OES BEACON

Newsletter of the Oceanic Engineering Society

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We are looking forward to welcoming new members!

IEEE OES ADCOM MEETING
January 28-29, 2023 London UK

IEEE

IEEE Oceanic Engineering Society

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

OCEANS 2022 Hampton Roads photos on the front cover:
Virginia Beach artwork by Yessine Karray
OES AdCom group photo by Francisco Pinto

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Member Benefits—Did You Know?

Did you know that you can access the past issues of the Beacon newsletters on the OES website? All of the Beacons with our past announcements and articles are available for access to all members and visitors to the site's Publications tab. Visit us at

https://ieeeoes.org/publications/oes-beacon/

From the OES BEACON Editors

Harumi Sugimatsu and Robert Wernli

Welcome to 2023 and the March 2023 issue of the Beacon. Hope this issue finds all our members well and happy to put the problems of the last few years into the past. And with the arrival of 2023, we welcome the election of our new AdCom and ExCom members, who are all listed on the inside front cover. Thanks to all our officers who have reached the end of their terms . . . well done! And, don't miss the announcements of this year's OCEANS in Limerick, Ireland, and the Gulf Coast in the U.S., and our OTC conferences in Houston and Brazil.

Our chapters have been busy as the reports show. The Hong Kong joint chapter was busy with student ROV competitions and workshops. The University of Southern Mississippi's (USM) OES Student Branch Chapter (SBC) provides the results of their first annual poster competition. The University of Zagreb, Croatia, Student Branch Chapter was busy with many activities as shown in their report. We also have reports on OES student support of phytoplankton research at First Flight High School, and which Young Professionals (YP) were chosen for our 2023–2024 YP-BOOST Laureates program. And don't miss the reports from our Providence, Japan, UK & I and very busy Hong Kong and Malaysia chapters.

We also have several reports on what to expect this year from our ExCom VPs for Technical Activities (VPTA), OCEANS (VPO), Workshops and Symposia (VPWS) and Professional Activities (VPPA) and our new Treasurer Elect and also the new position of Executive VP. Two of our members were also recipients of prestigious awards as described in their article and our newest IEEE fellows are also highlighted. The Journal EIC also provides a list of recently released papers that are available to our members. You will also see in the report from the OES president his view on the direction of the society.

Harumi and Bob at the London AdCom meeting.

The international outreach by OES in support of the UN Decade of Ocean sciences for sustainable development 2021–2030, is also documented. This includes a report on our participation in the World Ocean Assessment workshop at Belitung, Indonesia.

Have you done something exciting lately? Received an award or professional recognition? Be sure to contact your editors about submitting an article.

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.

Your OES AdCom and ExCom at work in London.

Did You Know???

You see many photos from past conferences in the Beacon, especially in the Blast from the Past articles. For decades, our conference photographer, Stan Chamberlain, has taken the photos and uploaded them to our website. However, the link to them hasn't been obvious, so we have updated the website with an easy link to 20 years of past conference photos. Under **Society News** on the right side of the OES website, you can access the photo archives by using the **Conference Photo Gallery** link (https://ieeeoes.org/conferences/photo-gallery/0/) Enjoy!

From the President

Christopher Whitt, OES President

Welcome to 2023! The year is just beginning and already we expect to see even more activity across the Society and opportunities for us as members. While we all are still conscious of the safety of our families and loved ones as in-person meetings regain momentum, we can't wait to see you at Offshore Technology Conference, OCEANS, or one of our many workshops and symposia.

To begin 2023, your Administrative Committee (AdCom) met on January 28–29 to have in-depth strategic planning discussions and set priorities for our activities for this year and next. The meeting resulted in a prioritized list of tasks and projects we all agreed to focus on to improve the functioning of the Society. Throughout the discussions we regularly referenced our Vision, which is "a collaborative community working towards a safe, healthy, and productive ocean" and our Mission is "to be the professional home of people passionate about ocean science, engineering and technology." For more information on our strategic planning please read the report from the Executive Vice President.

Shortly after the AdCom meeting, the Executive Committee (ExCom) held a follow-up meeting to develop the detailed plans for 2023 for each of our Society activities. ExCom took the prioritized list of tasks from the AdCom meeting and further developed the costs and volunteer efforts required and ensured that every action is assigned to specific individuals for implementation.

With plans in place we are now hard at work preparing to support conferences, workshops, symposia and local activities all around the world. In May the Offshore Technology Conference happens in Houston, USA. At OTC, OES will be supporting the theme of "Delivering the Future of Offshore Energy." As we know well, ocean engineering and science is crucial to better understand the ocean, so that we can better manage ocean resources while sustainably meeting the needs of society. Of course, there will be the OCEANS Conferences, in Limerick, Ireland, in June and Gulf Coast, USA, in September. We expect to have strong society activity at each of those events. If you plan to attend, please come to the Society booth and visit us, and join us at the OES Member's Reception.

Additionally, there are several workshops and symposia around the world on more specific topics (see the report from the VP of Workshops and Symposia).

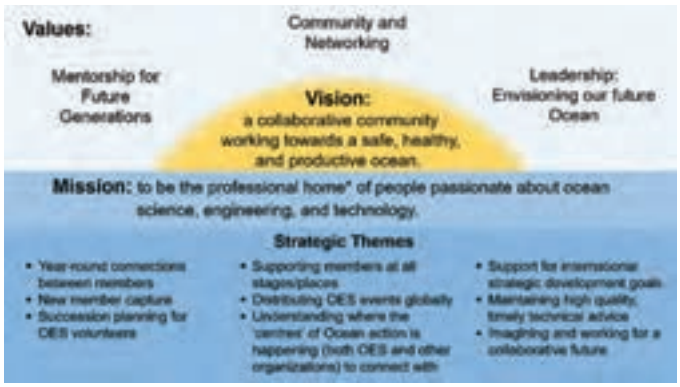
As I've previously reported, we intend to expand the Society efforts to address sustainability in 2023. We already have the Ocean Decade Initiative, which aims to connect our members to the needs and opportunities within the science community, which is coalescing around the UN Decade of Ocean Science for Sustainable Development. In addition, we intend to address the sustainability of OES activities directly.

As always, there are more exciting projects and opportunities than there are people to develop them. If you wish to get more involved in Society activities in any way, please email me! president@ieeeoes.org

Introducing the Position of Executive VP

Brandy Armstrong, Executive VP, executive-vp@ieeeoes.org

As the newly elected, and first ever, Executive Vice President (Executive VP) of IEEE OES, I thought it would be a good idea to describe some of the responsibilities of this new role and my plans for my term as Executive VP. The Executive VP is tasked with Governance and Strategic planning committees as well as assisting and learning the role of Society president. The role of Executive VP is not a President elect. The Executive VP is expected to learn the role of the President, but must run and be elected to become President.



The Strategic Planning committee has been working with AdCom to define IEEE OES' Vision, Mission, and Values.

Governance

A quick recap on Governance committee work accomplished in 2022. You may recall that we voted to change the Constitution and Society By-Laws in 2022. These votes synchronized our Constitution with IEEE policies and introduced a new position, the Executive Vice-President, while removing the position of Senior Past President.

Strategic Planning

During 2022, the Strategic Planning Committee collected input from Society members to help define and refine IEEE OES' Vision, Mission and Values. These inspired a brainstorm of ideas at the in-person Administrative Committee meeting held at OCEANS Hampton Roads in 2022. During the in-person Administrative Committee meeting in January of 2023 in London, ideas were prioritized and then the top ideas were expanded upon to flesh out costs, volunteer needs and timelines. Executive Committee then used these top ideas to prioritize what projects, initiatives and operational programs IEEE OES will focus resources on in 2023 and into 2024.

Diversity, Equity and Inclusion

In this role I will continue to promote Diversity, Equity and Inclusion at all events and at all levels of the Society. IEEE OES will continue to build on our adoption of the WIE Pledge for diversified panels at all IEEE meetings, conferences, and events as well as the WIE PROPEL program, now in its second year.

What to Expect in 2023

The strategic planning committee will be updating the Society's strategic plan in preparation for the IEEE 5 year Society review. The governance committee will incorporate gender-neutral language and clarify the process for filling mid-term vacancies in AdCom in the by-laws this year. Looking forward to another successful year for the IEEE OES!

VPTA Column

Shyam Madhusudhana, VP for Technical Activities

Well, it is my first stint in an executive role in the OES, as the Vice President for Technical Activities (VPTA), and I am happy to have received the baton from the outgoing VPTA, Dr. Venugopalan Pallayil (Venu). When I had thrown my hat in the ring, I knew there were big shoes to fill. Thanks to Venu's willingness to continue to assist, I have had a softer landing embarking on this role. As the community continues to trail out of the pandemic-related restrictions, we have seen mixed opinions about conducting our technical activities in virtual, hybrid or in-person formats. While there were no clear winners on addressing the trade-offs between cost-effectiveness, reach, opportunities for networking and connectedness, we definitely witnessed some lull in the overall responsiveness of Chairs (both Technology Committees as well as Chapters). Perhaps, the fatigue from increased online presence was starting to show. Regardless, moving forward, we shall continue to be opportunistic and stay agile. In addition, a variety of new tasks were

identified during the year's first Administrative Committee (AdCom) meeting in January. There is much work to do. Watch this space!

Technology Committees (TC)

Upon assuming the role of VPTA, I vacated my prior role as the Technology Committees Coordinator (TCC). The vacancy needed to be filled quickly. Following an e-vote by the AdCom late in 2022, Prof. Atmanand MA (Atma) was appointed as the new TCC for the term 2023–25. Atma's appointment will be beneficial given his experience and considering that he has been engaged with the UN Ocean Decade activities for quite some time. Looking forward to working with Atma.

Following consultations with pertinent colleagues, we have now decided to disestablish the TC on Underwater Cables and Connectors. We are currently in the process of formalizing the same. The slate of Chairs and co-Chairs of the remaining 10 TCs were due to be renewed at the start of 2023. However, we have been set back due to several reasons, including difficulties finding successors. We are now back on track and hope to formalize appointments in the coming weeks.

Chapter Activities

Dr. Gerardo Acosta (Gerry) is serving the last year of his current 3-year term as the Chapters Coordinator. Efforts will be on later in the year to plan for succession. Ms. Amy Deeb has continued to generously volunteer to support Gerry. Together, they organized the past year's Chapter Chairs (ChaCha) meetings and briefings. They are also putting together a welcome packet for Chapter executives to help streamline information; I presume the packets will have been sent out to the ChaChas by the time this edition of Beacon is out. We are also working on making the information on our website up-to-date. We would like to remind the ChaChas and Student Branch Chapter coordinators to take advantage of our DL programme and utilize the opportunity to hear the experts in different technical fields related to oceanic engineering.

Distinguished Lecturers (DL)

Starting this year, we have 10 DLs with expertise in varying topics. Welcome to our newest DLs, Drs. Ferdinando Nunziata and Junku Yuh, who were appointed for the term 2023–25. Our website has been updated with the details of our new DLs and their fields of interest. As of this year, the VPTA will help connect traveling DLs with regional Chapters so they may utilize the opportunity of regional proximity to organize talks. This is aimed to make it easier for the involved parties to organize lectures to plan early and engage with the local community.

The call for new DLs for the period 2024–26 has been announced and is available in this edition of Beacon. The involvement of TC Chairs in identifying, endorsing, and proposing new candidates is key to the success of this programme. I request their active participation in this process. The candidates for DLs should be able to deliver talks to a broader audience of our community and hence their lectures should be prepared to be not too technical. Areas of emerging technologies and techniques should be given preference when selecting the topics.

Call for OES Distinguished Lecturers 2024–26 Nominations Close on July 31, 2023

Shyam Madhusudhana, VP 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 in one of their follow-up meetings.

Requirements

Distinguished Lectures are meant to appeal to a broader audience and not just technical experts. So, the talks should be prepared accordingly to attract as many members as possible from OES community. Distinguished Lecturers are expected to have

- High technical proficiency in their area;
- demonstrated ability to make technical presentations that are inspiring to audiences of both experts and general audiences;
- OES membership throughout the term of their appointment.

Technology Committee Chairs and AdCom members are strongly encouraged to make nominations as long as there is no conflict of interest in the selection process. Nominations from Chapters as well as self-nominations are encouraged. All nominations are to be endorsed by the relevant TC. So, if you are looking for a nominator, we encourage you to contact the chair of the most relevant OES Technology Committee. A nomination email to the Vice President for Technical Activities

(VPTA) should include a brief CV (1 page) of the nominee, contact details for the nominee, the nominator and endorsement by the relevant Technology Committee Chair.

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

Duties

The Distinguished Lecturers will start their three-year term in January 2024. 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 are expected to add small diversions to their international travels to present lectures as opportunities arise. Reasonable travel expenses will be paid by the Distinguished Lecturer Program based on the availability of funds.

Closing Date

Nominations for a three-year term 2024–26 close on **31 July, 2023**.

Welcome from Steve Holt as the New VPPA

Steve Holt, VP of Professional Activities, up-professional-activities@ieeeoes.org

I am deeply honored to be the newly elected Vice President of Professional Activities (VPPA) for 2023. I was elected to carry the mantle from Brandy Armstrong, who is now the new Executive Vice President. It will be very difficult to fill Brandy's shoes since she did so much during her tenure as the VPPA. I have much to learn about the operations associated with this position!

To briefly describe some information about the activities of the office of the VPPA, note that there are three Standing Committees: Membership Development, Student Activities, and Promotion. To talk a little about these committees, I would ask everyone to please first look closely at our OES website to see the activities associated with all our Standing, Ad Hoc, and Operational Committees that may interest you. Its portal is at: https://ieeeoes.org/menu/organizational-committees/standing-committees-and-operational-committees/. At this location, you will see, under the office of the VPPA, the committees for Membership Development, Student Activities, and Promotion, of which I earlier referred to.

The benefits of membership in the OES can be found at: https://ieeeoes.org/member-communities/membership-info/. Information on our Student Branch Chapters can be found at: https://ieeeoes.org/member-communities/student-branch-chapters/ and past Student Competitions can be found at: https://ieeeoes.org/technical-activities/student-competitions/. Information on Social Media coverage can be found at: https://ieeeoes.org/social-media-initiative-2021-support/.

Also, Roberto Petroccia is the liaison for the OES Young Professionals (YPs) committee that participates in the various meetings and with several activities with other YP groups (societies, regions, etc.) within the IEEE. He oversees as the liaison the YP-BOOST Program, about which more can be read at: https://ieeeoes.org/young-professionals/.

Please note that our Diversity, Equity and Inclusion AdHoc committee and Women in Engineering (WIE) committee activities have recently been relocated under the role of the Executive Vice President, who is now the newly elected Brandy Armstrong.

Under Promotion, our Beacon newsletter is published four times a year as a benefit to the membership of the IEEE Oceanic Engineering Society. Its development is led by Harumi Sugimatsu, who is the Editor in Chief and Bob Wernli who is the Co-Editor in Chief. To read the latest and past issues of the Beacon, please access their portal at: https://ieeeoes.org/publications/oes-beacon/.

Our Earthzine journal provides up-to-date information on science, technology, Earth/Ocean observation and information utilization and those participating and contributing to its advancement. Its publication is led by Hari Vishnu as its Editor. To read the latest and past issues of the Earthzine, please access their portal at: https://earthzine.org.

For further information on the IEEE OES Ocean Decade Initiative, please visit their site at: https://ieeeoes.org/oceandecade/.

My sincere hope is to grow and strengthen these committees under my supervision and open a dialog with anyone who wants to be more involved, especially as volunteers, with the operations of the OES.

Please also consider visiting us at our upcoming OCEANS 2023 conferences in Limerick, Ireland at: https://limerick23.oceansconference.org/ and the Gulf Coast, Mississippi, USA at: https://gulfcoast23.oceansconference.org/. We hope to see you there!

For further information about anything associated with OES activities, especially those associated with my role as the new VPPA, please contact me anytime at: vp-professional-activities@ieeeoes.org

From the Vice President for Workshops & Symposia

Fausto Ferreira, Vice President for W&S

New year, but still busy. As you were able to read in the last edition, 2022 was a very intense year. Nonetheless, 2023 seems to be as much or even more with 9 planned events as detailed below. I am very glad to see that OES has such a vibrant and diverse community engaged in different technical areas and geographies. As I mentioned, this year we are still improving the portfolio organization and procedures. The guidelines revision is taking a few more weeks to be sure to include updated instructions for session chairs, something identified as a needed improvement in the late January AdCom. A small change has occurred in the Workshops & Symposia (W&S) Committee for the term 2022–2024, as Bharath Kalyan replaced Hari Vishnu. I would like to thank Hari for his commitment and service. Finally, the paper management study will be more comprehensive and include as well registration systems and potential integration/usage of one common system both for the Journal of Oceanic Engineering (JOE) and the different W&S. Thus, we plan to delay the results of the study to make sure that it has both breadth and depth and can establish the basis of long-term shared decisions among the diverse W&S.

IEEE 9th International Conference on Underwater System Technology: Theory and Applications (USYS 2022)

USYS 2022 took place from the 5th to 6th of December in a hybrid format: in Kuala Lumpur, Malaysia, and online. USYS 2022 was organized by our OES Malaysia Chapter. It had 26 papers accepted and more details about it can be found in the OES Malaysia Chapter report in this edition.

2023 IEEE Underwater Technology (UT)

By the time this newsletter gets to our readers, the International Symposium on Underwater Technology (UT23) might already have finished. It takes place from the 6th to the 9th of March, 2023, in Tokyo, Japan, and both our Beacon co-editors are highly involved in the organization. 89 abstracts were accepted and will be presented. As VPWS I will support the symposium by attending it and giving a talk at the pre-event Workshop on Career Path Benefits of AUV/ROV Competitions. A full report on UT23 will be published in the next edition of the Beacon. http://www.ut23.org/

10th Annual IEEE Conference on Technologies for Sustainability (SusTech 2023)

The 10th Annual IEEE Conference on Technologies for Sustainability (SusTech 2023) will take place from the 19th to the 22th of April, 2023, in Portland, U.S. IEEE SusTech pursuits of environmentally sound development that meets the needs of the present without compromising the future. OES is one of the technical co-sponsors and is organizing a panel. A report on it will be included in the next Beacon edition. More on https://ieee-sustech.org/

SeaAI—Artificial Intelligence and Sea

The SeaAI – Artificial Intelligence and Sea, 10th Haifa Conference on Marine Sciences will take place on the 20th of June and is hosted by the Leon Charney School of Marine Sciences, University of Haifa, Israel. SeaAI is intended to provide a forum for research scientists, engineers, and practitioners throughout the world to present their research findings, ideas, and applications in the areas of Artificial Intelligence and Sea. SeaAI will include keynote speeches and invited presentations by renowned scientists and engineers such as Mandar Chitre, Editor-in-Chief of our Journal of Oceanic Engineering. The abstract submission is open until 10 March. More info on https://marsci.haifa.ac.il/en/seaai-conference2/

Robotics for Asset Maintenance and Inspection (RAMI) Marine Robots 2023 Competition

The second RAMI Marine Robots competition will be held at the NATO STO Centre for Maritime Research and Experimentation (CMRE) in La Spezia, Italy, from 16 to 21 July 2023. More information will soon be available in the website. https://metricsproject.eu/inspection-maintenance/rami-competition/

Breaking the Surface (BTS) 2023

The 15th edition of International Interdisciplinary Field Workshop of Maritime Robotics and Applications—Breaking the Surface (BTS) 2023, co-organized by the OES University of Zagreb Student Branch Chapter (SBC) will be held from the 24th to the 29th of September in Kumbor, Montenegro (first time outside Croatia). The website will soon be updated with more news. https://bts.fer.hr

2023 IEEE International Workshop on Metrology for the Sea (MetroSea 2023)

The 2023 IEEE International Workshop on Metrology for the Sea (MetroSea 2023) will place from the 4th to the 6th of October in La Valetta, Malta. The OES Italy Chapter will be involved again in the organization of this conference and OES is a Platinum Sponsor, the highest sponsorship level. An OES representative from the W&S Committee will attend the conference to disseminate the society and engage better with this community that recently connected with OES. The call for papers is open until 31 May. See more on https://www.metrosea.org/

2023 China Ocean Acoustics (COA)

The 2023 OES China Ocean Acoustics (COA) will take place on the 15th to the 19th of October in Harbin, China. More information including the website and the call for papers will be included in the next edition of the Beacon.

Symposium on Ocean Technology, 2023 (SYMPOL 2023)

The 17th biennial Symposium on Ocean Technology (SYMPOL 2023) is organized by the Department of Electronics of the Cochin University of Science and Technology, Kochi, during 13–15 December 2023. This Symposium is intended to provide a forum for the researchers in the area of Ocean Electronics to interact with each other and present their innovative ideas and findings. The call for papers is open until the 3rd of July in https://sympol.cusat.ac.in/callforpapers.php

Argentinian Marine Energies Workshop (ENAEM) 2023

The Argentinian Marine Energies Workshop (ENAEM) 2023 will be held on the 23rd and 24th of November, bringing together actors of the national orbit related to marine energies, including academia, industry and government sectors. More details will be announced in future Beacon editions.

Workshops & Symposia meeting at OCEANS 2023 Limerick

As in Hampton Roads, we are planning a Workshops & Symposia organizers meeting during OCEANS 2023 Limerick. More details on this meeting will be distributed directly to conference organizers, but if you are interested in starting a Symposium or Workshop, please contact me directly at vp-workshops-symposia@ieeeoes.org

Future Plans for 2024

For 2024, we plan new partnerships and workshops but these will be announced and confirmed in the next Beacon edition. I would like to remind all OES W&S members who are planning to organize W&S in 2024, wishing to have a financial (co-) sponsorship or a technical sponsorship with financial implications, that requests for these sponsorships should be sent to VPWS by 10 March in order to have time to submit them in advance of the Administrative Committee's April meeting. Please follow the current guidelines available on https://ieeeoes.org/conferences/workshops-and-symposia/. This is especially important for on-going symposia. For new projects and initiatives (non-existent or non-sponsored OES events at this moment), the deadline is 1 May.

As always, I would like to remind any OES members that wish to get involved in current workshops, or propose new ones, to feel free to contact me. We are here to serve the OES members and the larger community, and if you have ideas on improving current workshops, you are more than welcome to forward them to me!

