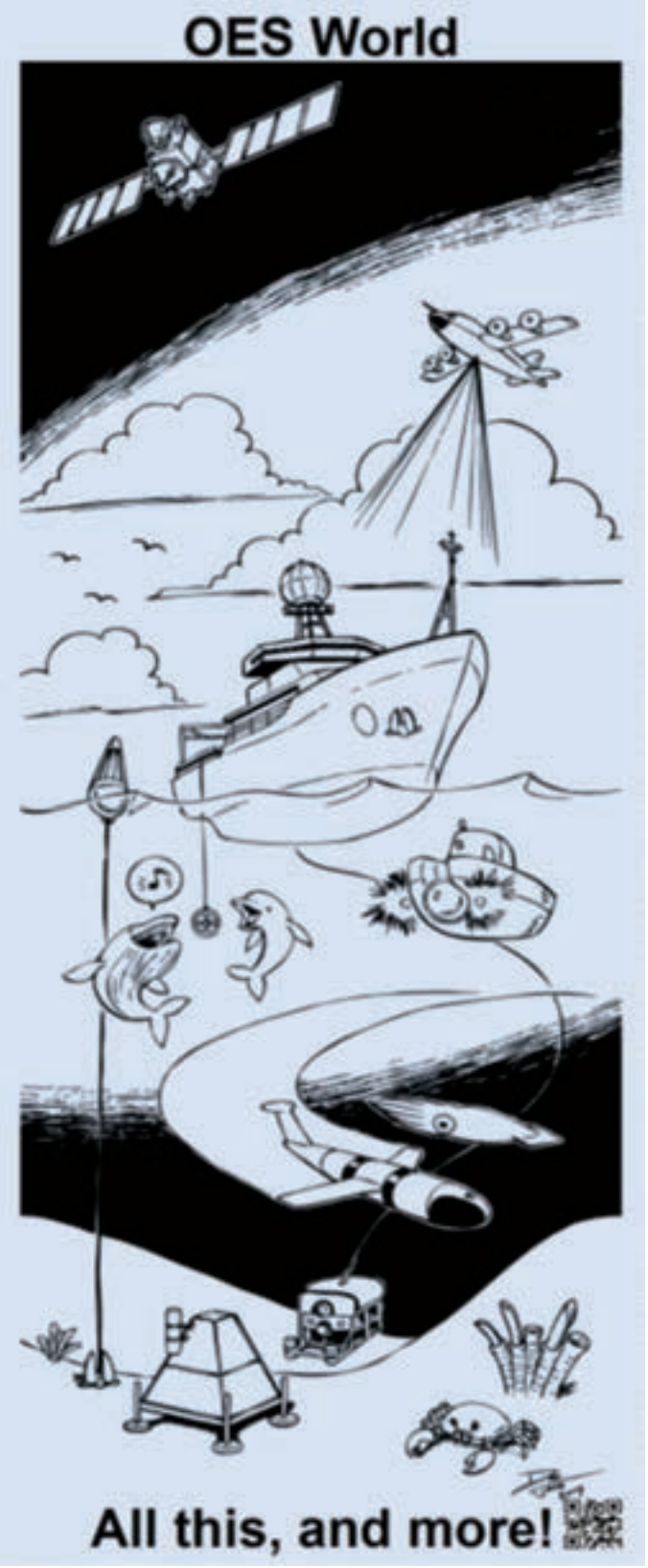
Figure 4. Team exhibiting exceptional Sportsmanship during NOSB Competition: Newport High School, Bellevue, WA.

as backpacks. The 1st and 2nd place winners each received a one week trip to Florida this summer provided by Sea World. The teams will work with Sea World personnel at their Rescue and Rehabilitation facility as well as travel to Mote Marine Laboratory, and FAU's Harbor Branch Oceanographic Institute. Finally, the team demonstrating the best sportsmanship throughout the competition, as seen by the judges, was named. The recipient was first time Finals competitor Newport High School, Bellevue, WA (Fig. 4).

"Overall, the four-day event provided over 100 students from across the country opportunities to learn about ocean sciences and the wealth of career paths in ocean science and STEM fields; participate in hands-on research and conservation projects; meet like-minded peers and potential mentors; and gain leadership, critical thinking, and communications skills to assist them in high school, college, and future careers." (NOSB website)

A 2017 competitor from Marshfield High School, Marshfield, WI, Suhaas Bhat, summed up his NOSB experience as "The great thing about the Ocean Bowl, and oceanography as a whole, is its ability to integrate all the sciences into one field, seamlessly using physics, chemistry, biology and earth science to understand the whole world around us."

Photos are courtesy of the NOSB.



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