'Changing' OCEANS

Venugopalan Pallayil, Vice President for OCEANS (VPO)

Hello OES Colleagues,

Welcome to the new VPO column. After a 2-year stint as Vice-President for Technical Activities (VPTA), I have moved on to the new portfolio as Vice-President for OCEANS (VPO) conferences. This is a two-year appointment for the period 2023–24. I would like to use this column to give you a brief of what is in the air about OCEANS conferences and share my ideas on how we can make it better; technically and financially. I value your ideas as much as mine and so please do send me your suggestions and support so that we can together continue to make our OCEANS great.

As most of you know OCEANS is our flagship conference and is being organized jointly with Marine Technology Society (MTS) with equal partnership. Every year two OCEANS conferences are being held, one in North America (NA) and the other either in Asia or Europe (often referred as Rest of the World or RoW OCEANS conferences). Below is a table showing some of the forthcoming OCEANS conferences with their location and dates. OCEANS in NA generally attracts 1000 to 1400 delegates and 80 to 100 exhibitors. While those held in RoW will have an attendance of 600 to 700 delegates and 40 to 60 exhibitors. In this new role my primary responsibility in its shortest form will be to ensure a smooth running of the OCEANS conferences in association with other stake holders.

OCEANS Restructuring

As some of you are aware we are in the process of restructuring our OCEANS conference operations. A Joint Conference Committee (JCC) will soon take over the duties of Reconnaissance Committee (RECON), which had been disbanded in 2022, and Joint OCEANS Advisory Board (JOAB), which will soon find its way out. The OCEANS Steering Committee (OSC) has set an ambitious goal of doubling the number of attendees for our OCEANS conferences over a period of 2 to 3 years with an ultimate goal of reaching 3000 to 5000 strong participants. The new conference committee is being setup to achieve this goal. The makeup of the conference committee consists of a conference manager, being hired as a paid position, 5 to 6 members each from the OES and MTS societies. A notable point here is that one of the committee members would be a Young Professional, (YP under OES) or Early Career Ocean Professionals (ECOP under MTS), from the respective societies. This approach would build some continuity into the knowledge sharing process on the conference

AMERICAS	
OCEANS 2023 Gulf Coast, Mississippi	September 25-28, 2023
OCEANS 2024 Halifax, Nova Scotia	September 2024
OCEANS 2025 Great Lakes	TBD, 2025 (Sep-Oct)
OCEANS 2026 Washington DC	TBD, 2026 (Sep – Oct)

EUROPE	
OCEANS 2023 Limerick, Ireland	June 6-8, 2023
OCEANS 2025 Brest	June 16-19, 2025

ASIA-PACIFIC	
OCEANS 2024 Singapore	April 14-18, 2024

organization to the next generation of leaders. The YP/ECOP representative would also be the voice of future at the OSC. The conference committee would be co-chaired by an Administrative Committee member from OES and Board of Directors member from MTS. The tenure of the Joint Conference Committee would be 2 years with an option to extend for a second term.

Another area that needs attention is an increase in the participation of exhibitors. We have to do this judiciously as there are big trade shows already in the offing. Oceanology International, Offshore Technology Conference (OTC) and Ocean Business, etc., are some. The objective of exhibition at OCEANS is largely different from those being hosted by the above-listed trade shows. Exhibitors are at OCEANS usually not to market their products and sign contracts, but to build a business rapport with the scientific community and academics. To let the delegates know what tools and equipment are available to them to pursue their scientific goals. I have heard from some exhibitors that the smaller size of the exhibition at OCEANS, as compared to other trade shows, gets them more attention, especially for those companies who are either growing or start-ups. So, we should keep an eye on not sizing up the exhibition too big. We need to build the RoW OCEANS exhibitor participation at par with the NA conferences.

Strategic Discussions on OCEANS

The recently concluded AdCom in London had a breakout session on 'OCEANS future strategies.' I shall share some of those discussion points here so that if you have further input or have other suggestions you can raise them with VPO.

1) The Technology Committee (TC) Chairs are to be default members of the Technical Program Committee for OCEANS conferences. They take lead in organizing special sessions. These include inviting papers, reviewing them, and organizing the sessions, including chairing the sessions.
2) The Local Organising Committee (LOC) must build a wider and stronger technical collaboration with other societies within and outside of IEEE and invite them to organize sessions that would help to bridge connections. Some examples are Robotic Automation Society (RAS), Signal Processing Society (SPS), Power Engineering Society (PES), etc.
3) Widen the scope of OCEANS conferences to include topics like marine biology and ecology, seabed mapping, maritime defence, etc. At present these areas are not well represented at OCEANS.
4) Work through chapters across the world and also send invitations to universities and research institutes (RIs) for conference participation. University professors and scientists in the various RIs would be of help.
5) Make general poster sessions a feature of OCEANS technical programme. Possibly, a separate set of posters on each day would bring in more participants.
6) One of the observations is that only a small number (15 to 20%) of student poster submissions under SPC makes into the conference due to the limited travel grant support available. It is worth considering offering those papers, which are reviewed and accepted, but cannot be funded, be presented as posters at a student rate.
7) Affordable and reduced conference fee for delegates from developing and third-world countries.

I plan to setup a sharing platform for ideas and suggestions in making OCEANS more attractive to participants, which I would then bring up to OSC. OSC will evaluate the merits of these recommendations before they are accepted and implemented.

Targeted Marketing

As part of expanding OCEANS reach, OSC is exploring targeted marketing through social media and also at specific events to attract people's attention. The focus will be on RoW OCEANS to bring it up to some level with the NA OCEANS conferences. To test out this idea MCI-USA will be engaged for both Limerick and Singapore conferences, while IEEE MCE will launch a marketing campaign for Limerick OCEANS alone.

In conclusion, OSC is looking at different ways to upgrade the OCEANS conference operations and engage with more communities globally. I invite your strong participation and support in this venture.

Updates on Limerick and Gulf Coast OCEANS

The preparations for both Limerick and Gulf Coast OCEANS are progressing well. As per the latest information available with me, the Limerick OCEANS has received 576 abstract submissions of which 455 are regular submissions, 84 are for the Student Poster Competitions, 35 poster presentations and two are in the commercial category. We anticipate 400 to 450 presentations at the conference. There are great plenaries lined up such as Offshore Wind, Carbon Neutrality by 2050 and Ocean Health and Resiliency. The exhibitor booths are being filled up slowly, but steadily. Overall, a great conference is in the offing. For the YP/ECOP, I hope to see many of you in the OCEANS 2022 Limerick.

Three months after Limerick we have the Gulf Coast OCEANS. You may recall that Gulf Coast was scheduled to host the conference in 2020, which due to the pandemic was held as virtual conference jointly with OCEANS 2020 Singapore. This report is getting longer than expected and so I shall provide more updates on the Gulf Coast OCEANS in the next edition. I wish you all a great year ahead.

From Treasurer Elect

William Kirkwood, Treasurer Elect

Well, it's been a while since I've written for the Beacon. I want to say that it's great to be back and working with so many long-time friends. A lot has changed in the IEEE treasurer's world so I'm working with Liz Creed, our current treasurer, to get up to speed and hopefully avoid any bumps for those who are depending on me to assist them in the work that OES is pursuing. I have been busy, however, doing other activities on behalf of OES.

I attended AUV 2022 in Singapore as the liaison and Co-Chair of the Autonomous Marine Systems technical committee. The meeting was a great success and congratulations are in order for the local organizing team led by Bharath Kalyan and backed up by the usual team in Singapore, a very strong group and very active. They always impress and put on good meetings. OCEANS will be returning to Singapore in April of 2024 with the same team. I'm looking forward to the meeting and have no doubt about their continued success. At the meeting I presented a number of awards for outstanding contributions; mid-career awards were given to Blair Thornton and Nikola Miskovic. I also gave an award for Lifetime Achievement in AUVs to Hanumat Singh. On a sad note, I delivered a eulogy for Claude Brancart. Claude was a special person to the AUV community, and the meetings in particular, as he created the Symposia back in the 90's. I have to mention here that my mentor in autonomous and remote vehicles also passed, James McFarlane Sr., who was someone who gave great advice to me in my early days working in the marine science business. Both will be greatly missed. Look for announcements about the next AUV to be held in Boston, fall of 2024.

On a happier note, I also attended Breaking the Surface (BtS) in the same role as AMS Co-Chair, but also as part of the program committee. A speaker I suggested, Kakani Katija, gave an excellent talk. It isn't just me who was saying that. The meeting was a great success and, as always, a great exchange of concepts and knowledge. The usual cultural tour happened on the last day of the meeting, entirely optional, but if you want to learn about life on the Adriatic Sea I recommend not missing it. This meeting is also operated mostly by the student chapter from Zagreb, a very capable team. If you haven't checked out

BtS, I highly suggest you do. It is a different kind of meeting where young PhD and Masters students meet with end users of marine technology with a series of demos and tutorials in the mix. The BtS team is outstanding in every respect and next year the location moves to Montenegro.

Presently, I'm working to bring a new group into our OES Technical Committees, a group focused on Marine Imaging. I fully expect the same successful results. They already have a winning track record with several meetings already in the books. They are looking to expand and take the next step in becoming the home for science and engineering to develop and present new technologies and methods in marine imaging. They would like to bring the ocean to the public in a new way as well as carry on their own advanced research. There will be more on this as things take shape.

So, looking forward to the new role as Treasurer . . . well the old role . . . just doing it again.

From the Journal Editor's Desk: IEEE Journal of Engineering Early Access Papers

Mandar Chitre, Journal Editor-in Chief

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

- F.-X. Socheleau, "Cyclostationarity of Communication Signals in Underwater Acoustic Channels".
- X. Qin, R. Diamant, "Joint Channel Estimation and Decoding for Underwater Acoustic Communication with a Short Pilot Sequence".
- A. Trucco, A. Barla, R. Bozzano, S. Pensieri, A. Verri, D. Solarna, "Introducing Temporal Correlation in Rainfall and Wind Prediction from Underwater Noise".
- T. Thevar, N. Burns, M. Ockwell, J. Watson, "An Ultracompact Underwater Pulsed Digital Holographic Camera with Rapid Particle Image Extraction Suite".
- Y. Xie, N. Bore, J. Folkesson, "Bathymetric Reconstruction From Sidescan Sonar With Deep Neural Networks".
- D. Beal, J. Legris, A. Kellogg, M. Perkins, W. Wilkinson, "The Effect of Crossflow on Flapping Fins".
- M. Gough, P. Chu, V. Pressanha, J. Calantoni, "Deep Scour Burial of a Tapered Cylinder by an Energetic Wave Event".
- S. Wang, C. Chi, P. Wang, S. Zhao, H. Huang, X. Liu, J. Liu, "Feature-Enhanced Beamforming for Underwater 3-D Acoustic Imaging".
- D. Kipnis, Y. Levy, R. Diamant, "Sonar Point Cloud Processing to Identify Sea Turtles by Pattern Analysis".
- J. Bonnel, A. R. McNeese, P. S. Wilson, S. E. Dosso, "Geoacoustic Inversion Using Simple Hand-Deployable Acoustic Systems".
- M. Elamassie, S. Sait, M. Uysal, "Effect of Sea Waves on Vertical Underwater Visible Light Communication Links".
- L. Zacchini, A. Topini, M. Franchi, N. Secciani, V. Manzari, L. Bazzarello, M. Stifani, A. Ridolfi, "Autonomous Underwater Environment Perceiving and Modeling: an Experimental Campaign with FeelHippo AUV for Forward Looking Sonar-based Automatic Target Recognition and Data Association".
- R. Dreo, A. Trabattoni, P. Stinco, M. Micheli, A. Tesei, "Real-time detection and localization of multiple ships using acoustic vector sensors on a buoyancy glider".
- W. Snyder, R. Renken, L. Van Uffelen, "Performance of a MEMS IMU for Localizing a Seaglider AUV on an Acoustic Tracking Range".
- S. Rajan, Y.T. Lin, "Broadband Geoacoustic Inversions for Seabed Characterization of the New England Mud Patch".

Remembering Jim McFarlane

Edited by Robert Wernli, BEACON Co-Editor-in-Chief

James Ross McFarlane, age 88, passed away peacefully on November 1, 2022, in Port Moody, BC., Canada. Jim was born in Winnipeg, Manitoba, June 20, 1934. Jim's adventures and achievements were plentiful and took him all over the world, but the one he was most proud of was his company, International Submarine Engineering Ltd (ISE), that he started in 1974. ISE continues to operate and grow, it is truly the legacy Jim wanted to leave behind. Jim's son, James Arthur Ross, continues to work in the offshore technology arena.

Jim received the IEEE Oceanic Engineering Society's Distinguished Technical Achievement Award in 1987 in recognition of his outstanding contributions as a pioneer and internationally known leader in research and development related to underwater vehicles and their associated support subsystems. The award recognized him as follows: "He developed systems for supporting offshore drilling, advanced intervention technology and hydrographic surveys and led the industry in free swimming vehicle research and development. As the founder and president of ISE, he was involved in the design, construction, and operation of tethered and untethered remotely operated vehicles such as TROV, TREC, DYSUB, HYDRA, DART, RASCL, TARS, SUPEREDART and WRANGLER, as well as the development of autonomous vehicles such as ARCS and DOLPHIN." And he has accomplished much much more since then.

Jim was highly recognized internationally and especially by his home country, Canada. He was awarded as an Officer of the Order of Canada on 17 November, 1988. Established in 1967 by Her Majesty Queen Elizabeth II, the Order of Canada is the cornerstone of the Canadian Honours System and recognizes outstanding achievement, dedication to the community, and service to the nation. The Order recognizes people in all sectors of Canadian society. The award included the following:

Jim speaking as General Chair of OCEANS 2007 Vancouver.

"Co-founder and President of International Submarine Engineering Limited of Port Moody, B.C., he has been largely responsible for placing Canada at the forefront of industrial underwater technology and applications. Tethered and untethered Remote Operated Vehicles, each built by this company in response to individual customer requirements, are in daily use around the world for purposes as diverse as fighting oil well blowouts, hydrographic surveying beneath the polar ice and undersea pipeline installation and repair."

Jim also was the General Chair of the OCEANS 2007 Vancouver conference.

Personal Comments Regarding Jim

Tamaki Ura—Jim recognized the achievements of many international colleagues. He is shown in the next photo where he spoke as a special guest at the Celebration Party for my IEEE OES Distinguished Technical Achievement Award in October 2010.

Robert Wernli—I met Jim early in my career in underwater robotics and he was always ready to offer assistance and/or build what you needed. We interacted closely on the ROV conferences for the Marine Technology Society, with ROV '89 going to Vancouver, and he was a key player on my ROV Committee as we established a series of workshops to produce the MTS published book, Operational Guidelines for ROVs, in 1984. Jim was a great friend and deserves all the honors that he received.

Drew Michel—I first met Jim in the mid nineteen seventies when he was using repurposed hand drill motors as thruster motors on his first ROVs. Had many great visits with him at ISE and at his home and mine. When other manufacturers were erasing model and serial numbers off of their ROV components to force end users to go to them for replacements, Jim would send a list of parts that could be purchased at the same places he procured them. My teenage son and I spent most of the summer of 1988 in Vancouver building a one off ROV for a tunnel penetration. The plan was for Jim to teach the 15-year-old how to scrub decks and chip paint on the Researcher, instead Jim and his wife spoiled him. Jim needs to be remembered, not only as a friend to the industry, but also as a true engineer and innovator who much preferred building things and being on the deck of the Researcher to being at a desk and making maximum profit.

Ian Monteith recalled Jim being very competitive. He would love to race people across the parking lot even as he was getting on in years!

Rob Rhodes recalls the release of the Hydra AT in the early 1980s. After a night of heavy testing of the ROV on sea trials the team pulled it back on deck to find the cover plate holding the telemetry can was missing with stuff hanging out everywhere. The team can still see Jim in his boxer shorts getting employees to get it back into shape, including a cardboard template for the cover. It was back to beautiful that afternoon!

James Collins—Jim McFarlane's company, International Submarine Engineering, was truly a pioneer in the field of underwater robotics. When he established his company in Port Moody in 1974, I believe it was the only private organization in that business.

I met Jim in 1979 when I was preparing for a new position at a Military College in Victoria, Canada. I was interested in developing a research project in autonomous robotics. Jim was the subject of a news article at that time on his company, which manufactured U/W ROVs and manipulators. It was an obvious place to start my investigations. This resulted in a small contract to investigate technologies which would be relevant to the creation of AUV's. I was hooked on the topic.

Jim speaking at Tamaki's Award Ceremony.

Jim (L) and Tamaki (R).

Our association continued for many years until I retired in 2021. When I Chaired the 1993 OCEANS in Victoria Jim agreed to be one of my keynote speakers and I later helped him when he agreed to Chair the 2007 OCEANS in Vancouver. During the years he would give continuing education lectures and courses on marine robotics. His company created more than 400 manipulators and more than 200 U/W Vehicles over a 40+ year period. Perhaps what will be as important is the number of students and private company leaders that he mentored at ISE. This includes companies such as Bluefin Robotics Corporation and Cellula Robotics Ltd.

Bob Christ—I met Jim in 2000 while sourcing subsea equipment in the Vancouver area. Jim graciously and unselfishly helped me navigate the subsea equipment vendor market as a small ROV manufacturer (later ROV service provider). He mentored me though the growth process and was always available to lend support to [at that time] a new entrant into market. Jim was a good man and will be missed by a grateful and admiring industry.

For a comprehensive pictorial based obituary see:

James McFarlane Obituary—Port Coquitlam, BC (dignity memorial.com)

Passing of Long-Time Contributors to the OES

Robert Wernli and Harumi Sugimatsu, BEACON Editors

Joseph R. Vadus

Joseph (Joe) Vadus, General Co-Chair of UT02 Tokyo.

We recently received notification of the passing of Joseph R. Vadus on 17 October, in Potomac, MD, USA, at the age of 93. We will provide an in-depth article on his achievements in the June issue of the Beacon. If you have any personal comments that you would like included in the article, please send to the Beacon editors prior to the 14 May 2023 deadline.

Peggy Barbera

It is with sadness that we report the passing of Peggy Barbara, wife of past OES President Jim Barbera, following a sudden illness.

Peggy was always at our OCEANS conferences and was often the lead at our events in getting the wives together and for helping organize local tourist style visits.

Peggy was as much a fixture at our OCEANS conferences as the OES booth in the exhibits. This is well demonstrated by her hat with the collection of past OCEANS pins. She will definitely be missed.

Bev Wernli, Izzie Williams and Peggy Barbera at OCEANS 2018 Charleston.

Peggy's OCEANS hat
This photo was used on the front cover of the BEACON 2015 September issue.

Awards for OES Members

Contact the Editors With Your Submissions

We are pleased to inform you that two new AdCom members, Albert J Williams 3rd and Karen A. Panetta, have received the following Awards. Congratulations!

A Celebration of Installing the Alvin Milestone Bronze Plaque at Woods Hole Oceanographic Institution on October 21, 2022.

Albert J Williams 3rd

The IEEE President Elect, Dr. Saifur Rahman, Albert J Williams 3rd, President and Director of Woods Hole Oceanographic Institution*, Dr. Peter de Menocal (From L to R).*

On October 21, 2022, a celebration was held at Woods Hole Oceanographic Institution to install the Alvin Milestone bronze plaque. The figure shows this plaque with Dr. Peter de Menocal, President and Director of Woods Hole Oceanographic Institution at the right, accepting it from Albert Williams, Scientist Emeritus and organizer of the Milestone. The IEEE President Elect, Dr. Saifur Rahman in the figure at the left; WHOI VP Marine Facilities and Operations, Robert S.C. Munier; Alvin Senior Engineer, Lane J. Abrams; and WHOI Past Executive VP & Director of Research, Larry Madin gave presentations to an audience of about 80 including 24 members of the Providence Section OES Chapter. After the installation, a reception was held for all attendees and subsequently there was a dinner at the Landfall Restaurant in Woods Hole Village where informal conversations were continued. The plaque is mounted on the Smith Laboratory of the Institution near the entrance where it can be viewed up close by visitors without restrictions.

Alvin was launched in 1964 and commissioned by the U.S. Navy in 1965. From 1974–84, Alvin's engineers developed acoustical navigation (ALNAV), communications, photography, lighting, and life support systems specifically intended for the deepest oceans. It is now certified to 6500 meters depth and is continuing its support for scientific studies of hydrothermal vents, where much of its fame has arisen. But Alvin is famous for recovery of a hydrogen bomb fallen from a plane crash in the Mediterranean Sea in 1966, a box lunch that didn't decay after spending a year at a depth of a mile after sinking filled with near surface water in 1969, and the earliest exploration of hydrothermal vents at the Galapagos vents on the East Pacific Rise in 1977 and 1979. Alvin also visited the RMS Titanic after its discovery by Bob Ballard in 1986. Now with more than 5000 dives under its titanium hull it continues to be one of the most capable and sought-after vehicles for visiting the seafloor.

It is noteworthy that this Milestone is the second to be awarded to the Providence Section OES Chapter, the other being for the first direct transatlantic telegraph cable, Brest France to Orleans Massachusetts in 1899 installed at the Orleans Cable Museum in 2018.

You can read the Alvin Mile Stone Story on pages 18–20 of the BEACON 2021 December issue, and its sequel is on page 9 of the BEACON 2022 June issue.

IEEE-Eta Kappa Nu Announces Its 2022 Awards Program Recipients

Dr. Karen A. Panetta

Jim Conrad presents Dr. Karen Panetta with the DSA.

Dr. Karen A. Panetta received the 2022 IEEE-HKN Distinguished Service Award "for outstanding contributions to the advancement of IEEE-HKN educational and professional programs." Dr. Panetta was inducted into Tufts University's Epsilon Delta Chapter of IEEE-HKN.

According to their website (hke.ieee.org) IEEE-Eta Kappa Nu (IEEE-HKN), the honor society of IEEE, promotes excellence in the profession and in education with ideals of ***Scholarship,***

Character and Attitude. Founded on 28 October 1904, HKN promotes professional accomplishment, service to others, and leadership development for students and professionals in electrical engineering, computer engineering, and other IEEE fields of interest. With its merger in 2010 with IEEE, the honor society now has over 200,000+ members in more than 250 Chapters around the globe. The Distinguished Service Award was initiated in 1971 to recognize those members who have devoted years of service to Eta Kappa Nu, resulting in significant benefits to all of the society's members. The award is based on lifetime contributions to Eta Kappa Nu.

KAREN A. PANETTA (S'84-M'85-SM'95-F'08) is the Dean for Graduate Education in the Tufts University School of Engineering, a Professor in the Department of Electrical & Computer Engineering and an adjunct Professor of Computer Science and Adjunct Professor of Mechanical Engineering. Dr. Panetta was the 2019 President of IEEE HKN (Eta-Kappa, Nu) and is the Editor-in-Chief of the award-winning IEEE Women in Engineering Magazine. She is a Fellow of IEEE, NASA JOVE, AAAS, AAAI, and National Academy of Inventors. She is a Past-Vice-President of IEEE-USA. Prior to joining the Tufts faculty, Dr. Panetta was a Principal Engineer for Digital Equipment Corporation. She has numerous awards including the NSF Presidential (PAESMEM) Award, awarded by U.S. President Barack Obama. And, she was elected to the 2023–2025 OES AdCom.

Congratulations to Karen and her happy family.

Request for Nominations for OES Awards 2023

Jerry Carroll, Chair of IEEE/OES Nominations and Appointments Committees

Each year at the beginning of January, the Oceanic Engineering Society is proposing a call for four Awards, with **a closing date of June 30th**. A reminder call for nominations is issued mid-March. The Awards Committee requests the nominator to provide the listing of qualifications of the nominee relevant to the award criteria, and up to 5 references, by filling the Awards Nomination on-line form (https://ieeeoes.org/menu/award-forms/oes-awards-nomination-form/).

The Awards descriptions are given below.

Request for Nominations for DTAA: The Distinguished Technical Achievement Award 2023

The Distinguished Technical Achievement Award is given to honor an outstanding technical contribution to oceanic engineering in either the fundamental or applied areas. The award recognizes either a single major invention or scientific contribution or a distinguished series of contributions over a long period of time.

Request for Nominations for DSA: The Distinguished Service Award 2023

The Distinguished Service Award is given to honor an individual IEEE OES member for outstanding contributions towards furthering the objectives of the Oceanic Engineering Society.

Company/Institution Award

The award will be presented to a corporation or institution that has significantly supported the activity and goals of OES through such areas as conference participation, patronage, technical innovation and technical or administrative participation.

Emeritus Award

The award will be presented to an OES member having been particularly important for the Society and who is no longer in any position of Society governance.

For more info, please visit the OES website as below:
https://ieeeoes.org/menu/award-forms/

*Jerry Carroll
*Chair of IEEE/OES Nominations and Appointments Committees
SrPastPresident@ieeeoes.org

James Preisig and Peter Gerstoft—Elevation to IEEE Fellow in 2023

Andrew Singer, OES Fellow Evaluation Committee Chair

We are delighted to announce that two long-time OES members, James Preisig (known to many as Jim) and Peter Gerstoft were elevated to the rank of IEEE Fellow in the class of 2023. The fellow elevation recognizes Jim "for contributions to underwater acoustic communication channel modeling, signal processing and performance prediction," and recognizes Peter "for contributions to environmental signal processing and geoacoustic array processing."

Jim received his B.S. degree in electrical engineering from the U.S. Coast Guard Academy, New London, CT, USA, in 1980, his S.M. and E.E. degrees in electrical engineering from the Massachusetts Institute of Technology, Cambridge, MA, USA, in 1988, and his Ph.D. degree in electrical and ocean engineering from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution (WHOI) Joint Program in Oceanography and Oceanographic Engineering, Woods Hole, MA, USA, in 1992. He was a Postdoctoral Investigator with WHOI from 1992 to 1994 and a Visiting Assistant Professor with Northeastern University from 1994 to 1997. From July 1997 through November 2014, he was a member of the scientific staff with the Department of Applied Ocean Physics and Engineering, WHOI, and received Tenure in August 2005. He currently holds an Emeritus Scientist Appointment with the Department of Applied Ocean Physics and Engineering, WHOI. In September 2013, he founded JPAnalytics LLC, a small business focused on developing innovative signal modeling, analysis, and processing techniques that address challenging signal processing problems. His research interests are in the areas of adaptive signal processing, system identification, underwater acoustic propagation modeling, underwater acoustic communications and array processing, numerical optimization, and the development of embedded signal processing systems. Jim is the recipient of the 1999 Office of Naval Research Ocean Acoustics Young Faculty Award and is a Fellow of the Acoustical Society of America (ASA). He is a member of the ASA's Underwater Acoustics and Signal Processing Technical Committees and served on the ASA's Membership Committee. He has served as an Associate Editor for the IEEE Journal of Oceanic Engineering and as a member of the IEEE Sensor Array and Multichannel Signal Processing Technical Committee.

Peter's research focuses on data-driven computational geophysics and within these fields, he further covers the subtopics of applied signal processing, inverse methods, mathematical models, extracting information from noise, and machine learning. He currently focuses on developing new sensing techniques using large array sensor data. Data science methods (big data/machine learning) as well as compressive sensing are focuses of his for sensing the physical environment where he applies these techniques to observing tsunamis, earthquakes, traffic, Antarctic signals, as well as extracting environmental information from noise.

***Peter** camped on the Ross Ices Shelf in Antarctica in 2014 where he and colleagues installed seismometers to monitor the health of the ice shelf with noise. They slept in these one-person tents with big mattresses and sleeping bags. The research results eventually made it to Stephen Colbert's Daily Show. While **Jim** has undertaken many data collection exercises at sea for his research and that of his colleagues, he is shown here in a decidedly more formal pose.*

Peter received the M.Sc. and the Ph.D. from the Technical University of Denmark, (in Structural Engineering) Lyngby, Denmark, in 1983 and 1986, respectively, and also the M.Sc. from the University of Western Ontario, London, Canada, in 1984. From 1987–1992 he was employed at Ødegaard and Danneskiold-Samsø, Copenhagen, Denmark, working on forward modeling and inversion for seismic exploration, and from 1989–1990 he was Visiting Scientist in Ocean Engineering at the Massachusetts Institute of Technology, Cambridge, and at Woods Hole Oceanographic Institute, Cape Cod. From 1992–1997 he has been a Senior Scientist at NATO CMRE La Spezia, Italy, where he developed the SAGA inversion code, which is used for ocean acoustic and electromagnetic signals. Since 1997, he has been with Marine Physics Laboratory, University of California San Diego. His research interests include global optimization, modeling, and inversion of acoustic, elastic, and electromagnetic signals.

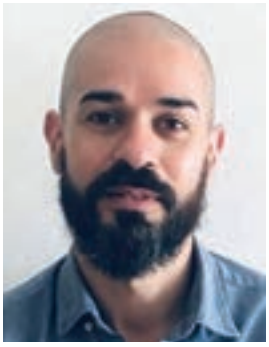
In addition to his recent elevation as IEEE fellow, Peter is a Fellow of Acoustical Society of America, and elected member of the International Union of Radio Science, Commission F.

Please join me in congratulating Jim and Peter for this honor that also shines a light on the entire OES community.

New YP-BOOST Laureates 2023–2024

Filippo Campagnaro & Francesco Maurelli, New YP-BOOST Laureates, Roberto Petroccia, OES Liaison for the YP-BOOST Program

Introduction by Roberto Petroccia, OES Liaison for the YP-BOOST Program



I am very happy to share with you that the IEEE OES Young Professional (YP) BOOST Program is getting up to speed with four YP BOOST laureates active each year. Two new laureates have recently been selected and will be active for 2023–2024. They will join Amy and Mehdi that were selected at the end of 2021 and active for 2022–2023. The YP-BOOST program aims at helping selected YPs in their career development and engagement with the leadership of the OES society and maritime scientific and technological community at large. The two new YP BOOST laureates active in 2023–2024 are Filippo and Francesco. We are very happy to have them on-board and, as you can read in what follows, they have strong ties with OES and will quickly start taking part in leadership meetings and actively contributing to society activities. Two new YP BOOST candidates will be selected at the end of 2023 to serve in 2024–2025 and the application process will open in October-November 2023. I would like to invite all of you to visit the OES YP webpage (https://ieeeoes.org/young-professionals/), learn more about this program and apply to engage more within the OES society and give a boost to your career development and networking.

New YP-BOOST Laureates 2023–2024

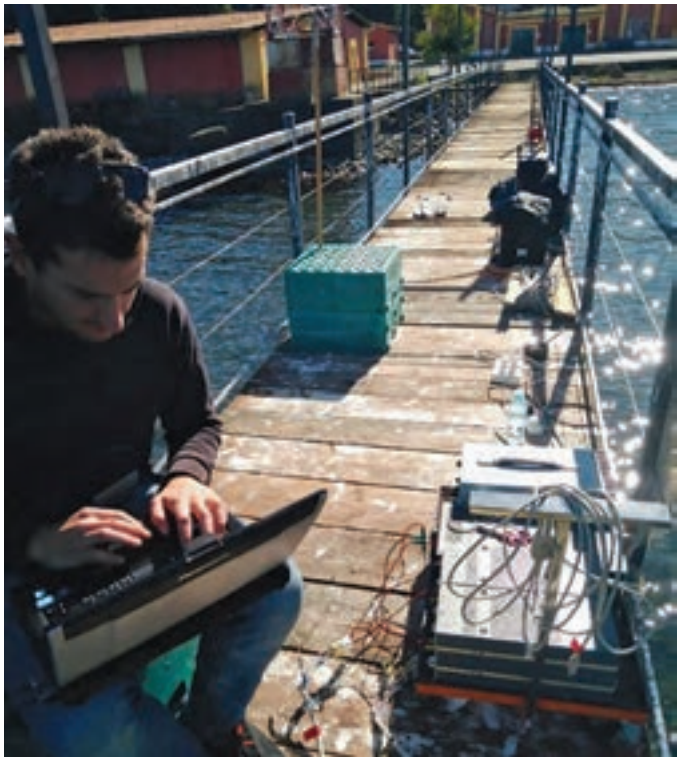
Filippo Campagnaro

What does a countryman do in the Oceanic Engineering Society? My name is Filippo Campagnaro, and the literal translation of my family name is "countryman." I grew up in a small town 15 miles from Venice, in countryside, where I now live with my wife. I eat the eggs picked up from my grandmother's hens, my uncle's homemade salami, the vegetables I grow in my own garden and drink the wine made by my parents. I practice traditional sports (palo della cuccagna, among the others) and enjoy local feasts. So, how did I fall into the IEEE OES community?

When I was a teenager, I did not have any Internet connections at home as the rural area I was living was not covered by any provider. Therefore, I decided to study computer engineering and telecommunications both at the high school and at the University, because I was very curious about this technology that I could not use due to "geographical issues." During the University courses I attended a seminar on underwater network, where some PhD students and post doc fellows presented the challenges of the underwater environment and their experimental activities, that I found very interesting, so I decided to do both my bachelor Thesis in 2012 and my master Thesis in 2014 in underwater communications. During my thesis activities I was amazed by the work performed by these young researchers, that were often going to sea trials in all parts of the world, from Hawaii to Norway, coming back very tired and enthusiastic, with many stories to tell about their adventures. Their job was looking amazing, thus I decided I wanted to be part of the crew, joining scientific expeditions and sea experiments (that I did, counting more than 15 field tests in rivers, lakes, seas, and oceans). Moreover, the challenges imposed by the underwater acoustic, optical and electromagnetic channels, where there are still many unresolved problems, provide lots of new stimuli for research activities. Indeed, the fact that it is easier to establish a communication link from the Earth to the Moon, or even to Mars, than making reliable underwater communication links in the middle of the oceans, in my opinion, is something astonishing, don't you think so?

Therefore, immediately after my Master Thesis, I have satisfied my desires by joining the SIGNET lab at the University of Padova, doing research and experimentation in underwater communications, and a few months later (May 2015) I had the opportunity to attend my first IEEE/OES OCEANS conference, in Genova, Italy, presenting my first proceeding in front of the IEEE/OES community. This allowed me to attend many

Attending OCEANS 2019 Marseille student poster competition (I am the first in the right).

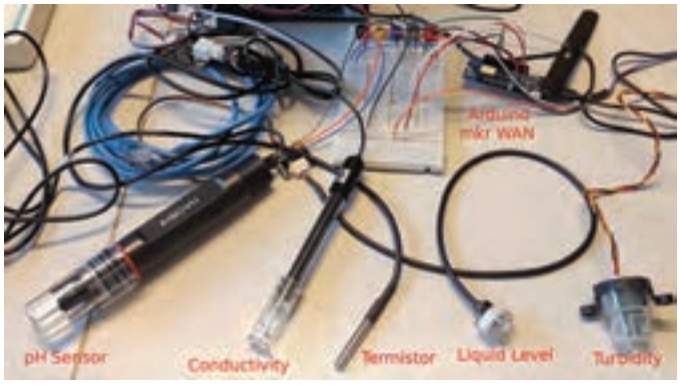


Experiment with optical communication, Bracciano Lake, Rome.

nice presentations and visit the exhibition hall, where almost all the devices that I had previously studied in the brochures and manuals to perform my research were exhibited. This gave me the possibility to ask all curiosities I had about those sophisticated devices, often learning from those speeches details that are complementary with my literature surveys. Afterwards, I was so enthusiastic about this experience that I have kept attending the OCEANS conferences and other OES-supported events: in the last 8 years I attended 9 OCEANS and 4 UComms conferences, one Breaking the Surface workshop and one European Robotic League student competition.

During my PhD, I was selected for the OCEANS 2019 Marseille student poster competition, where I could present my research work to a large audience and exchange ideas with other students and fellows. Since then, many things changed: I got married, finished my PhD, and became a staff member (research assistant professor) at the University of Padova. But something has not changed: my curiosity and my willing of doing experimentation and sea trials. My research focuses on underwater multimodal acoustic optical and electromagnetic communications, with specific interest on underwater sensor networks. Given the big problems caused by sea pollutants and climate change, I am also very involved in low-cost dense sensor deployments to monitor aquatic biodiversity, water quality, and predict floods in coastal areas, such as the Venice lagoon.

I am very glad that I have been selected for the OES YP BOOST program 2023–2024, that I see as an entry point to this community, and I hope to provide OES with my contribute giving, hopefully, helpful suggestions and guidance to young fellas. I recommend young researchers to be curious and satisfy your wishes, doing something more than just follow your advisor's suggestions (that you need to pursue, by the way). I leave you with a final (perhaps foregone) citation, considered by many people a sort of hymn to research: "Consider your origin: you were not made to live like brutes, but to follow virtue and knowledge." *Dante Alighieri, The Divine Comedy – Inferno Canto XXVI:85-142*



First prototype of the wireless sensor I will deploy in the Venice Lagoon.

Francesco Maurelli

Since I was a kid, the sea fascinated me: so majestic, yet mysterious with its wide range of ecosystems. We know more about the Moon surface than about the depths of the Oceans. And they are so important for human life: every second breadth comes from the Oceans! Joining my passion for innovation and technology, I was so excited to start a PhD in marine robotics quite a few years ago. I was working on autonomous driving for my Master thesis when I received an offer to start a PhD in Heriot-Watt University, Edinburgh, focusing on intelligent localization. Just before starting, I traveled to Japan for the World Esperanto Congress, and I had the possibility to visit JAMSTEC. The visit confirmed I made the right choice: I felt so excited to start exploring the oceans, using and developing advanced technologies in AI and robotics, to make pieces of plastic and metal to actually do something useful on their own.

Visiting JAMSTEC in 2007, with a big ramen cup after being placed in a hyperbaric chamber reproducing pressure of the deepest ocean location, at more than 11 000 meters depth.

Field trials in Loch Linnhe, Fort William (Scotland), with Nessie AUV, in a beautiful Scottish late Spring weather.

Speaking at the UN General Assembly Hall during the UN Oceans Conference, underlining the importance of ocean engineering to achieve SDG14.

The team Black Pearl I supervised at the RAMI Competition 2022, winning the Best Rookie Award and scoring third place.

Looking at the various aspects related to oceans, science and technology are inevitably entangled. From ocean measurements and sensing to field intervention, energy harvesting, marine waste reduction, the progress in marine systems has made significant advancements. Globally, we are in the process of the fourth industrial revolution. Robotics and autonomous systems have become a key component for so many industry sectors and significant progress has been made in marine systems as well. During my research activities, I focus on making marine robots smarter, equipping them with high level autonomy: from sensor data processing to intelligent planning in challenging environments. I had the opportunity and the pleasure to perform field activities in many different environments, including Scottish lochs, North Sea, Atlantic Ocean, and Mediterranean Sea.

I strongly believe that smart autonomous marine robotic systems represent a key enabler to achieve the Sustainable Development Goals set by the United Nations. I am very keen in supporting the OES to play a central role in the UN Ocean Decade activities.

As a professor at Constructor University (Bremen, Germany—formerly Jacobs University), I also put a great emphasis on student activities and involve both undergraduate and postgraduate students in marine robotics.

When I am not working with robots or with students, I like to play the piano. Bach, Mozart, Chopin and many other great composers are incredible life coaches. I am very much an international person, feeling that the EU first and then the overall world is my Motherland. For this reason, I speak the international language Esperanto, which was created some 125 years ago with the goal of having a neutral tool to overcome language barriers. "*Today, within the welcoming walls of Boulogne-sur-Mer, there meet not Frenchmen with Englishmen, not Russians with Poles, but people with people*" were deeply touching words at the first World Esperanto Congress in 1905, before two world wars teared Europe and the world in pieces. I feel that the Oceanic Engineering Society does work towards the same direction as well: joining people via common technical interests, fostering international collaboration in mutual respect. As an Italian living abroad, I have developed a *very essential* survival skill: the ability to cook some fine vegetarian and vegan dishes. Let me know if you pass by Bremen!

I am very honored to have been selected for the OES YP BOOST Program 2023–2024 and I am looking forward to contribute, to network and to inspire young scientists in a field which is as demanding as rewarding. We'll be in touch! 😊

Chapter News

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

Hong Kong Chapter

Hong Kong IEEE CE/OES Joint Chapter runs the Young Engineer Conference (YE-22) at IEEE TENCON 2022

Reported by Paul Hodgson (MIEEE) and George Woo (MIEEE)

The CT/OES Joint Chapter in Hong Kong has been organizing Young Engineer conferences since 2019. YE-19 was held in early 2020 and YE-21 in 2021. And in November 2022, as IEEE Hong Kong once again hosted the AP regional conference TENCON, a STEM Student Conference—YE@TENCON was included as a part of the program.

TENCON 22 was held in November at the prestigious Hong Kong Convention and Exhibition Center. The STEM Student Conference took place on days 3 and 4 (November 3rd and 4th) of the main Conference.

Since we started the conference for secondary school students, momentum has been building in terms of number of presenters and schools involved. Y-19 had 16 student presentations, and YE-20 had 19. In YE-22, we had 100 students from 16 schools and organization participating, and they reported on 43 projects.

The STEM Student Conference at TENCON 22 was organized into two tracks. A junior track (the Pre-University student Forum, aka PUF) only submitted an A0 poster for display and gave a live presentation, reporting on their projects on stage at the Conference. A senior track (Young Engineers @TENCON, aka YE-22) in addition would also prepare a paper on their research projects for publication at ResearchGate.

The students worked either individually or in teams upto 4 members. They select a topic or a problem of interest and carried out a scientific study and/or built a device to solve the chosen problem. The selected project topic should be in-line with the United Nations' 17 Sustainability Development Goals, and the students should apply advance technology to address the problems facing Humanity.

United Nations' 17 Sustainability Development Goals.

The projects in YE-22 covered a very diverse range of topics.

Notable PUF projects included AI based sound and motion detection to forewarn parents of possible SIDS, portable windmill for power generation, using vegetation as noise barriers, detection of people trapped in a fire site and microplastics in drinking water, addressing the storage needs for the elderly. Highlights of YE projects included in situ removing of heavy metals from marine sediment, portable Pelton Turbine, and evaluation of Tritium batteries, and MicroBit powered weather stations.

Savana Chan, Charis Wong on Space Management.

Subjects pertaining Oceanic Engineering included measuring fish density using underwater AI cameras, simple wave monitoring buoys, simple ways to real time monitor estuary river areas and detecting algae blooms (red tides). Other Consumer Technology projects included the evaluation of Edison and microbial (mud) batteries as well as temperature based symbolic AI COVID detectors for schools, typhoon proof wind turbines. Other presentations reported on studies in the general environment of Hong Kong, such as the deposits of Uranium and Thorium ore in the abandoned tungsten mine in Needle

George Wyatt on the Needle Hill Mine.

Hill, Hong Kong, meteorites in Hong Kong and evaluation on bio-degradable plastics.

All participants were issued with Certificates and Prizes were awarded for the best projects and best posters (the full list of presenters and topics and also the list of Winners on Projects and Posters are included later).

Event Highlights

Organizing TENCON 22 posed unprecedented challenges. Hong Kong has just lifted its COVID quarantine for incoming visitors, but it was too late for most overseas participants to make travel arrangements. And just as the Conference opened, a Typhoon struck, throwing further chaos to last minute preparations. We only just managed to put up all the student posters for display. Nonetheless the student posters displayed along the corridors leading the conference venue rooms brought a colorful angle to TENCON 2022.

Posters on display.

The STEM Student Conference was opened by Joint Chapter Chair Dr. K.F. Tsang. Dr, Paulina Chan, TENCON 22 General Chair, also gave a motivating opening address online. Participants came from a broad spectrum of the Hong Kong Society, including those with international backgrounds and teams from China. Nearly half of the participants are girls and we also have many participants from ethnic minorities.

Dr. K.F.Tsang giving the Opening Address.

Dr. Paulina Chan.

Sam Arosti on Shing Min River runoff.

Audrey Au, BiBi Aisha Ahmed on Microplastics in drinking water.

Audience at the Opening.

Lucas Wong on detecting people trapped in Fire Site.

While the conference mainly addressed secondary students, we also have a talented young participant who is only 10 years old and presented on the detection of people trapped in a fire site.

The project list		
PUF Projects	**Name of project**	**Presenter(s)**
PUF 1	Railway energy consumption and service improvement	Li Kin Wa 李建樺, Chung Cheuk Yin 鍾卓延, Chan Ka Yin 陳嘉賢, Ko Ka Ying 高嘉瑩
PUF 2	Turning Magnetism into Electricity	Au Ying Hei, Ariel, Tam Chi Hin, Marco, Wong Ho Pui, Alvin
PUF 3	Effect on Temperature of Microbial Fuel Cell	Lo Tsz Chun, Ricky

PUF 4	Bineaqua	Lee Wing Hei, Hazel, Ho Wai Shum, Emma
PUF 5	Portawind 2.0	Fan Nga Shun, Li Chun Yik, Jessie, Wong Suet Nga, Cheung Hoi Lam
PUF 6	Water Monitoring and Purification System	Chan Chun Hei, Angus 陳晉希, Huen Wai Tak, Donald
PUF 7	The investigation on microplastics in drinking water from tap and bottled water	Au Yeung Shun Yu, Audrey, Ahmed Aisha Bi Bi
PUF 8	Wastewater ReLIFE	Chau Man Qian, Chau Yat Chi, Lam Ching Yi
PUF 9	Effectiveness of the Iot water quality probe in analyzing river water	Cheung Hei Yu Sabrina, Fung Yuet Kiu, Caron, Lor Tsz Man, Tiffany
PUF 10	Alleviating anthropogenic eutrophication through detecting bio-luminescence	I Gede Surya Bhattarai, Li Sze Chai, Isaac, Poon Hong Ki albert
PUF 11	Un-spilling Oil Spills	Wong Shun Wai Stephanie
PUF 12	Growing of good quality crops—soil monitoring system, Sanity	Lam Joshua, Mak Ho Hin, Rylan, Kwok Yi Ching, Evians
PUF 13	Warning Rubbish Bin	Ocean Kong, Sze King Tong, Clayton, Wong Lok Man, Jayden
PUF 14	Detection to prevent Sudden Infant Death Syndrome	Serene Ng, Sam Hui Yin, Chloe, Law Tsz Yan, Winky, Chan Nok Yiu, Kathy
PUF 15	Space Management App with Space Optimization and Location Recall Functions	Chan Yuet Wah, Wong Yan To
PUF 16	Protect our respectable firefighters and civilians	Lucas Wong
PUF 17	Investigation on the Effectiveness of Vegetation in Noise Reduction	Tang Marcus 鄧正浩, Lou Pak Yin 劉柏言. Lee Ching Hong, Marcus 利政匡
PUF 18	Simplified RAT test kit to reduce plastic waste	Qin Bing Run Robin. Chan Man Tik, Li Yip Cheung Jeffery. Ng Siu Kit
PUF 19	UV Toliet Sterilizer	Chow Cheuk Yee, Carlie, Iu Yuet Sang Prudence, Tang Cheuk Yee 鄧焯而, To Yuen Yin 杜宛燃, Yeung Oi Ying
PUF 20	Energy hydroponics	Cheung Hei Lee, Hailey, Cheung Ka Ki, Kelly, Cheung Sum Wo, Joyce

YE Projects	**Name of project**	**Presenter(s)**
YE 1	Application of Heavy Metal Bio-mediating Bacteria in Hong Kong Waters	SHEN, Winston Yuk Ting
YE 2	To what extent are there radioactive substances inside the abandoned Needle Hill Tungsten mine in HK?	WYATT, George Robert
YE 3	Bio-degradable Bioplastic	Isabel Lin, Arthur Zhang
YE 4	Intelligent Traffic light system	Ng Tsun Kiu, Marcus 吳峻翹, Wan Pak Lam 温柏霖, Tsui Chi Tang 徐志騰, Wan Yu Yin 溫語嫣
YE 5	Portable Pelton Turbine in Hong Kong	Qiao Lok Hei, Kyle, Wong Yik Ka 王繹嘉, Chan Clinton Denzel Pak Hei, Choi Shin Hang Ian
YE 6	Meteorites In Hong Kong	WONG, Joshua Cho Ho, CHENG, Sze Ming Joshua
YE 7	Urban Water Runoff—Shing Mun River	AROSTI, Samuel Mauro
YE 8	Water Quality Survey of Tai Hu Lake	董梓涵, 高淑雯, 褚庭艳
YE 9	ROV for cleaning Marine Garbage	黃熙媛
YE 10	Cost-Effective Arduino Wave & Current Sensor	Agastya Singh, Wu Kiu Chun, Aidan
YE 11	Edison Battery	Tony Pang
YE 12	Wind Power during typhoons	Cheuk Fung Lau
YE 13	Simple COVID detector using temperature & AI suitable for school aged children	Peter Wan
YE 14	Adolescent Bot	Carolyn Yu, Julia Shaw, Samuel Lin

YE 15	How can we utilize a tritium light source in a battery	Sean Tam, Mathew Li
YE 16	We Blow Bubbles	Mathew Chung,
YE 17	Identification of boat type using U/W sounds	Colby Lin
YE 18	Rescue lost Hikers through tracking cellphone	Chan, Hubert 陳灝, Lai Tin Yui, Tristan 黎天睿, Lee Pui Wing, Adeline 李沛穎, Tso Ka Yu, Justina 曹嘉瑜,
YE 19	Smart Phone Holder	王怡捷, 王子玉, 陈怡可, 黄沐妍
YE 20	Fish Counting with AI to Determine the Effectiveness of Marine Reserves	Daniel Park, Samion Suwito, Wu Shu-Hong
YE 21	Investigating Water Quality in Hong Kong	LEUNG, Ping Thomas
YE 22	ROV for cleaning Marine Garbage	黃熙媛
YE 23	Micro:bit Weather Machine	Jonathan YungYat Hei

List of Winners for Projects and for Posters:
Pre-University Forum
Best Project Awards:

1st Place: Detection to prevent Sudden Infant Death Syndrome—SKH Lam Woo Memorial Secondary School
2nd Place: Portawind 2.0—St. Stephen's Girls' College
3rd Place: Investigation on the Effectiveness of Vegetation in Noise Reduction—Diocesan Boys' School

Best Poster Awards:

1st Place: Detection to prevent Sudden Infant Death Syndrome—SKH Lam Woo Memorial Secondary School
2nd Place: Protect our respectable firefighters and civilians—Canadian International School Hong Kong
3rd Place: The investigation on micro plastics in drinking water from tap and bottled water—SKH Li Fook Hing Secondary School

Young-Engineers (YE-22)
Best Project Awards:

1st Place: Application of Heavy Metal Bio-mediating Bacteria in Hong Kong Waters—ISF Academy
2nd Place: Portable Pelton Turbine in Hong Kong—St. Paul's Co-educational College
3rd Place: How can we utilize a tritium light source in a battery—Oceanway Corporation Limited

Best Poster Awards:

1st Place: How can we utilize a tritium light source in a battery—Oceanway Corporation Limited
2nd Place: Micro:bit Weather Machine—Oceanway Corporation Limited
3rd Place: Portable Pelton Turbine in Hong Kong—St. Paul's Co-educational College

Judges Special Mention Awards

Pre-University Forum: Protect our respectable firefighters and civilians—Canadian International School Hong Kong
Young Engineer-22: To what extent are there radioactive substances inside the abandoned Needle Hill Tungsten mine in HK—ISF Academy

Special thanks and the YE-23

We are honored by and grateful to our judges. Professor Joseph Orimolade from the Caritas Institute of Higher Education served as the lead judge for the YE track. The lead judge for the PUF track was Mr. WONG Ming Yam, Honorary Fellow at the City University.


Mr. Wong Ming Yam.

Prof. Joseph Orimolade.

The IEEE Hong Kong Section sponsored and included the STEM Student Conference student conference as an integral part of TENCON-22. Their overwhelm support is very much appreciated.

Special mention and thanks for those people who made the event happen, particularly, George Woo, Jacky Liang, Min Ng and Edward Wan.

For those interested the web site with all of the details: www.ieeeye.com

The next Young Engineer's Conference will be the YE-23 and the tentative date is the 11th and 12th November 2023.


Closing Group photo TENCON 22.

We have already started accepting projects for this conference and if anyone is interested please contact paulhodgson@ieee.org for more details.

Providence Chapter

The Marine Renewable Energy Collaborative (MRECo), the Bourne Tidal Test Site and the Marine Sensor Testbed

Reported by David Leslie, Chapter Secretary

A technical presentation on the subject of "The Marine Renewable Energy Collaborative (MRECo), the Bourne Tidal Test Site and the Marine Sensor Testbed" was made to the Providence Section, OE22 Chapter, on December 1, 2022, at the Massachusetts Maritime Academy in Buzzards Bay, Massachusetts, USA. John Miller, the Executive Director of MRECo, provided background on the marine renewable industry, some of its challenges, and explained why this facility will solve some of them. Prior to founding MRECo, Mr. Miller led development of ocean renewable energy for the University of Massachusetts.

The Bourne Tidal Test Site (BTTS), located in the Cape Cod Canal in Bourne, Massachusetts, is the only permanent test stand in the world designed specifically for tidal devices such as turbines. This partial scale test site allows a transition from testing in university tanks to full scale, avoiding some of the failures that have happened when deploying larger prototype turbines too quickly. Sensors can be tested economically on the co-located Massachusetts Ocean Sensor Test Bed (MOST). Experiments have been conducted there to monitor water conditions and fish behavior. MOST provides a secure, stable platform for cost-effective, long term sensor testing with continuous power and real time sensor data. With this facility, Massachusetts has positioned itself among the leaders in the emerging tidal energy industry, part of the Blue Economy. This is a young industry that has many challenges, but also opportunities.

A critical problem that the world faces today is that not enough energy is derived from renewable sources, and much of that power is intermittent. Historically, New England was built using renewable energy, from the wind that drove clipper ship transport, to the water that drove mills, to the unsustainable use of biofuel in the form of whale oil. In modern times the demand for energy has grown hugely. In the USA alone demand in the early 21st century was on the order of 4000 TWHr/yr. The resource available from wind, wave and tidal was estimated to be about 900, 260, and 110 TWHr/year respectively. But the predictability of each of those sources varies considerably, being hours vs days vs centuries respectively. Tidal energy is very dependable and suitable for the provision of base load energy.

Mr. Miller reviewed several classical approaches to extracting energy from waves. Water driven "overtopping" devices funnel water through a device such as the Kaplan Turbine, while oscillating water columns can be used to drive air through Wells Turbines. Wave terminating devices contain stationary components, and components which move in response to the water. These devices may take the full force of wave motion. Point absorbers include buoys and flexible structures, which transform energy from their bobbing or bending motion. New approaches and commercial devices for extracting energy from waves and currents include surge capture (Resolute), pressure wave driven bladders (M3), wave and current driven cylinders (Arrecife) and cycloidal motion capturing rotational blade systems (Atargis).

For tidal power extraction a variety of underwater turbines have been developed. Some of these are helical foil systems oriented with horizontal axes, parallel to the flow, and others with vertical axes. Both open blade and shrouded configurations have been developed.

The critical challenge for all of these devices is survivability in the harsh ocean environment, and the research and development investment necessary to bring technologies forward follows a characteristic rising and then falling cost path through "technology readiness levels." Costs are relatively low during the research phase of modeling and wave/flume tank tests. They increase through the development phase of partial scale ocean testing, where tidal and river turbines now find themselves, and they reach a peak in the demonstration phase of full-scale ocean tests. Costs begin to decrease during the subsequent deployment phase where technologies such as geothermal energy, offshore wind and biomass utilization lie, and are lowest for mature technologies such as onshore wind and hydroelectric power plants.

Regulations requiring environmental testing and governmental permitting contribute to the development costs of marine energy technology. The Bourne Tidal Test Site is a pre-permitted test site for mid-scale (3m diameter) devices. It provides a controlled, stable platform for testing turbines and sensors, with minimum wave interaction, no blocking that distorts fluid flow, and water velocities up to 2 m/s. The site is easily accessible and flexible in its scheduling and use. Similarly, the Massachusetts Ocean Sensor Test Site for marine instrumentation is stable and secure. Tidal flow through the canal insures variable water conditions.

Mr. Miller noted that there are a number of full-scale testing facilities around the world, such as PacWave for harnessing wave energy in the Pacific, and areas for extracting energy from

John Miller, Director of MRECo, addressing the Providence OE Chapter at the Massachusetts Maritime Academy.

tidal flow, such as the Fundy Ocean Research Centre in the Bay of Fundy, and at MeyGen in the Pentland Firth in Scotland. However, the case for early partial scale testing at the BTTS facility appears quite compelling.

Rigging up to test a turbine at the Bourne Tidal Test Site in the Cape Cod Canal in Bourne, MA, USA.

Malaysia Chapter

IEEE OES—UMP STEM Carnival 2022: Underwater Robotics Workshop

Reported by Zainah Md. Zain & Mohd Shahrieel Mohd Aras

Photos during the event.

The IEEE OES Malaysia Chapter has conducted an Underwater Robotics Workshop for primary and secondary students in the UMP STEM Carnival 2022 on the 5th of October 2022. A total of 60 students from various schools in Kuantan and Pekan participated in this workshop. In this workshop, the students were introduced with theory, concept and steps in the development of low-cost remotely operated vehicles (ROV).

Underwater Robot Challenge 2022

Reported by Zainah Md. Zain & Mohd Shahrieel Mohd Aras

Underwater Robot Challenge 2022 was sponsored by the IEEE Pre-U STEM Grant. This challenge was held on 3 December 2022 at Universiti Malaysia Pahang, organized by IEEE OES Malaysia Chapter, Universiti Malaysia Pahang and Universiti Teknikal Malaysia Melaka. The Underwater Robot Challenge 2022 had 2 categories: primary schools and secondary schools, where 5 teams from primary schools and 21 teams from secondary schools around Malaysia have participated in the competition. This program also got the permission from Ministry of Education Malaysia and approved as National level activity for students.

Photos during the event.

Winner (secondary school)—SMK Ulu Sapi, Sabah (above)
Winner (primary school)—SK Pelak, Pekan, Pahang(below).

The IEEE 9th International Conference on Underwater System Technology: Theory and Applications (USYS'22)

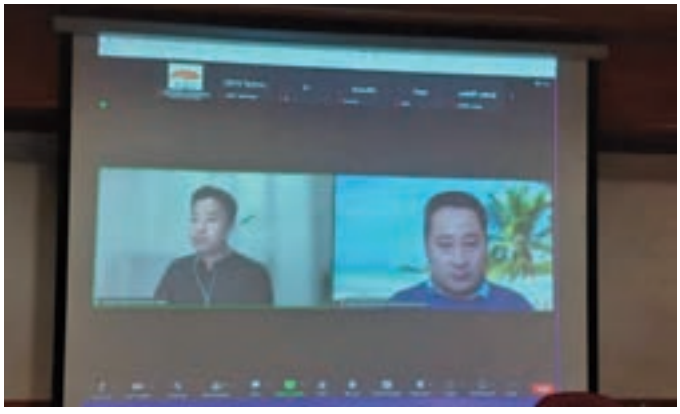
Reported by Zainah Md. Zain & Mohd Shahrieel Mohd Aras

The conference was held in collaboration with International Islamic University of Malaysia and Northwestern Polytechnical University, China on the 5th to 6th of December 2022. This conference aims to provide a platform for researchers, scientists, engineers, academicians, as well as industrial professionals from all over the world to share, discuss and disseminate their current

Keynote Speaker Talk by Prof. Dr. Huiping Li, School of Marine Science and Technology, Northwestern Polytechnical University.

R&D activities and experiences related to the field of underwater system technology, including relevant theories as well as applications. A total of 31 papers have been submitted to this conference. After the reviewing process, the best 26 papers are accepted for oral presentation which is organised in hybrid mode (face to face and online platform presentation). 2 keynote speakers; Prof. Dr. Ning Wang, School of Marine Engineering, Dalian Maritime University and Prof. Dr. Huiping Li, School of Marine Science and Technology, Northwestern Polytechnical University presented their keynote in USYS 2022.

The committee of USYS 2022.



Keynote Speaker Talk by Prof. Dr. Ning Wang, School of Marine Engineering, Dalian Maritime University.

Hybrid mode conference (face to face and online platform presentation).

Japan Chapter

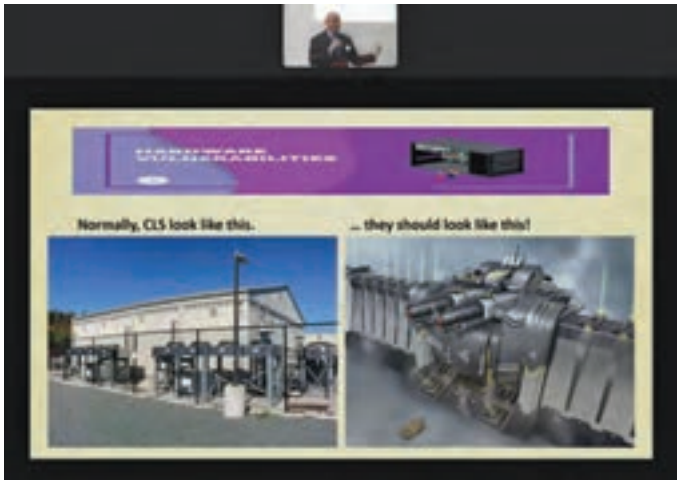
The 5th Workshop on Scientific Use of Submarine Cables & Related Technology Hybrid

Reported by Harumi Sugimatsu

SSC workshop

We had the fifth domestic workshop on SSC (Scientific Use of Submarine Cables & Related Technology) in a hybrid style on the 8th of December, 2022, at the convention hall of the Institute of Industrial Science, the University of Tokyo. In this workshop, we focused on the application of the submarine cable system to science, social implementation and commercial purposes. Speakers and audiences, approximately 150 attendees, were enjoying a variety of talks and discussions. The discussed topics were as follows:

- Future vision of utilization and application of geoscientific data acquired by submarine cable system
- Development of N-net: Nankai Trough Seafloor Observation Network and Tsunamis
- Application of CTBT International Monitoring System to Earth Science—Underwater acoustic observation by Hydrophone-Array



From the talk "Flowing Data and Competing Powers: Dimensions of submarine cable security".

Discussions.

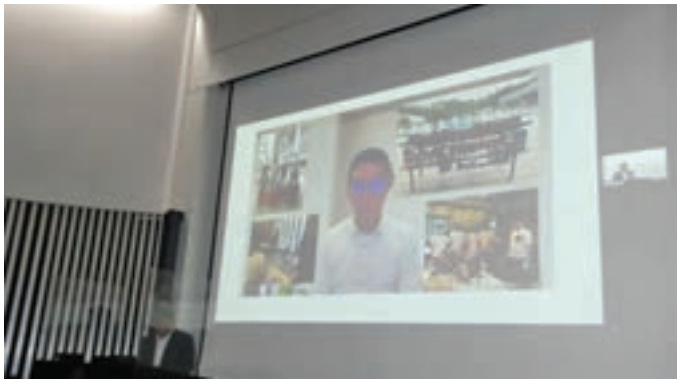
- Development of ultrawide-area seafloor observation by undersea fiber optical cable
- Tsunami prediction by assimilation of tsunami data using offshore submarine cable observation network—Case study of Hunga volcanic eruption
- Flowing Data and Competing Powers: Dimensions of submarine cable security
- Effective maintenance standards for prolonging the life time of armored submarine cables
- Development of expandable flexible optical mesh network on the seafloor
- Recent development and prospects for high-capacity fiber optical cable technology

IEEE OES Japan Chapter Awards Ceremony

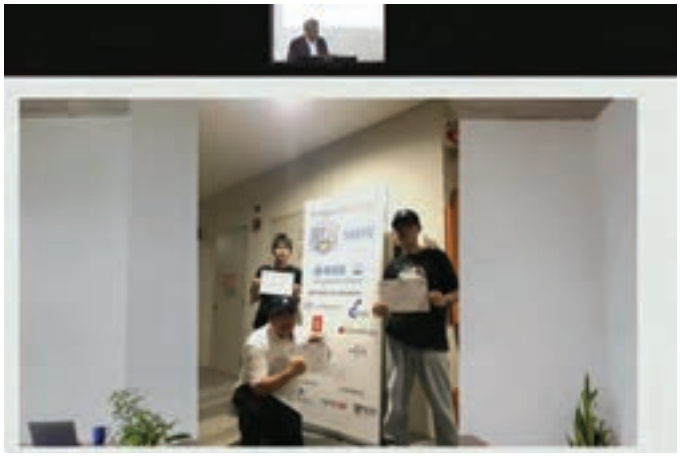
Following the SSC workshop, the IEEE OES Japan Chapter Awards Ceremony was held and moderated by Prof. Kazuo Ishii, OES Japan Awards Screening Committee Secretary. IEEE OES Japan Chapter runs these three programs for students and young researchers to enhance their research and career activities.

1) IEEE OES Japan Chapter Youngster Robocon Support Program Award in 2022. The program supports student travel to challenge the SAUVC 2022. The winner was the "HIT-Robotics" team from Hiroshima Institute of Technology. Jonghyun Ahn, a supervisor, and the team expressed their joy in receiving the award in a video message.
2) IEEE OES Japan Chapter OCEANS Student Support Program 2022 (OSSP 2022). The program supports student registrations to present the excellent paper to the OCEANS 2022 Hampton Roads. Four students were certificated.
3) IEEE OES Japan Chapter Young Researcher Award 2022. This program awards a young researcher who presented an outstanding paper at the IEEE OES sponsored conferences, OCEANS 2022 Chennai, OCEANS 2022 Hampton Roads and AUV2022 Singapore. Dr. Yang Weng was awarded for his distinguished work in the paper "Time Synchronization Scheme of Underwater Platforms Using Wireless Acoustic and Optical Communication," presented at AUV2022 Singapore.

Details are on the OES Japan Chapter website (URL: https://www.ieee-jp.org/section/tokyo/chapter/OE-22/). Hope we can have many excellent candidates for the programs in 2023.

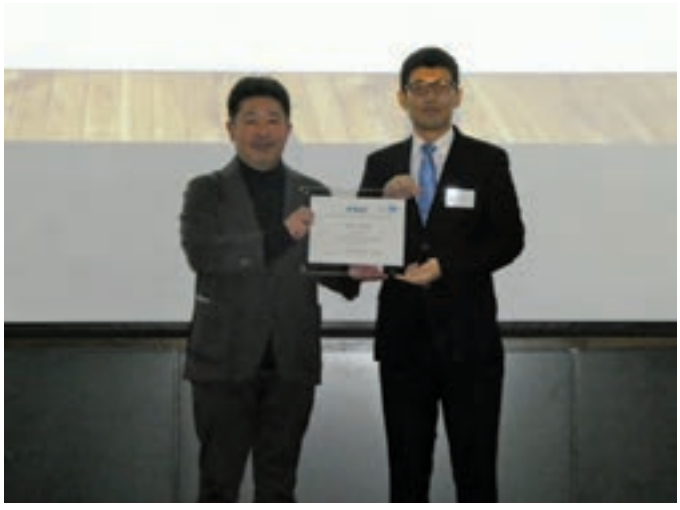


"HIT-Robotics" team supervisor Jonghyun Ahn.



"HIT-Robotics" team members.

OSSP 2022 Winner Announcement.



Dr. Yang Weng (R) receives the Young Researcher Award from WS chair Katsuyoshi Kawaguchi (L).

United Kingdom & Ireland (UK & I) Chapter Share Stand at Subsea Expo in Aberdeen

Reported by Brian Horsburgh, UK & L Chapter Secretary

Subsea Expo 2023 was held in Aberdeen, UK, from 21 to 23 February. The organisers, Global Underwater Hub, provided OES UK & I Chapter with a complimentary stand space to promote OES membership. Secretary of UK & I Chapter Brian Horsburgh approached the Limerick OCEANS LOC to offer them an opportunity to share the stand and promote attendance at the upcoming OCEANS conference in Limerick, Ireland. Deborah Tudge and Anthony Weir, the Exhibit Co-Chair, attended the Aberdeen show and manned the stand jointly with members of the UK & I Chapter committee, Prof. John Watson, Prof Prabhu Radhakrishna and Brian Horsburgh.

A number of useful contacts for potential exhibitors, delegates and presenters were achieved by the Limerick team. Limerick is building on its 40 confirmed exhibit stand spaces; with active contacts they expect 50 exhibitors. Projected attendance at the conference is at 600. The UkK& I team gained several new member contacts, and promoted information on other upcoming OCEANS conferences.

Photo of stand shows (Lto R), Brian Horsburgh, Secretary, UK & I Chapter, Deborah Tudge, PCO Limerick LOC, Anthony Weir, Exhibit Co-Chair Limerick LOC.

HK ROV 2022—More Workshops, Another Competition and Lots of Fun

Raul Hodgson, Hong Cong Chapter Vice chair

The Hong Kong IEEE CT/OES Joint Chapter was very busy in 2022 with their continued effort to instill remotely operated vehicle (ROV) knowledge in local primary and secondary schools. The COVID-19 pandemic had made the previous year, 2021, quite difficult but now with the COVID issue becoming more predictable, so the task was a lot easier.

The ultimate goal, at the start of the year, was to hold a proper, in person, MATE Navigator and Scout ROV competition in October 2022. Local COVID restrictions in the past two years had limited the numbers of people in groups. CT/OES had run competitions in 2021, but with small numbers of students only. Recent changes indicated that things were a bit more relaxed and we wanted to take advantage of this. Anti-COVID measures, like always wearing masks, temperature checks and RAT result photographs were still enforced especially when large groups of students met, but the local community was now quite used to all of this. So we did not see this as a hindrance at all.

The 2022 workshops started later than we would have liked, with the first ROVs built in May. However, the students were as enthusiastic as ever and we were raring to go. We still kept the groups small mainly to keep the schools happy. By the time of the competition, on October 29th, we managed to build 55 ROVs, involved 209 students and organize 29 competition teams. Not all of these ROVs would attend this year's competition and some of the previous year's ROV builds would.

Workshop Builds, Dry Testing, Buoyancy Adjustment and Wet Testing. All good fun!

The workshops involved younger students, which was great for us to see. The youngest age was 10 and many teams had students almost the same age. Previously we had noticed a wide mix of ages in teams. This new demographic was a healthy sign for us to see. Another important trend is the use of English language by more teams. This allowed for more MATE Navigator and Scout teams this year.

The younger groups consisted of both girls and boys teams

The Basic ROV workshops are structured classes, supervised by trained instructors. The "ROV in a Box" concept actually allows students to change and modify the general build instructions to add their ideas to the ROV. Many teams did this and built ROVs of different dimensions and added special tools to the basic frame structure. Some of the builders also experimented with the orientation and position of the thrusters finding out this can make the buoyancy trimming quite tricky.

At 9:00 am on the 29th of October, 2022, at the Queen's College Old Boy's school on Tsing Yi Island, the 2022 Hong Kong Mate IEEE CT/OES (Consumer Technology Society/Oceanic Engineering Society) Joint Chapter opened the 2022 Navigator, Scout, Adventurer and Sentinel ROV competition. The competition

Setting up the props and figuring out how to read the layout drawings of the stations

was opened by the CT/OES Chairman, Dr K. F. Tsang. We had 24 teams comprising 113 students.

Lots of competition activity underwater and top-side

The underwater Judges. They have advanced from past competition teams

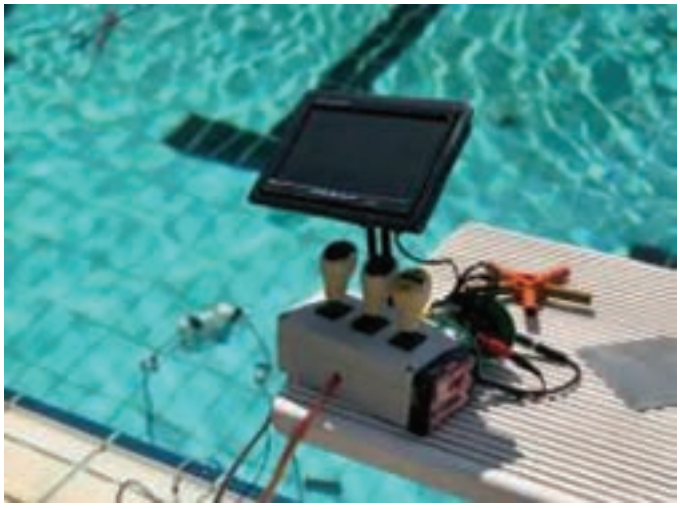
This year we saw some novel engineering. One team had attached gear stick grips to their joysticks. But the most interesting was the integrated ROV/Game controller. These students had found a way to fill in the waiting time in between runs by integrating a full video game system into the controller. There was even a choice of many different software, including all of the popular MMA sparring games.

The Canadian International School of Hong Kong provided the Junior Engineer support this year, with 8 students running around with pockets full of fuses and screwdrivers helping the teams get ready to compete. This was particularly useful for the younger teams. They also helped the judges with the logistics they needed.

Winning teams were:

MATE Navigator:	*The final results*
First Place:	Fukien Secondary School
Second Place:	Canadian International School of Hong Kong
Third Place:	Pui Kiu Middle School
MATE Scout:	
First Place:	Pui Kiu Middle School
Joint Second Place:	CUHKFFA Thomas Cheung Secondary School
Joint Second Place:	Canadian International School of Hong Kong
HK Adventurer:	
First Place:	Queen's College Old Boys' Association Secondary School
Second Place:	CMA Secondary School
Third Place:	SKH Li Fook Hing Secondary School
HK Sentinel:	
First Place:	Lovempathy Academy
Second Place:	Team Gunners
Third Place:	Team Halves

It was a great day for all. The competition had great weather, strong teams and the CT/OES made a successful attempt at getting back to normal ROV Competitions after the huge



Car gear stick joysticks

Spend the waiting time playing computer games

Junior Engineers at the pool and inside the waiting / repair centre.

Winner recognition and closing ceremony

disruption caused by the COVID Pandemic. Please see www.rov.hk for more information.

Finally, the IEEE CT/OES Young Engineer's Conference (YE-23) will be held in Hong Kong, November / December 2023. We hope to see you there.

The Hong Kong IEEE CT/OES Joint Chapter are looking forward to an exciting 2023. Already planned is an Invitational competition in January 2023, an ROV BattleBot in April 2023 and the next main ROV Competition in October 2023.

All good stuff!

Ocean Decade Initiative—Into the Second Year, and Gathering Steam

Hari Vishnu, Amy Deeb, Laura Meyer, M. A. Atmanand, With Inputs from Ocean Decade Initiative Committee

As the UN Decade of Ocean sciences for sustainable development 2021–2030 (http://oceandecade.org/—Ocean Decade, or "Decade" for short) enters into its third year, it is generating increasing enthusiasm in the ocean science and engineering communities. To bridge the society with this movement, and to spread the message wider, IEEE OES has formed the Ocean Decade Initiative Committee (ODIC). The initiative aims to spread awareness on the Ocean Decade goals to IEEE members, and to encourage members to contribute to these goals. If you want to get involved in any of the activities being undertaken by the committee or propose a new idea, the ODIC is always open to new volunteers please email us at oceandecade.oes@gmail.com.

There are abundant opportunities for raising awareness of the Decade in our OES communities through our various arms—the chapters, student branch chapters, technology committees, conferences, workshops and symposia, and through individual members themselves. The Decade is also an opportunity to connect with other IEEE Societies and bodies that have a common interest in the goals of the Decade, and our communities can engage in the goals by partnering with science events and organizations to share IEEE members' expertise.

The initiative made some good progress in 2022. Firstly, let us point you to the initiative website that was launched at https://ieeeoes.org/oceandecade/. It contains updated information on our aims, mission, past activities, and upcoming ones. Check it out to keep abreast of the initiative activities, and to explore opportunities that you can tap into to participate in the Decade via OES.

You may know that several OES events in 2022 were already endorsed by the Ocean Decade-this includes OCEANS Chennai 2022, OCEANS Hampton Roads, AUV Symposium 2022 and the Singapore AUV Challenge (SAUVC). This is another good way to participate in the Decade, and use the momentum provided by this worldwide movement to improve the visibility of our exciting efforts.

Another important step we undertook in 2022 was attending the UN Ocean Conference. Three of our volunteers had the honor of representing IEEE, the largest association of technical professionals in the world, at this conference. This was an important event to bridge with other like-minded societies and to form connections that would be important in achieving our goals. You can read more about it in another article in this Beacon issue. One of the recent outcomes of this visit was that a contact we established at the conference, Ocean Visions, got involved in OCEANS Hampton Roads. They organized a special session on Carbon Dioxide removal in an outreach effort to the engineering sector, which was very engaging and lively. More such exciting technical sessions are envisaged as part of the ODIC's "Design the Future Ocean" objective. We also had significant engagement with the community looking into marine data interoperability, and we believe this is a key area we can get involved in, along with ocean observation, best practices and standards (see https://earthzine.org/bringing-different-stakeholders-together-for-the-mammoth-problem-opportunity-of-marine-data-interoperability-panel-at-un-ocean-conference-lisbon/). Bringing in expertise and inputs from IEEE Standards on this would be a great opportunity for OES to play an important part in the problem of how to effectively handle data generated during the Decade.

The Ocean-based Carbon-dioxide removal panel at OCEANS Hampton Roads.

Further, in 2022 we launched the chapter activity initiative, and the Earthzine funding initiative. Chapters and Student Branch Chapters (SBCs) are the main vehicles of OES's activities at the regional level, and it is important for them to lead as one of the implementers of OES's Decade plans and bridge it with regional Decade-oriented efforts. These are also avenues to recruit volunteers. Over the duration of the initiative, Chapters/SBCs are encouraged to organize local events that relate to any of the themes of the Decade. OES is especially interested in activities that bring together ocean scientists with engineers, technologists and industry. These could be linked to any of the Decade Outcomes and Challenges, or existing Decade programmes. In the latter half of 2022, the initiative funded 6 chapters/SBCs for organizing Ocean Decade related events/activities—these included the Escuela Tecnológica Instituto Técnico Central student branch, Colombia, the Chapter and student chapter in Indian Institute of Technology Delhi, Canadian Atlantic Section OES Chapter, Japan Chapter and Singapore chapter. You should see some, if not all, these activities reported in Beacon in this issue or coming issues.

The chapter activity funding initiative has been announced for 2023 as well. The details of the call are available on the ODIC website (ieeeoes.org/oceandecade). We encourage all

chapters and student branch chapters to use this funding opportunity to develop exciting programmes and conduct events relevant to the Decade. Proposals must be submitted by April 1.

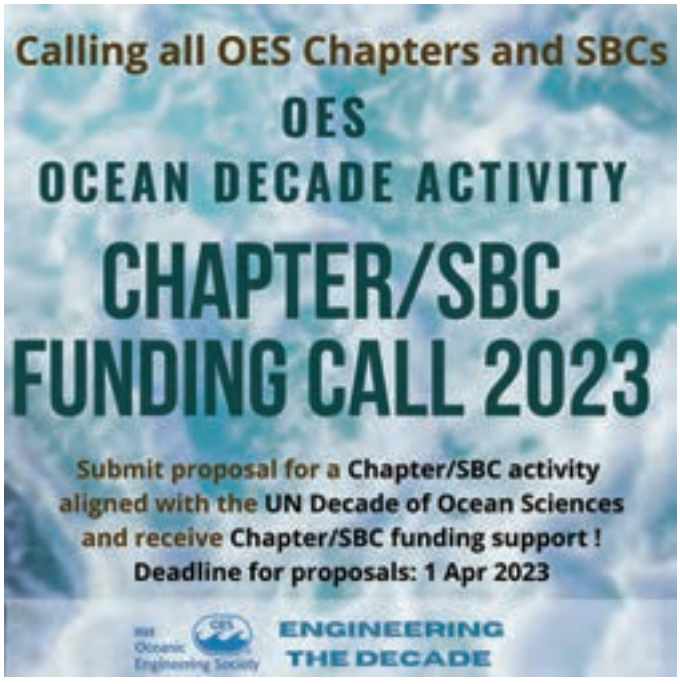
Science communication is an important direction for achieving the ocean awareness desired as one of the Decade outcomes. The OES Sci-comm magazine Earthzine, as well as Beacon, are important vehicles for this. An Earthzine theme for this was started in 2021, and invites articles on this theme to be published. As part of the Ocean Decade initiative, a funding initiative was announced in late-2022 for student reporters to write up articles covering Decade themed events and initiatives, or OES activities geared towards the Decade. For every article contributed by a student, the Ocean Decade Initiative funded the respective chapter. At OCEANS Hampton roads, student reporters signed up to cover many such events, and one of these articles has already been published (see https://earthzine.org/offshore-wind-in-the-us-the-take-at-oceans-2022-hampton-roads/). More are expected to follow. The Earthzine funding initiative for Chapters/SBC student reporters continues into 2023, so if any of you out there would like to cover Ocean Decade events for Earthzine, and want to know details of how to contribute, please get in touch with the Earthzine Chief editor Hari Vishnu at earthzineeditor@ieee.org.

Another important activity we are introducing this year is the Ocean Decade Ambassador Program. As the name implies, an Ambassador is responsible for representing and supporting an organization's goals (in this case the Decade's goals) in another organization. We envision this program as a way to support volunteers who wish to be such an Ambassador either from the Ocean Decade to communities within OES and IEEE, or from within OES and IEEE to the Decade. This year, we are starting with identifying people who are already embedded in OES networks (e.g., chapter chairs, members, conference or workshop organizing committee volunteers, etc.), who are familiar with and interested in the Decade, and want to actively support and represent the Decade's goal in their (OES) network. Ambassadors will define a program of activities for the year that will best align with this purpose, and OES will provide mentorship, funding, and a supportive community to accelerate their work. The 2023 call for IEEE OES Ocean Decade Ambassadors closed on February 21 and the selected Ambassadors will soon be announced. Please visit the Ocean Decade website for more information.

Apart from this, ODIC is involved in Planet Positive 2030, an initiative supported by the IEEE Standards Association that brings together a global, open community of experts to chart a path for all people to achieve a flourishing future for 2030 and beyond. Planet positive is compiling a book towards this end, divided into several chapters contributed by different groups. We are contributing to a chapter on Ocean & Coasts. With a committee of several high-level experts, the most important topics regarding climate change related issues in the Ocean are being touched upon.

For the first time, the OES ODIC had its own booth at the OCEANS Conference in Hampton Roads in September 2022. This was a great opportunity to network and make the initiative more visible, as well as spread awareness on the Decade. We were

Ocean Decade initiative booth at OCEANS 2022 Hampton Roads.



Call for Chapter/SBC funding initiative.

very delighted to be featured by the IOC (Intergovernmental Oceanographic Commission), UNESCO, in their social media.

For 2023, one of our aims is to get more visibility and to broaden our network. Therefore, our committee members will try to attend conferences focusing on different groups, such as policy-making, industry, law, and basic sciences, to bring the importance of engineering to the Decade. Volunteers are planning on going to the World Ocean Summit in Lisbon, OTC in Houston, and OCEANS in Limerick and Gulf Coast.

As always, we are open to volunteers to help achieve our aims. Our Young Professionals have been involved with existing OES activities that already contribute to ocean awareness and education by participating in various student outreach activities around the world, such as SAUVC and the European Robotics League. We have been further synchronizing our efforts with the Decade endorsed Early Career Ocean Professional (ECOP) programme (ecopdecade.org/), and OES is one of its official partners. We hope to support the ECOP programme by bringing our expertise in oceanic engineering to the table—for example, technical webinars in topic areas of our interest (e.g. acoustics, robotics etc.), and interested OES YPs are welcome to come forward to deliver these. The ECOP program also gave good visibility to some of our Decade endorsed programmes such as SAUVC, AUV Symposium and our OCEANS Hampton Roads booth via their portal, and also featured interviews with some of our members. They are continuing their visibility campaign for ECOPs who are interested, and OES ECOPs who would like to contribute are welcome to join.

OES Makes Its Presence at the UN Ocean Conference—Bridging Ocean Engineering and Ocean Decade

Hari Vishnu, Chief Editor, OES Earthzine Magazine, Venugopalan Pallayil, Vice-President of Technical Activities at OES, Christopher Whitt, President, IEEE OES

The global ocean covers 71% of Earth's surface. 38% of people live within 100 km of it, and it provides 17% of food protein and supports 12% of human livelihoods. It has been a key element of development of all life on Earth. Understanding the ocean holds the key to solving many problems facing mankind such as food shortage, social development, poverty, climate change and energy security. Recognizing the urgent need for humanity to improve its understanding of the ocean, the United Nations has proclaimed 2021–2030 as the Decade of Ocean Science for Sustainable Development, which we all now know as the *Ocean Decade*.

In relation to this, the UN Ocean conference (UNOC) was organized in Lisbon from 27 June to 1 July, 2022 (https://www.un.org/en/conferences/ocean2022). It was co-hosted by the Governments of Kenya and Portugal, and came at a critical time as the world is seeking to address many of the deep-rooted problems of our societies laid bare by the COVID pandemic and which will require major structural transformations and solutions anchored in the sustainable development goals. The UNOC sought to propel much needed science-based innovative solutions aimed at starting a new chapter of global ocean action.

Three volunteers from IEEE Oceanic Engineering Society (OES) had the honor of representing IEEE at this conference. In response to the launch of the Decade, OES has started an Ocean Decade Initiative to synergize its participation in the movement. One of its aims is 'bringing engineering to the Decade'—to highlight the importance of engineering in creating transformative

The inaugural plenary session, by the UN Secretary general.

and impactful solutions to the Decade objectives. OES participation in this conference was part of this initiative. While the Ocean Decade states a focus on science for sustainable development, it is engineering guided by science that will ultimately build the capabilities for fostering a sustainable ocean. In response to this need, IEEE OES is well-placed to bridge IEEE, the world's largest professional society of engineers with this global movement. Events like the UN Ocean Conference provide an avenue for engagement and identifying like-minded individuals and organizations with whom IEEE and OES can partner with to generate impactful outcomes.

The opening **high-level plenary session** of the UNOC saw attendance from many world leaders, marking the importance of the landmark event in addressing humanity's relationship with the ocean. It was opened by the **UN Secretary-General António Guterres**, who called on world leaders, the private sector and civil society to take bold climate action to save our ocean and our shared future. The Cabinet Secretary of Kenya's Ministry for Environment & Forestry, Tobiko Keriako, stated that we are all in agreement that we cannot have a healthy planet without a healthy ocean. Marcelo Rebelo De Sousa, President of Portugal, said that his country, together with Kenya, wanted to "make the conference a sign of peace, both with nature and among people, a symbol of multilateralism in the face of alluring unilateralism and a moment for mobilization and not contemplation".

The conference also saw heavy media coverage, and engagement with celebrities, whose presence improved the public appeal and outreach element to the conference, and furthered its visibility to all sections of society. In the build-up to the conference, world-renowned surfer Maya Gabeira was designated as the UNESCO Champion for the Ocean and Youth, to spread the message of the ocean via her activities. Apart from scientists, academics and various industry representatives, there was also significant participation from diverse fields such as fashion designers, sports personalities, artists, philanthropists, and policy-makers.

In addition to the plenaries and side events, the conference also hosted **'Interactive dialogues,**'—where eminent scientists, technologists and policy-makers spoke in a forum of high-level representatives from countries around the world. Participation was allowed in a select number of Interactive dialogues, and OES had the honour of participating in one on "**Increasing scientific knowledge and developing research capacity and transfer of marine technology."** The panel included, amongst others, Vladimir Ryabinin (executive secretary of the Intergovernmental oceanographic commission), Margaret Leinen (Director of Scripps Institution of Oceanography) and Jane Lubchenco (Dep. Director for Climate/Env at US Whitehouse). Lubchenco emphasized that during this decade, we need to change the script on the relationship between mankind and the ocean. "We used to first think of the ocean as too big to fail, and then, as being too big to fix. But now, we must see it as too important to ignore." Inspiring words indeed.

Vladimir Ryabinin highlighted the worrisome fact that, with respect to ocean science and technology, we under-observe, under-research, and under-coordinate what we are doing. The ocean covers 70% of Earth's surface, but gets only about 1.7% of global spending in terms of research and development. He

A High-level Interactive dialogue including multiple stakeholders including policy-makers.

emphasized that the Ocean Decade implementation plan, that has been developed in the first year, discusses on energizing the science to break this barrier by focusing research on infrastructural developments in ocean science. Capacity building is an important part of ocean science study as well. He outlined that we are now in the second year of the Decade, and what we (the Decade) had created so far was the approach towards energizing science. The Decade has 43 endorsed programmes, and is the largest undertaking in ocean science ever.

Early-Career Professional and Public Engagement

One of the thrusts in the Decade is on enabling and uplifting Young Professionals (YPs) in the ocean sciences/engineering domain (referred to as Early Career Ocean professionals, or ECOPs) so that they can take up this movement in coming years, and are able to sustain it beyond the span of these ten years. As part of this, the OES YPs have also been involved in activities that contribute to the decadal aims of awareness and education by participating in various student outreach activities around the world.

The Ocean Decade also has a specific endorsed programme geared towards ECOP development and coordinating networks around the world. This programme also had a presence at the conference, and OES had many opportunities throughout the conference to have productive conversations with their representatives, especially the ECOP-Asia node. Thanks to the effective use of social media tools and efforts from the ECOP program to coordinate the communication, the ECOPs at the conference were very connected and unified. The ECOP program organized an **ECOP Networking walk (Netwalk)** to promote conversations amongst the attending ECOPs, which was a great experience—the group walked around the conference venue and past the iconic Miradouro da Ponte Vasco da Gama. The ECOP program has shown a keen interest to get OES onboard in training programs for ECOPs around the world. This fits in well with our vision of being a leader in promoting engineering and its importance during the Decade. It is a great opportunity for OES to engage and inspire the next generation of students to take up engineering and technology in the ocean sector. The ECOP program is also keen to collaborate

The ECOPs at the Networking walk (Netwalk) organized during the conference.

Penultimate day at the conference ending on a great note with the Decade forum, bringing together many stakeholders for discussion at one location, with an idea to inspire."Let's hope this seed change will turn into a sea change."

with our existing ECOP outreach activities such as underwater robotics competitions and technology committee webinars.

In tandem with the conference, there were also exciting art exhibits organized in other parts of Lisbon city sponsored by the Oceano Azul foundation, highlighting the importance of the ocean to the public. It caught quite a bit of public attention as it was parked in the heart of the city at Rossio square, and the message was conveyed through attractive photos. This is very important because it plays to one of the key aims of the Decade —to get the common person involved in caring for the ocean. The exhibit photos can be accessed here: https://www.theoceanagency.org/exhibition.

One of the most useful outcomes from this conference was that it gave us many opportunities to network with other groups with similar interests, which included academics, industry and philanthropic organizations. We re-energized our communication with the Schmidt Ocean Institute (a philanthropic organization active in ocean exploration) who have been supporting us in our ocean technology endeavors by involving in our conferences and symposia. We also created valuable contacts to initialize our idea of theme-focused panel discussions and workshops (called Future Ocean endeavor). One recent successful outcome from this was born out of our talks with experts working in carbon-dioxide removal - a potentially disruptive technology in nascent stages, that may be one of the keys to how humanity battles the climate crisis. As a result of this, the Ocean Decade initiative also supported organizing a successful panel discussion on carbon-dioxide removal at the recent OCEANS 2022 conference in Hampton Roads, by Ocean Visions. Such discussions will be paramount in taking the conversation forward on how to tackle this technological barrier, and in creating awareness of it. A future Beacon report will cover this panel.

Two examples of the art exhibits at Rossio square, (a) by designer Herri Susanto (original available here) highlighting the importance of the ocean to the public. Clearly, the ocean affects not only those who live near it in coastal areas, but even those in off cities and towns who live far off from it. The impact of the ocean on human livelihood and climate is felt on all parts of Earth. (b) by designer Sean C. (available here). There is a lot to explore in the depths of the ocean, as much as there is beyond the limit of our skies.

Ocean Decade Forum

A collective forum organized on the penultimate day of the conference gave a good round-up of several Decade-endorsed actions, programmes and activities around the world. The forum followed a rotating panel format, where the panel was rotated every 1 hour, focusing on each of the 7 "desired outcomes" of the Decade. At the forum, The Ocean Foundation announced that they were making available resources for promoting 3 Cs—Codesign, Capacity development and Communication. The Schmidt Ocean Institute announced a partnership with National Geographic to promote diversity and equity in ocean exploration with specific focus on ECOPs, including via funded shipboard time opportunities. Another philanthropic organization, RevOcean, also announced that they were making available shipboard opportunities for deserving ECOPs.

As part of this, a call to action to protect the ocean was announced by The Ocean Decade alliance—a high-level network of eminent partners of the Decade that aim to lead by example to catalyze support for the Decade through targeted resource mobilization, networking, and influence. The call drew attention to the significant threats the ocean is facing, including climate change, unsustainable exploitation of marine resources, pollution and uncoordinated development of the ocean and coastal zone. It recognized the importance of investing in relevant and solutions-oriented science as the basis for action to restore the health of the ocean (see full proclamation in Figure below).

One of the most exciting developments revealed during the conference was the progress made by the Seabed 2030 program in mapping the depths of the world's ocean. Mapping the ocean

forms one of the many crucial parts required for us to map this important sphere of Earth. Until 2015, only 5% of the ocean was mapped to modern standards. By 2020, that number had more than quadrupled to 21%, through the efforts of the program and its partners including GEBCO and The Nippon Foundation. At UNOC 2022, Seabed 2030 announced that the percentage of seabed floor mapped had increased to 23.4%, which is a big step forward in this endeavor.

Marine Data Interoperability

We had a useful discussion with a set of experts who have been promoting marine data sharing and interoperability standards, as well as the promotion and adoption of best practices in ocean sciences (these discussions and takeaways from a related panel session will be presented in a separate report by us). Given that data has turned into one of humanity's most valuable assets during the ongoing information age (as of 2017, data surpassed oil as the world's most valuable resource), and with the expectation that the accelerated ocean exploration this Decade will yield an explosion of data from different quarters, ensuring this data is interoperable and/or standardized is as important as ensuring it is accessible (desired outcome #6 of the Decade). The community discussion stressed that no real change in the status quo on ocean data can be made without the digitization, sharing, and management of data, information, and digital knowledge of the ocean. A first step forward in data sharing and interoperability is finding who are the different stakeholders holding the data, so that they can be convinced to join sharing networks. The process of searching for this data also needs to be simplified, so that it becomes more accessible. The discussion agreed that eventually, data-sharing is a practical need for all ocean stakeholders.

This is one sector where IEEE can make a great impact during the Decade—for example, we could be a potent contributor through the framework provided by IEEE Standards and synergize it with the needs to pursue standards in ocean data, observing and exploration. We have a large network of experts spanning different fields, geographic regions and stages of career, who could contribute towards developing these standards. We could also use our multiple IEEE conferences as avenues to hold important discussions required to form multi-stakeholder consensus for building these standards.

The UNOC was also a great avenue for IEEE and OES to give visibility to our ongoing and planned efforts and contributions to the Decade. We stressed the role of IEEE and OES in promoting the role of engineering in the Decade objectives, and shared many of our ongoing and planned activities undertaken by chapters, technology committees and special interest communities. Our science communication magazine of IEEE OES, Earthzine, and society magazine Beacon regularly publish special thematic articles on the Decade and its impact on humanity, thus catering to our aim of educating the masses about this movement. Earthzine is predominantly run by the OES YPs, thus bringing them to the forefront of this movement. Several OES-sponsored conferences and workshops in 2022 have been endorsed by the Ocean Decade, namely OCEANS 2022 conference in Chennai, AUV Symposium, SAUVC and OCEANS 2022 conference, Hampton Roads, which is a great source of pride for IEEE. OES also participates in several Decade-endorsed programs including Ocean Best practices group, Coastpredict, ECOPs-Asia, and the Technology and Innovation working group. OES is also giving thrust to more Decade activities by incentivizing events and initiatives that align with the goal of the Decade, including through its Ocean Decade Ambassador program, Earthzine article coverage incentive, and a chapter funding program through which 5 OES chapters across the world were funded for pursuing events and activities in synch with the Decade.

A call to action announced by the Ocean Decade alliance, accessible here.

At UNOC 2022, we received great interest for some of our ECOP-outreach events such as SAUVC, ERL and Earthzine (some twitter coverage here: https://twitter.com/eumissionocean/status/1544013731155398659). Our attendance at this event was also well-covered on IEEE OES social media outlets. At the end of the conference, OES submitted a statement on our takeaway from the conference, proudly displayed at the Ocean Decade website here.

In the coming editions of UNOC, we hope that OES can participate in a more advanced and pro-active role by organizing some side-events at the conference and get actively involved in a larger capacity. Our presence at this conference has laid the groundwork for us to work towards that aim in the coming UN Ocean conferences. We should also integrate the aims and challenges of the Decade into our existing conferences, workshops and symposia via targeted events in this direction.

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

OCEAN DECADE ALLIANCE

CALL TO ACTION

on the occasion of the

2022 UN OCEAN CONFERENCE

We, the members of the Ocean Decade Alliance, draw attention to the significant threats that the ocean is facing. Climate change, unsustainable exploitation of marine resources, pollution, and uncoordinated development of the ocean and coastal zone are creating multiple and cumulative impacts that threaten the state of the ocean and jeopardize its capacity to support human safety, health and wellbeing.

We recognize the importance of investing in relevant and solutions-oriented science as the basis for action to restore the health of the ocean and achieve sustainable development. We affirm that collective ambitions for climate action, biodiversity, and food and energy security cannot be met without improved generation, accessibility, and uptake of ocean data, information and knowledge.

We recognize the many decades of achievements in ocean science from actors around the world that provide a sound basis for future action. Yet we acknowledge that further investments are required from governments, industry, academia, and philanthropy to achieve Sustainable Development Goal (SDG) 14 "Life below water". We recognize that solutions to sustainable development across the global ocean require strong investment in systematic and sustained ocean observation to generate knowledge for sustainable ocean planning and management.

We recognize that the UN Decade of Ocean Science for Sustainable Development is a once-in-a-lifetime opportunity to convene diverse actors to co-design and co-deliver transformative ocean science that fills priority knowledge gaps at the global, regional, national, and local scales. We furthermore highlight the role of the Ocean Decade in embracing the value of a panoply of knowledge systems, including Indigenous and local knowledge.

We affirm that to fulfil the vision of the Ocean Decade, a step-change in the type, volume and coordination of investment that is available for ocean science is required. We stress that such investment needs to be significantly scaled up, sustained, and accessible across geographies and genders. It needs to support the unique role of early career ocean professionals and youth in ensuring the legacy of the Ocean Decade. A significant increase in investment needs to be accompanied by comprehensive capacity development and increased ocean literacy for and with all stakeholders so that no-one is left behind.

We commit to:

- Using our individual and collective networks and influence to raise awareness for the need to increase investment in ocean science to support for sustainable development in the framework of the Ocean Decade.
- Building on existing and new partnerships across all sectors of society including governments, intergovernmental organizations, industry, philanthropy, academia, and United Nations entities to unlock required investment.
- Supporting partnerships with and between actors in Least Developed Countries, Land-locked Developing Countries, and Small Island Developing States to achieve the aims of the Ocean Decade.
- Working with the Intergovernmental Oceanographic Commission of UNESCO in its role as coordinator of the Ocean Decade to identify and advance priority investment needs.

On the occasion of the 2022 UN Ocean Conference, we launch a Call to Action to partners from diverse sectors including governments; national, regional, international and private financing institutions; philanthropy; United Nations entities; and industry to join us in the Ocean Decade Alliance. We call upon these partners to co-create innovative, tailored and adaptive approaches to sustainable and inclusive investment around common ocean science priorities, including focusing investment in areas of ocean science that directly inform tangible outcomes for sustainable development.

OCEAN DECADE ALLIANCE

CALL TO ACTION

on the occasion of the

2022 UN OCEAN CONFERENCE

SIGNATORIES:

PATRONS OF THE OCEAN DECADE ALLIANCE:

- H.E. Hon. Uhuru Kenyatta, President of the Republic of Kenya
- His Serene Highness Prince Albert II, Sovereign Prince of Monaco
- H.E. Jonas Gahr Støre, Prime Minister of the Kingdom of Norway
- H.E. Marcelo Rebelo de Sousa, President of the Republic of Portugal
- H.E. Wavel Ramkalawan, President of the Republic of Seychelles
- Her Royal Highness Princess Lalla Hasnaa, President, Mohammed VI Foundation for Environmental Protection
- Dr. Martin Parkinson AO, Co-Chair, Great Barrier Reef Foundation
- Mr. Kjell Inge Rokke, Owner, REV Ocean
- Ms. Wendy Schmidt, Founder, Schmidt Ocean Institute

INSTITUTIONAL MEMBERS OF THE OCEAN DECADE ALLIANCE:

- Fisheries and Oceans Canada
- Republic of Kenya
- Republic of Korea
- Kingdom of Norway
- Republic of Portugal
- Republic of Seychelles
- Kingdom of Sweden
- International Seabed Authority
- Fugro
- Great Barrier Reef Foundation
- Mohammed VI Foundation for Environmental Protection
- Prince Albert II of Monaco Foundation
- Schmidt Ocean Institute

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

OCEANDECADE.ORG
2022 UN OCEAN CONFERENCE

Report Upon Attending the World Ocean Assessment Workshop at Belitung, Indonesia in December 2022

Prof. M. A. Atmanand, Senior Member IEEE, AdCom Member and Coordinator of Technology Committees

Atmanand was recommended to the UN-Division of Ocean Affairs and the Law of the sea (DOALOS) as a Technical and Scientific Expert from the region of Indian Ocean based on his track records and professional experiences by the Intergovernmental Oceanographic Commission (IOC)-UNESCO Secretariat. They requested his participation and contribution to the Workshop for the region of the Indian Ocean (including the Arabian Sea and the Bay of Bengal), the Red Sea, the Gulf of Aden, the ROPME/RECOFI area, and the North and South Pacific in support of the third cycle of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects at Belitung, Indonesia from the 13th to 15th of December, 2022.

The Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects (Regular Process), is a global mechanism established by States after the 2002 United Nations World Summit on Sustainable Development held in Johannesburg, South Africa. It aims to regularly review the environmental, economic and social aspects of the state of the world's oceans, both current and foreseeable. Its purpose is to contribute to the strengthening of the regular scientific assessment of the state of the marine environment in order to enhance the scientific basis for policymaking.

The third cycle of the Regular Process was launched by the General Assembly in December 2019, to cover five years from 2021 to 2025. In accordance with the programme of work for the third cycle, one of the outputs of the third cycle will be the production of one or more assessments of the marine environment, including socioeconomic aspects. In addition, the Regular Process will provide support for other ocean-related intergovernmental processes, which may include a series of policy briefs for policymakers tailored to each process. The third cycle will also include a coherent capacity-building programme with the aim of strengthening the ocean science-policy interface at national, regional and global levels.

Atmanand presenting at the Plenary

The scope of this workshop is to inform the scoping exercise and the development of annotated outline(s) of the next assessment(s) to be produced during the third cycle of the UN Regular Process, collect regional-level data, raise awareness and provide information on the Regular Process, and

Atmanand at the Group I meeting as rapporteur

generate interest from the scientific community in contributing to the drafting of the assessment(s). The Workshop is organized under the auspices of the United Nations, in coordination with the secretariat of the Regular Process, represented by the Division for Ocean Affairs and the Law of the Sea, United Nations Office of Legal Affairs (the "Division") and with the assistance of members of the Group of Experts, as appropriate.

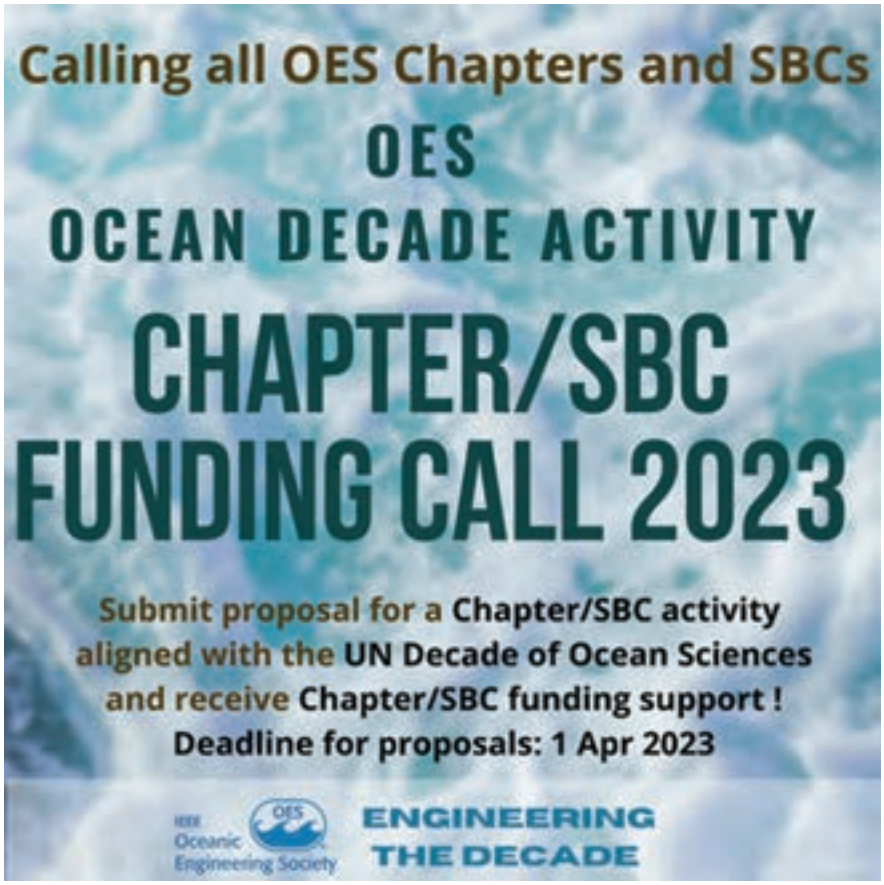
The workshop has thrown light to the current state of the oceans, especially the effect of Covid and its aftermath on the system. The need to further take up activities like pollution control, especially due to plastics and due to overuse of fertilizers and pesticides, came up as an outcome. Utilisation of renewable energies to reduce carbon footprint also came up as an important point.

Atmanand had the good occasion to be the rapporteur of Group I discussions wherein he could compile the discussions and present effectively to the Plenary session.

The assessment is in line with the UN decade of Ocean Science for Sustainable development (2021–2030) and SDG 14. Thus, the outputs from these two activities are to be gelled with the WOA III report so that the policy makers get a gist of the ocean state without going through multiple reports from various sources. Personnel from countries like Australia, Bangladesh, China, Egypt, Fiji, France, India, Indonesia, Iran, Japan, Papua New Guinea, Philippines, Republic of Korea, Samoa, Saudi Arabia, Singapore, Sri Lanka and Timor-Leste participated

References

https://www.un.org/regularprocess/first-round-regional-workshops
https://www.un.org/regularprocess/woa2-policybriefs



OES Conference Calendar

Contact BEACON Editors, OES VPWS and VPTA

OCEANS

OCEANS 2023 Limerick
June 5–8, 2023
Limerick, Ireland
https://limerick23.oceansconference.org

OCEANS 2023 Gulf Coast
September 25–28, 2023
Gulf Coast, USA
https://gulfcoast23.oceansconference.org

OTC

OTC 2023
May 1–4, 2023
Houston, U.S.A.
https://www.otcnet.org

OTC Brazil
October 24–26, 2023
Rio de Janeiro, Brazil
http://www.otcbrasil.org

OES Sponsored

UT23
March 6–9, 2023
Tokyo, Japan
http://www.ut23.org

SusTech 2023
April 19–22, 2023
Portland, Oregon, U.S.A.
https://ieee–sustech.org

SeaAI – Artificial Intelligence and Sea
June 20, 2023
Haifa, Israel
https://marsci.haifa.ac.il/en/seaai–conference2/

RAMI Marine Robots 2023 competition
July 16–21, 2023
La Spezia, Italy
https://metricsproject.eu/inspection–maintenance/rami–competition/
* More information will soon be available in the website.

BTS2023
24–29 September, 2023
Kumbor, Montenegro
https://bts.fer.hr
*The website will soon be updated with more news.

MetroSea 2023
October 4–6, 2023
La Valetta, Malta
https://www.metrosea.org

COA2023
October 15–19, 2023
Harbin, China

SYMPOL
December 13–15, 2023
Kochi, India
https://sympol.cusat.ac.in/callforpapers.php

Non–OES

Maritime Informatics & Robotics – Maritime 2023
July 3–12, 2023
Syros, Greece
https://summer–schools.aegean.gr/Maritime2023

The first Aegean Ro–boat Race
July 10, 2023
Syros, Greece
http://smartmove.aegean.gr/roboat–race/

5th International Conference on Synthetic Aperture in Sonar and Radar
6–8 September, 2023
Villa Marigola, Lerici, Italy
https://www.ioa.org.uk/civicrm/event/info?reset=1&id=718

Please contact us if you have any information about non–OES events that OES members are involved in.


OTC BRASIL 2023
An event organized by IBP and OTC
OFFSHORE TECHNOLOGY CONFERENCE
BRASIL
CALL FOR PAPERS IS OPEN
SUBMIT YOUR ABSTRACT
https://otcbrasil.org/call-for-papers/
Proposals will be accepted through 7 March 2023

IEEE Oceanic Engineering Society

IEEE / OES Japan Chapter

Underwater Technology 2023 UT 23

Advanced Underwater Technology

Welcome to UT23!

UT23, a symposium on underwater engineering research led by the Asia-Pacific research community, will be held in Tokyo. It will be the first in-person event in four years since the 2019 symposium in Kaohsiung.

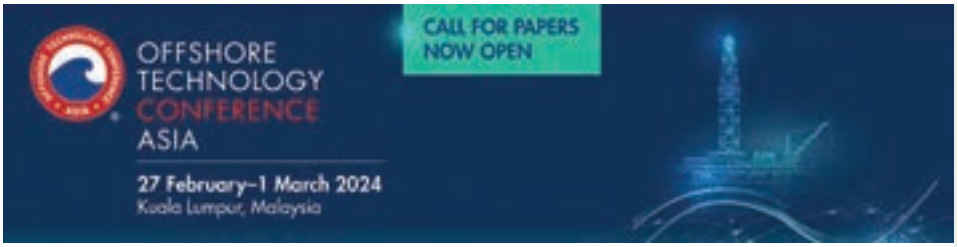
The symposium focuses on the environment, resources, energy, disasters, etc., related to the ocean space, and provides a place for discussion on various research results to overcome the technical challenges of each topic.

We look forward to the conference being vibrant and informative, seeing you March 6-9, 2023 at Conference Hall Haricot of Institute of Industrial Science (IIS) at the University of Tokyo's Komaba Campus!

For more information about UT23, please contact:

UT23 Secretariat: info@ut23.org

http://www.ut23.org



Call for Papers Open

Submit your abstract by **23 May 2023!**

The sixth edition of the Offshore Technology Conference Asia (OTC Asia) will be back in **Kuala Lumpur, Malaysia from 27 February–1 March 2024**. The biennial OTC Asia is where energy professionals meet to exchange ideas and opinions to advance scientific and technical knowledge for offshore resources and environmental matters.

Showcase Your Expertise to the Offshore Energy Community

- **Participate** in an international multi-disciplinary, inter-society energy conference and exhibition
- **Contribute** to technical knowledge transfer on a global platform
- **Share** new technologies and best practices with the offshore energy community
- **Boost** your company's profile at a renowned industry event
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- Have your paper **published** in the multi-society library, OnePetro®

What to Expect

Focusing on advancing offshore energy sustainably, OTC Asia is Asia Pacific's most comprehensive event with programmes for industry leaders, technical professionals, award winning projects and technologies, emerging leaders, and university and STEM students.

YES! I WANT TO SUBMIT AN ABSTRACT!

https://2024.otcasia.org

A Blast from the Past! . . . A Look to the Future

Bob Wernli—Beacon Co-Editor-in-Chief and Photographer Stan Chamberlain

Once again we are able to meet in person at the OCEANS conferences. Next September, we'll return to Biloxi for the OCEANS 2023 Gulf conference. In anticipation of the future, here's a look back to OCEANS 2009 Biloxi.

Biloxi Lighthouse

Laurie Jurgan, Charles Zang & Capt John Cousins Ribbon Cutting

Welcome to the exhibits

Mississippi Dept Marine Resources Booth

Karen Lynn (L) and Robert L. Wernli (R)

Jerry Carrol

OES AdCom meeting at the OCEANS Conference

Awards Ceremony of Student Poster Competition

Join us this summer at OCEANS in Limerick !

The OCEANS conference is the flagship event of the IEEE Oceanic Engineering Society (OES) and the Marine Technology Society (MTS). The event is recognized as the premier forum for the international marine community to meet and discuss technical innovations and current trends in the marine technology sector.

OCEANS brings together engineers, industry practitioners, government officials, public sector executives, researchers and academics from all aspects of the oceanic spectrum. The event will feature all aspects of oceanic engineering, science and technology. The conference theme is "Blue Ocean Planet Earth".

Registration open February 2023

Key highlights:

- Over 500 professionally reviewed technical papers, including special focus theme sessions.
- Plenary sessions with leaders from industry, academia, and government.
- 60+ exhibitors showcasing the latest innovations in products and services.
- A student poster session featuring outstanding projects and other student activities.
- Papers presented at the conference are subsequently archived in the IEEE Xplore online research database.
- Tutorials, workshops, demonstrations, government listening sessions, social and networking opportunities, field trips and an attractive social programme.

Venue and surroundings

The University of Limerick is situated on 130 hectares of beautiful parkland, with the River Shannon as its unifying focal point. Located 4kms outside Limerick City, the University is renowned for its superb facilities, well-equipped lecture theatres, sports facilities including a 50m pool, and attractive riverside walks.

The city is based in the Shannon Region, on Ireland's breathtaking West Coast. It is a vibrant place of culture and "craic" (fun), little secrets, and famous locals. Take a walk through Limerick's streets and you'll find stories everywhere.

The Region is the gateway to the Wild Atlantic Way, which offers visitors a chance to see the longest defined coastal driving route in the world, and to take in the amazing Irish landscape.

Why Exhibit

- Access to a broad network of industry partners from the public and private sector.
- Opportunity to present your newest innovations, products and services.
- Innovation space – the hot spot of the exhibition space provides exhibitors and patrons with an opportunity to hold technical presentations and product demos.
- Hands-on technical workshops to encourage engagement between industry and academia.

limerick23.oceansconference.org

Exhibitor brochure


OCEANS
CONFERENCE & EXPOSITION
2023
GULF COAST
September 25-28, 2023 | Biloxi, MS | In-Person & Virtual
The OCEANS 2023 Gulf Coast conference is for global maritime professionals to learn, innovate and lead in the protection and utilization of the world's largest natural resource – our OCEANS.
100+ EXHIBITORS
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IEEE Oceanic Engineering Society
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marine technology SOCIETY
Opportunity runs deep™

Who's Who in the IEEE OES

Takumi Matsuda, Meiji University, IEEE OES Japan Chapter, BEACON Associate Editor

I have been a member of OES since 2012 and working as a Beacon Associate Editor since 2015. I have been writing articles in the past OES Beacons about my research and underwater robot conventions in Japan. I will be a co-chair in a workshop about career path benefits of AUV/ROV competitions as a pre-event in Underwater Technology '23 to be held in Japan this March [1]. And I have got an opportunity to write the article in Who's Who this time. I am thankful to Beacon's editors for giving me this opportunity.

I am currently conducting research on intelligent robots and systems at Meiji University [2]. Intelligent robots such as AUVs play an important role in underwater exploration. Since it is not easy for humans to dive directly into the ocean, robots need technology that enables them to think for themselves and explore the undersea. In recent years, the development of information processing technologies, such as AI and big data, has made it possible for computers to realize human-like recognition and judgment. In the future, it will be increasingly important to create intelligence equal to or better than that of humans in ocean exploration.

I conduct research on underwater robots in collaboration with the Maki Laboratory of the Institute of Industrial Science, the University of Tokyo [3]. Last year, we conducted experiments in various sea areas in Japan. In this article, I would like to introduce some sea experiments.

Firstly, experiments were conducted in Shimoda, Japan, using multiple AUVs and an autonomous buoy. The autonomous buoy receives GNSS signals to know its position and control itself. The buoy is equipped with an acoustic positioning and communication device, which provides positioning and communication with the AUVs exploring underwater environments. The buoy acts as a reference point for AUVs to know their position and explore the ocean. This experiment was conducted in cooperation with Shimoda Marine Research Center of University of Tsukuba [4].

The AUVs and buoy were deployed and recovered from a ship of this center as shown in Figure 1. After deployment, the AUV performed autonomous exploration according to an implemented program. Figure 2 shows a scene of the experiments with 2 AUVs and the buoy. When the AUVs completed the exploration, they surfaced. The AUVs were guided to the ship by remote control and recovered. Recovery of multiple AUVs is a time-consuming process. Depending on the sea conditions, it may take a long time to recover the AUVs. After the

Figure 1. Deployment and recovery from a ship.

Figure 2. The scene of the experiment with two AUVs and the autonomous buoy.

Figure 3. The scene of returning to the port.

Figure 4. The scene of the experiment with the AUV and the buoy.

Figure 5. The port with waves on the first day.

Figure 6. The crane truck with the AUV and the buoy.

experiment, we returned to the port by this ship shown in Figure 3. Through repeated experiments in sea environments, the program can be improved to enhance the performance of the AUVs.

We also conducted sea experiments to evaluate the ability of the AUV to approach and follow the buoy at a fishing port in Hiratsuka, Japan, with the cooperation of the Hiratsuka Fishing Cooperative. Since the AUV can be deployed and recovered from the wharf, the experiments are easy to conduct. Thus, we often conduct experiments in this harbor to verify performance in sea environments. Figure 4 shows a scene of the experiment. In this photo, it looks calm, but waves can occur due to events such as wind. On the first day of the experiment, as shown in Figure 5, the waves were so high that we could not conduct the experiment. Small robots can be deployed and recovered by human power, but heavy AUVs require a crane. In this experiment, the AUV was deployed and recovered using a crane truck shown in Figures 6 and 7. By revising the program repeatedly, the AUV could finally track the buoy in Figure 4.

In this article, I introduced two experiments in the sea areas of Shimoda and Hiratsuka. I think that sea experiments are important for AUV research and can promote its development. I will further accelerate the development of the AUV by making small AUVs so that we can conduct experiments more easily and frequently.

Figure 7. The scene of lifting up the AUV by the crane truck.

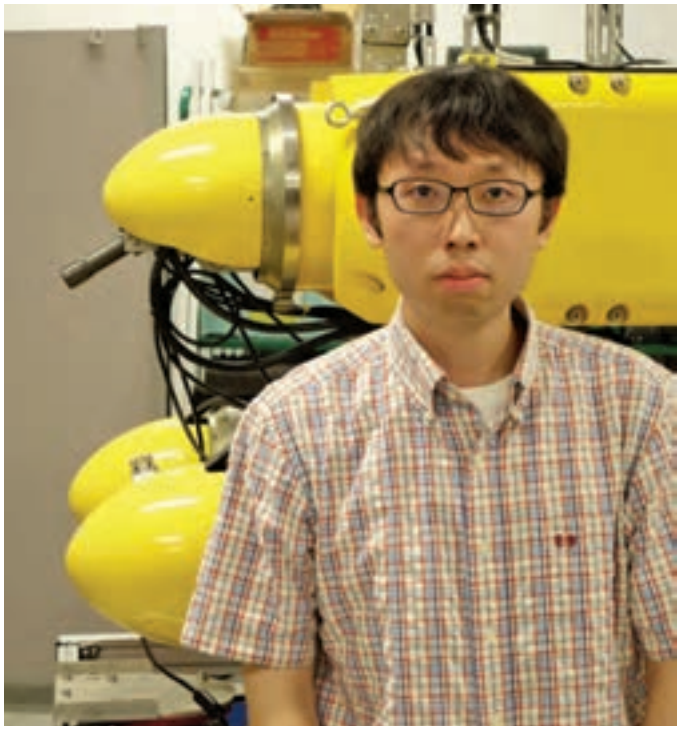


Figure 8. The author's photo taken together with the AUV.

Figure 8 shows the author's photo taken together with the AUV.

For more details about the activity of Meiji University and Maki Laboratory, visit the links shown in the references [1] and [2].

References

[1] Workshop on Career Path Benefits of AUV/ROV Competitions: Pre-Event in Underwater Technology '23, https://ut23.org/ut23-pre-event.html

[2] Meiji University, https://www.meiji.ac.jp/cip/english/

[3] Maki Laboratory, http://makilab.iis.u-tokyo.ac.jp/english/index.html

[4] Shimoda Marine Research Center, https://www.shimoda.tsukuba.ac.jp/en/

Request for OES AdCom Nominations

Nominees for the Term 1 January 2024–31 December 2026

Jerry Carroll, Chair of IEEE/OES Nominations and Appointments Committees, SrPastPresident@ieeeoes.org

The IEEE OCEANIC ENGINEERING SOCIETY is governed by an Administrative Committee of 18 members. Six are elected each year to serve three-year terms. Members are limited to two consecutive terms, although they may be reelected after a lapse of one year. This will be the thirty-eighth election to be held to determine the membership of our Administrative Committee (AdCom).

This year, the Nominations and Appointments Committee is chaired by the Past President. The committee is charged with proposing a slate of nominees each year. For this election, twelve members of the OES will be nominated to fill six positions on the AdCom for the three-year term 1 January 2024–31 December 2026.

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

The nomination Packet should include a Letter of Nomination accompanied by a one-page biographical sketch of the proposed candidate with picture and one-page statement from the proposed candidate giving:

- Their views of the opportunities and challenges facing the Society
- Steps to be taken to advance the IEEE Oceanographic Engineering Society, including Ideas for potential initiatives and projects
- How they plan to contribute to standing and ad hoc committees

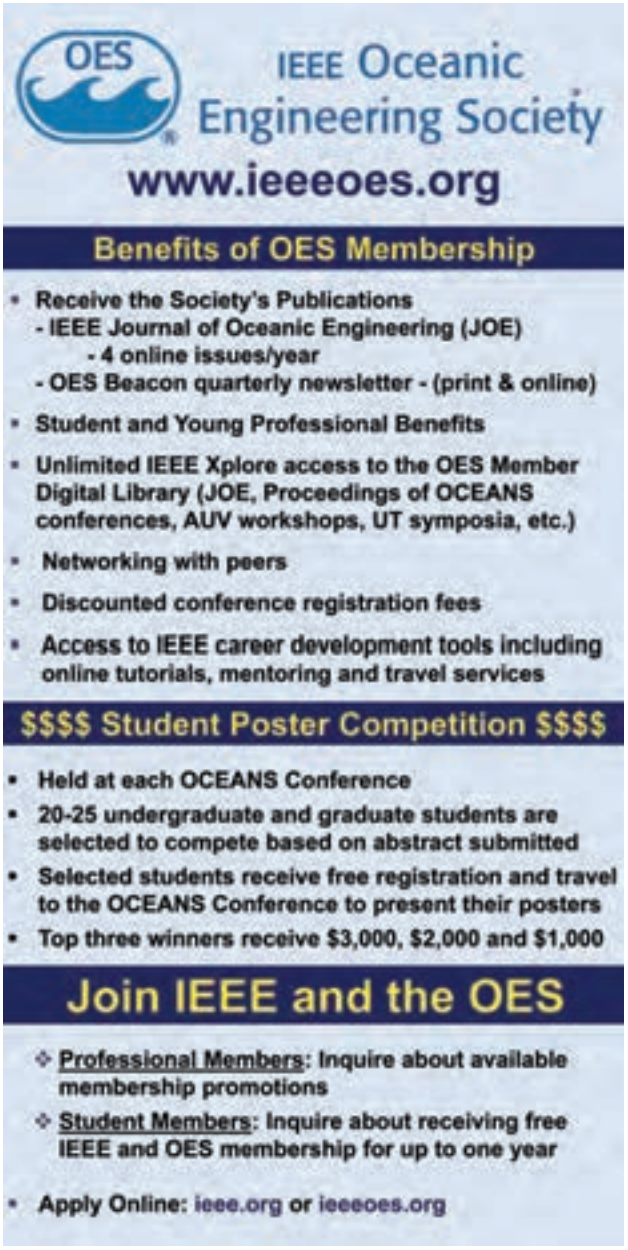
Elected Ad Com members should expect:

- To participate in administrative activities required to run the society (tasks will be assigned, including participation in standing, and/or ad hoc committees)
- To spend on average 5 to 10 hours per week on communications (email, phone, virtual meetings) which may not be evenly distributed throughout the year
- To travel to at least 1 in person AdCom meeting per year

The election will be conducted in accordance with our Bylaws. Follow this link to read the Bylaws: https://ieeeoes.org/about-us/bylaws-of-the-ieee-oceanic-engineering-society/).

The Bylaws specify that general nominations close on *March 1*, and nominations by petition close by *April 15*.

Please submit nominations to the undersigned starting 1 January 2023. Please do not delay your efforts in finding and nominating qualified candidates. Send your nominations to:
*Jerry Carroll
*Chair of IEEE/OES Nominations and Appointments Committees
SrPastPresident@ieeeoes.org



Welcome New and Reinstated Members

Australia
Andrew K Lammas

Canada
Rishad Irani

China
Hai Huang
Linlin Mao
Haojie Ren
Lei Wan
Zhiqiang Yao
Xun Zhu

Colombia
Camilo Andres Segura Quintero

France
Henri Chandran
Xavier Demoulin

India
Jasdeep S Dhanoa
Pandu Ranga Prasad Modi V Prabhu
Swagata Sarkar
Neha Sharma
Asheesh Kumar Singh
Abhilash Somayajula
Shanmuga Sundar

Italy
Michele Cioffi
Alessandro Gentili
Zakir Khan
Juri Khanmeh
Gherardo Liverani
Vittoria Puzone
Enrico Simetti
Simone Tani
Mirco Vangi

Japan
Yusuke Kozawa
Keisuke Watanabe
Hiroyuki Yamato

Korea, Republic of
Jongmin Cheon

Malaysia
Syahirah Hanizam
Muhammad Aiman Norazaruddin
Sathiabama T. Thirugnana

Pakistan
Engr. Ehtisham Ul Haque

Portugal
Guilherme Clarindo Marcos

Singapore
Jeffrey Phillip Adie
Len George
Gregory V Tan

Spain
Javier Busquets
Matias Carandell
David Pinto

Sudan
Hana. Mohammed Eltgani

Taiwan
Jenn-Shyong Chen

Tunisia
Hichem Karray
Ben Mabrouk Sabrine

Turkey
Alper Avcioglu

Ukraine
Oleksii Viktorovych Bogdanov

United Kingdom
Craig Stewart
Thangavel Thevar

USA
Quinton Adams
Jeffrey Allanach
Kristian Barton
Cherish E Bauer
Charlie Booker
Cathy Ann Clark
Timothy Collins
Ronald S Coppersmith
Yurii Edukere
Sara Falleni
Michael A Gann
Thomas M Garity
Stephanie A. Huguenin
Nare Karapetyan
Robert Patrick Kratz
Andrew Lee
Charles Loscalzo
J. Keith McElveen
Laura Mendoza
Anna Michel
Zachariah Sutton
T Vanik
Mingxi Zhou

Title USM SBC Poster Competition 2022

Nahruma Mehzabeen Pieu, Carrie Miller, Ardian Mahiru Rizal, Megha DevKumar, SBC of University of Southern Mississippi

The University of Southern Mississippi's (USM) Student Branch Chapter (SBC) of the IEEE Oceanic Engineering Society held its first annual poster competition on July 14th at the Marine Education Center (MEC). It was the first in-person outreach opportunity the SBC hosted since the COVID-19 lockdowns disrupted society events. Twelve graduate students presented their work while four USM's Ocean Science and Engineering department professors served as judges (Figure 1). Different backgrounds of students and professors highlighted a wide range of research and experiences within USM's School of Ocean Science and Engineering from ocean engineering, physical oceanography, marine chemistry, geological oceanography, hydrographic science, and biological oceanography. While most graduate students have had previous experience at professional conferences, the primary

Figure 1.The participants and judges of the poster competition.

Figure 2. The campers from MEC judging the posters.

focus for this competition was to present science to middle school students from the MEC summer camp (ages ranging from 12–14). The event sought to highlight the different backgrounds and research of participating graduate students and professors with the end goal of energizing the next generation of scientists. The program highlighted how diverse scientific study can be, thus educating and inspiring participating campers and creating an opportunity for them to tie STEM with activities and hobbies they are currently passionate about.

Two groups of campers had a chance to observe and interact with the posters and graduate students (Figure 2). The competition was made interactive by allowing the audiences to take part in judging the posters based on how much they understood the content as well as participating in a questionnaire on what they found interesting from the posters. To ensure the campers received a decent amount of exposure to the material without feeling like it was homework, the competition was judged 50% by them. This added autonomy to the exercise and created a dynamic atmosphere, allowing the SBC to gauge how much the campers understood the content.

It was a great and unique experience to see middle schoolers take an interest and ask intuitive questions regarding ocean science. Various techniques were used to focus on science communication with the posters, simplifying the research and including more illustrations. When asked what they thought about the posters, one of the campers replied "They were cool!" And any parent will tell you there is no greater praise from a 13-year-old.

One of the aims of this outreach event was to get kids thinking about different branches of science and what it entails, and I think it did just that. For example, one of the presenters, Megha Devakumar, was asked what chemical oceanographers do and what their other interests are. "He was curious to know more about the Ocean and the life in it. He was amazed at seeing the images of the deep sea and sea floor, but he was more

Figure 3. Brandy Armstrong giving a presentation on IEEE events and opportunities.

Figure 4. The winners of the Poster Competition. (From left to right) The first prize winner was Tasnim Islam, the second prize winner was Carrie Miller, and tying for third were Yean Das, and Shihab Hossain Saran.

curious to know what causes the ocean color change of corals, which was Ocean Acidification. This urged him to inquire more about the chemistry part of Oceanography and how it can be studied" replied Megha.

The middle schoolers also inquired about what scientists do apart from their primary research. And it was conveyed that it was what any other person would do in their free time. Being a scientist may seem like a daunting profession to some kids at this stage, so it was important to convey that it was more relaxed than their ideas, and all it needed was an understanding and passion for science! Lunch was provided after the poster presentation session.

In addition to the poster presentation, the Vice President of Professional Activities, Brandy Armstrong, attended and gave a presentation about IEEE and OES highlighting the vast opportunities associated with the organization (Figure 3). After the presentation, the judges compiled the students' comments and announced the poster competition winners (Figure 4). The competition was an excellent opportunity for graduate students to communicate their science to people who are not from their field. At the same time, it looked encouraging and inspired the middle schoolers to take an interest in science. We hope to hold this competition next year as well!

UNIZG SBC Activities Report

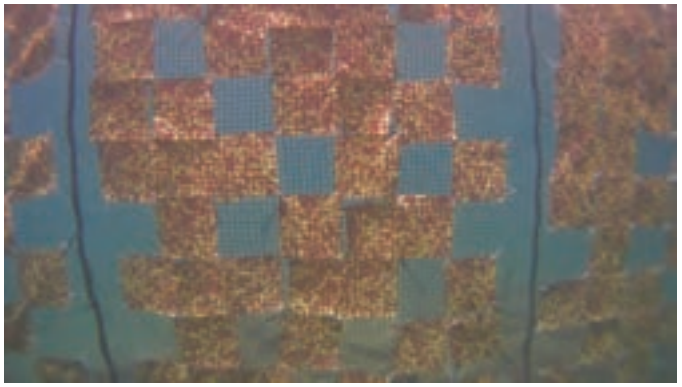
Matej Fabijanić, Nadir Kapetanović, Anja Babić, Ivan Lončar, Igor Kvasić, Vladimir Slošić, Juraj Obradović, and Kristijan Krčmar

Following the successfully organized lectures and hands-on tutorials during the International interdisciplinary field workshop of maritime robotics and applications—Breaking the Surface in October 2022, IEEE OES University of Zagreb Student Branch Chapter (UNIZG SBC) has remained active and continued to emphasize the importance of professional experience and knowledge transfer not only among the SBC members but also to the wider IEEE community. Breaking the Surface workshop serves as both a place for gathering experts from various fields of maritime robotics and an experimental test hub since it features a unique testing location right by the shore and a seawater pool. Our student members have therefore been hard at work crunching all the valuable data collected in the experiments and were happy to present some of their results in the following chapters. In addition to that, IEEE OES UNIZG SBC continued to maintain their presence in regional activities to promote their work as well to engage a broader audience in underwater robotics with a special emphasis on work with our youngest generations. In November 2022 our students successfully demonstrated a newly developed setup for AUV inspection at sea in Rijeka, Croatia, conducted from a remote operating center in Zagreb. In November, as every year, our members presented their recent activities at the University Fair in Zagreb and the Faculty of Electrical Engineering and Computing Open Doors day. Perhaps our most exciting news is the announcement that after months of hard work by many of our student members, the UNIZG-FER team entered the finals of the Mohamed Bin Zayed International Robotics Challenge (MBZIRC), with the final demonstration held in February 2024 in Abu Dhabi. The competition judges visited our members and evaluated their work, equipment and facilities prior to the final decision. More on that and much more in the chapters that follow!

HEKTOR Project Experiments

Field work done in Biograd, Croatia, spanning 4 days, focused on testing developed algorithms for autonomous underwater ROV control and fish cage biofouling estimation in an "ocean pool" environment. In the field we had the opportunity to use an actual net like ones used at industrial fisheries for testing and validating algorithms, and of course collecting new data to work with back in the office at Zagreb.

"Ocean pool" that served as testing grounds—the used fish cage net with hand placed patches can be seen.



Original frame and the output from an image segmentation module developed while working with a different dataset of videos.

Biofouling was simulated by placing yellow-brown colored square patches on the net and securing them in place so the net could be pulled out of the pool and deployed back in with the patches as needed. In total, about 25m^2 of square patches were placed in increasing amounts so that 4 different datasets with varying amounts of simulated biofouling were collected.

A developed algorithm for image segmentation tested on 2 year old data from a different location in open sea, and in different weather conditions, yielded promising first results. The new data will surely help in making the estimation algorithm more robust and accurate. The algorithm tries to segment a given image into 2 groups; background sea and everything else. The binary visualization is shown in the images with the patches correctly recognized as biofouling.

Black: recognized as sea, White: recognized as biofouling or cage structure.

The used underwater ROV behaved well under autonomous control, supported by an underwater localization system to close the control loop.

INNOVAMARE Project Demo at BtS 2022

As part of the Breaking the Surface 2022 workshop. a presentation of the Multifunctional Smart Buoy system was held for potential end users from industry and the academic community, as well as for interested citizens.

In a challenging operational environment, communication and data collection, as well as the operation of the entire system with a buoy, a sensor unit, a diver and two surface vehicles (catamaran), were demonstrated, with remote access via the Internet of Things enabled for all on the LABUSTBuoy website. The scenario presented in the demonstration involves a buoy as the main communication node in a mission to find and map pollution in the sea. An underwater vehicle connected to the Korkyra catamaran, controlled by an audience operator

Collaborative demo featuring two surface vehicles, a smart buoy, and an ROV participating in a mission in Biograd na Moru.

Demo participants inspecting the sensor unit and operator interface.

Smart Buoy prepared for deployment along with marine litter attached to a floater, which served as the mission target.

Example of the user interface showing data from all agents participation in the demo, available to participants online.

Demo participant operating the ROV in search for marine litter.

using a camera, finds previously prepared debris/litter in the sea. The buoy forwards this position of interest to the SWAMP (Shallow Water Autonomous Multipurpose Platform) catamaran developed by CNR INM in Genoa, which then moves to the target position and performs additional mapping of the bottom with acoustic (echosounder) sensors.

The vehicles communicate via WiFi, and the buoy serves as a relay that collects information packets from all other agents in the system. Thanks to the solar panels, the buoy is capable of long-term work at sea. Once packets of telemetry and/or sensor data are received from one of the catamarans, the data collected so far from all agents in the system is sent to an online IoT user dashboard that has the agents included as devices that monitor the environment, providing users with access to the vehicles' status in real time. The data sent by SWAMP is the GPS position of latitude/longitude, the direction of movement, the temperature inside the vehicle and the voltage state of its batteries. The buoy itself provides its own GPS position and internal and sea temperature for comparison. The sensor unit is equipped with sensors for pressure and temperature, chlorophyll, dissolved oxygen, and salinity. The Korkyra catamaran sends its own GPS position and the position of the Blueye ROV connected to it.

Autonomous Ship Experiments

In the scope of the project "Razvoj autonomnog besposadnog višenamjenskog broda" that includes the development of 24 meters long multi-functional unmanned ship situational awareness algorithms, which are essential to provide required

Position of the camera-LiDAR setup in the Biograd na Moru Marina.

LIDAR data sample and a part of the position track overlaid on the map of the area.

autonomous capabilities. For this task, multiple different sensors will be used and therefore the main goal in the BTS2022 was to gather interesting data that can be used for the development of different algorithms.

The dry run experiment had the purpose of logging the data in the area with heavy traffic (marina entrance) from the LiDAR and Camera. This data could be appropriate for the Camera-LiDAR sensor fusion algorithms or testing of the single sensor detection and classification algorithms from the camera and LiDAR sensor.

Next phase of the trials involved software and hardware preparation of catamaran Korkyra for remote control and supervision. Remote control GUI and surveillance camera streaming was tested in the safety of a bay.

Korkyra testing for the final data acquisition experiment.

Aerial photo of Korkyra catamaran entering the marina.

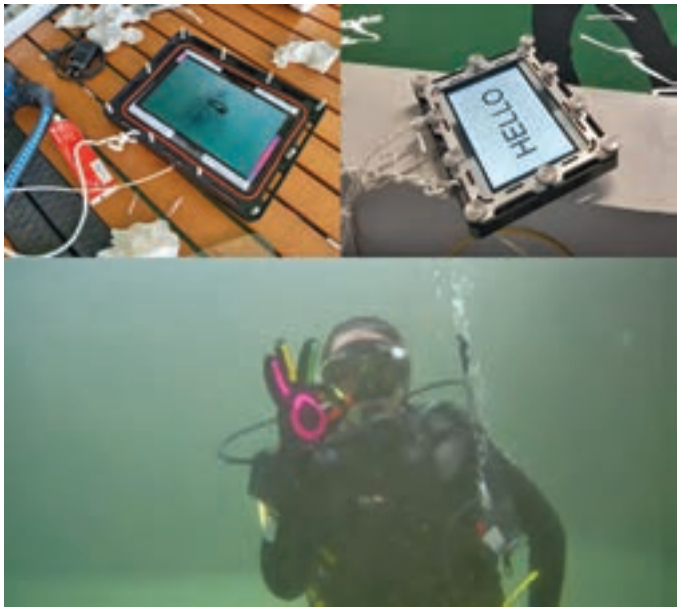
To gather more relevant data, sensor rig was mounted on a catamaran while controlled manually for safety. The goal of the experiment was to map the marina using a LIDAR and a monocular camera. During the voyage it encountered heavy traffic offering information rich data for the development of situational awareness algorithms for congested waters.

ROADMAP Project Experiments

As part of project Roadmap, our member Igor Kvasić, together with our project partners from the University of Auckland, New Zealand, and younger student members, conducted an experiment using a gesture recognition diving glove used for communicating with an autonomous underwater vehicle. One of the goals of the experiment was to collect and build a comprehensive dataset for benchmarking various gesture recognition techniques, mostly visual, and compare them to the algorithms developed within the project using a smart diving glove. For this occasion, the diving glove was fitted with colored vinyl stickers in order to mimic an existing diving language called "Caddian." The colored markings used in that language facilitate visual recognition of the gestures performed by divers and should make for interesting grounds for fairly comparing different detection methods.

Parallelly, our members, Luka Mandić and Vladimir Slošić, have gathered sonar footages of the seabed at the sea pool with

UNIZG SBC members gathering data with two H2Omni-X at the sea pool at Biograd na Moru.



Underwater tablet used for communicating gestures to the diver (top) and a diver performing gestures using the smart diving glove equipped with visual detection markings (bottom).

two ASVs H2Omni-X. One H2Omni-X was in charge of gathering the data from multiple sensors (GPS, inertial sensors, acoustic modem, sonar) while the other H2Omni-X had only acoustic modem and GPS. Gathered data will be used for three different experiments: mapping of the pool, sensor fusion for precise localization in poor GPS environment and acoustic identification of the sea pool. In all of the mentioned experiments, GPS RTK data was used as ground truth.

The experiments were conducted in both seawater and a pool, at different distances from the recording cameras (1, 2 and 3 meters) and by a total of 10 different divers, both professional and recreational. The variation in distance significantly impacts the visibility conditions and should produce interesting results when different detection techniques are applied. For communicating the set of gestures to the divers and recording the time, a tablet in an underwater casing was used together with an application developed in Unity to communicate visually. The gestures were recorded using a fixed underwater camera, but also using the gesture recognition glove, both in raw values and recognition data sent acoustically to a receiving acoustic modem. The gesture recognition timings were recorded, together with the diver reaction times, transmission times and snippets of every gesture and are soon to be published in a dataset paper.

MBZIRC 2023 Demo

We are proud to announce that we are members of the UNIZG-FER team that participates in the Mohamed Bin Zayed International Robotics Challenge (MBZIRC) held every two years. Our members have passed the White paper phase (March 2022) as well as the Simulation phase (October 2022) and are now preparing for the final Demonstration phase that is due February 2024. As a part of the Simulation phase, we had a demo of our infrastructure and equipment before a panel of three judges in October 2022.

On the first day, October 6th, 2022, our members walked the judges through our new research laboratory in Zagreb with a pool as well as the research laboratory of our colleagues from the LARICS team. On that occasion numerous research projects that we participate in and autonomous vehicles were presented. On the next day, the judges panel traveled to Biograd na Moru, Croatia where we had demos of the developed Marine Robotics Simulator (MARUS), ASVs H2Omni-X, autonomous catamaran Korkyra, smart Buoys, as well as various integrations of cameras, sonars, lidar, underwater localization equipment, and subsystems such as the landing platform, tether management system, and underwater sensor units.

Our student member, Allan Badian, with the gesture recognition glove, ready to perform the diving experiment with project partner Christopher Walker.

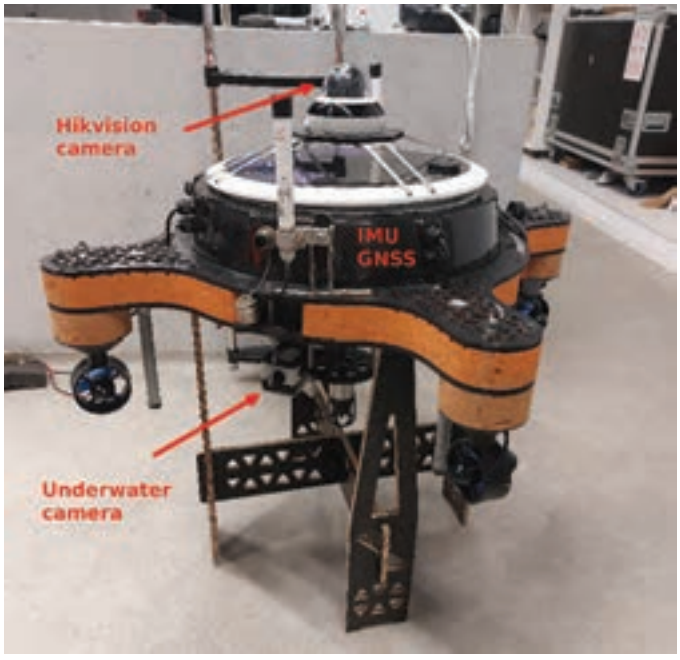
UNIZG SBC members presenting the developed ASV Korkyra to the panel of MBZIRC competition judges.

Rijeka Roadshow

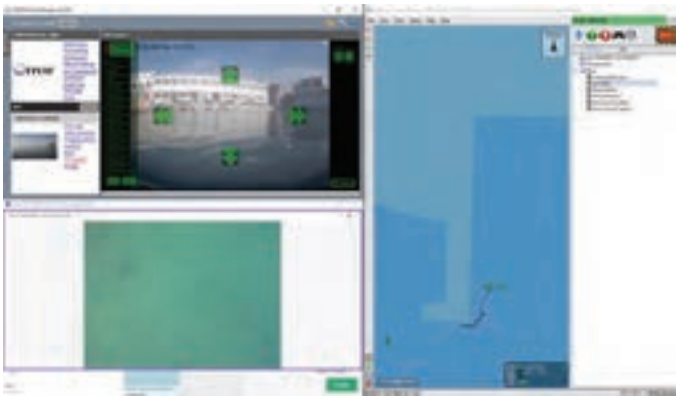
One of the InnovaMare roadshow events was held in Rijeka on November 7th, 2022. The main goal of this event was to display new technologies to the wider public and test the newly developed remote control setup for H2Omni-X robot. In this setup, we had an operator connected through VPN in our office in Zagreb. The operator had manual control using a joystick, and he was able to perform different tasks with the H2Omni-X such as go-to and lawnmower operations. The robot was equipped with a surveillance camera, Underwater camera, IMU, and GNSS. Using this equipment we were able to localize the robot with the fusion of IMU and GNSS data, and also stream data from cameras back to Zagreb. With above-the-water and in-water cameras, the operator was able to conduct operations such as the detection of underwater trash, inspection of underwater anchors, and surveillance tasks.

Using a VPN connection, we were able to get a small delay in the camera streams and the operator had a good awareness of the surrounding area, therefore, he was able to operate in very tight spaces and avoid shallow waters. Also, the operator was able to view the position of the robot on the map of the surrounding area using the Neptus tool, which also allowed the operator to define the area in which the robot should conduct the operations.

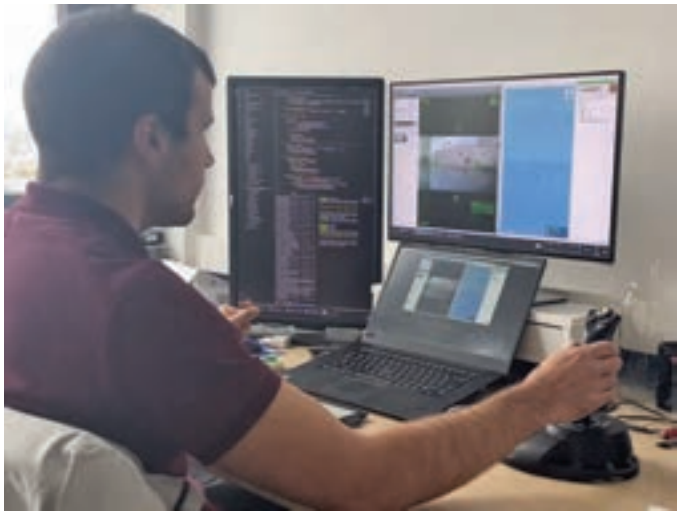
The most interesting operation for us and the public was the lawnmower operation, which was conducted over the bigger part of the bay and provided worthwhile information about the state of the sea bottom in the area. During the inspection, we were able to detect different kinds of trash that was laying on the seafloor of the bay for a longer period of time. During the testing, we had many interested attendants with questions about the robot, remote control setup, and future work in this area.



H2omni-X robot equipped with sensors before Rijeka roadshow.



The view on the operator screen displaying an above-water camera stream, underwater-camera stream, and Neptus GUI with a position of the robot in the surrounding area.



Operator in Zagreb office controlling the H2omni-X robot.

Detection of trash form the remote control center using stream from the underwater camera on the H2omni-x robot.

University Fair Event

Each November, the University of Zagreb organizes an event named University Fair. This time it was on 11 to12 November. There it gathers all faculties in one place so that students can more easily see and decide which faculty to enroll in. In this place, all faculties show the best they have to offer. It was a good opportunity for our members to present several research projects that they work on.

This year, due to logistics and venue, we decided to control the H2Omni-X ASV robot over the Internet. For better communication with the robot, we brought a 4G router through which we connected to the H2omni-x robot that was in our laboratory in the pool. We put the broadcast from the cameras in our pool area on the TV so that participants could see live how they drive the platform in the pool.

Remote over the Internet control setup at our booth.

Open Doors Day at FER

On the 26th of November, 2022, we opened our new laboratory's doors to participants of Open Doors Day at FER. Many visitors, mainly children and high schoolers with their parents, had fun while our SBC members presented their work with a short presentation. After the presentation, participants could try driving a surface drone developed by our SBC members.

Participants at the Open Doors Day at FER event.

Why has OES Funding of the First Flight High School Phyto-Finders Been so Successful?

Todd Morrison, Nobska, with Fenton McKown, Katie Kilburn, and Talulah Morris, FFHS

The Oceanic Engineering Society of IEEE has supported the phytoplankton and harmful algal bloom monitoring work of students at First Flight High School since 2010. That support is, fundamentally, an investment in the education of the next generation of ocean engineers and scientists. The most visible return on that investment to date has been nine FFHS student-authored papers, presented in OCEANS technical sessions by those student authors and published in the *Proceedings of OCEANS 2012 Hampton Roads*, *OCEANS 2015 Washington*, and *2018 Charleston*.

There are also many less obvious returns on our investment. Enabled by that funding, many dozens of students, not only the members of the Phyto-Finders, have been involved in or influenced by club activities. Club members have learned how to identify species of phytoplankton on microscope slides they prepare from their tow samples and many students have learned how to extract eDNA from those samples. Every club member has successfully graduated from FFHS and subsequently enrolled in an undergraduate program. Most, roughly 90%, have gone into STEM and related majors.

Those nine papers had eighteen student co-authors, all of whom could note a published paper on their college applications. Twelve of those student authors have been able to attend an OCEANS conference, actively participate in technical sessions, visit booths in the Exhibit, and interact with oceanographic engineers and scientists from around the world.

In addition, fourteen students have been able to travel to Woods Hole, MA, where they helped to sequence their eDNA

Networking their way through the Student Poster Competition, FFHS students, from left, Fenton McKown, Katie Kilburn, and Talulah Morris talk with Jacquelyn Veatch of Rutgers University. Jacquelyn was the winner of the Norman Miller Prize for her use of high frequency radar to investigate marine resource and prey concentrating features for oceanic food webs. Jacquelyn's research may provide insights for FFHS phytoplankton monitoring efforts.

samples at the Marine Biological Laboratory and developed better sample acquisition equipment and procedures at the Woods Hole Oceanographic Institution. The Phyto-Finders have twice been the first to detect a toxic bloom in the waters of the Outer Banks and once sampled a "red tide" bloom and showed it was not toxic.

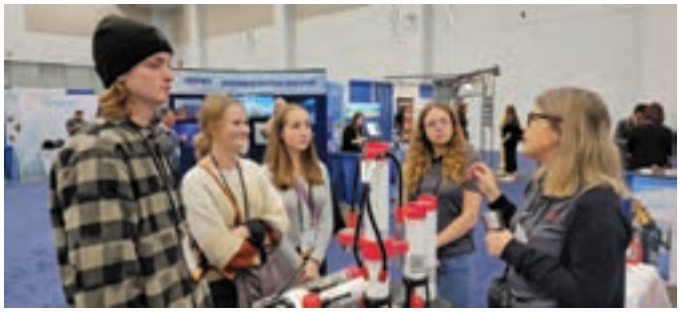
Clearly our investment has provided a strong return and the question I have been asked to address is, "Why has this program succeeded and thrived for over a decade when other educational investments have often foundered over time?"

Herewith, my response, which I offer with apologies to Jared Diamond and anyone else who has used Tolstoy's immortal opening line to make this point:

> All happy families are alike; each unhappy family is unhappy in its own way.
>
> —*Anna Karenina*, by Leo Tolstoy

Our investment in the Phyto-Finders of First Flight High School has thrived because, like "all happy families", all of the necessary ingredients for success are present. I (and Tolstoy and Diamond) argue that any combination of missing ingredients ("each … unhappy in its own way") will lead to a failure to thrive and will ultimately doom the effort. What are these ingredients? I believe these are funding, community support, facility and equipment access, school administration support, knowledgeable mentors, dedicated teachers, and invested student culture. All are happily present for the Phyto-Finders.

Before OES involvement, funding was very limited, with some support from NOAA and from parents. The club could not grow membership, could seldom purchase consumables or equipment, and had to cover their own travel costs for any field work. OES solved this limitation, enabling a significant increase in student participation, material purchases, and more frequent sampling activity over a broader geographic area. OES funding also meant the students could attend OCEANS and visit Woods Hole.



In the OCEANS Exhibit Hall, Candace Smith (right) and Susie Crowe (center) described the capabilities of the RBR product line to the students of FFHS. RBR has provided significant support to the Phyto-Finders through the donation of temperature, pressure, and dissolved oxygen sensors. Students have employed the sensors during their phytoplankton tows.

The Phyto-Finders engaged in a lively and lengthy discussion with a large group of Canadian women undergraduates from the Maritime Provinces. Thank you to Cathy Hogan (Oceans Advance and OCEANS 2014 St. John's) for arranging this opportunity to build connections with future colleagues.

The Phyto-Finders have always enjoyed support from the Outer Banks community. This includes parents, business owners (e.g., a restaurant providing breakfast to a group of students on an early morning sampling run before school), and private and public institutional support (providing mentors, expertise, and facilities access). That access, to the Army Corps of Engineers Field Research Facility pier in Duck, NC, for example, has been a critically important support for the program.

The club has also always enjoyed the support of their school administration, particularly two school principals, one of whom later served as Assistant Superintendent. Initially, outreach personnel for NOAA's Phytoplankton Monitoring Network provided mentoring to the students, but when the federal budget ax ended that support, OES added travel funding for an OES mentor (an ocean engineer and, later, a molecular biologist).

Very importantly, one dedicated teacher has served as advisor and guide from the formation of the club. The willingness of a few individuals to work closely with these students, despite their own already busy schedules, has been and remains a critical ingredient for success. Someday these individuals will retire and new advisors and mentors will be needed. I submit that these two ingredients are in shorter supply and much harder to find than the previous four I have listed.

Last, and arguably both the most important and the least tangible ingredient, is student culture. From the beginning,

students have enthusiastically embraced the mission of the Phyto-Finders, taken the work seriously, and developed and followed sampling and processing protocols. Critically, experienced students have recruited new students each year and passed on what they have learned so that the corporate knowledge of the club is not lost as each generation of students graduates. The origin of this ethos is unclear, but it has served the Phyto-Finders very well.

Unfortunately, passing the torch to the current generation of students has been compromised by COVID, which curtailed student sampling and other club activities for two years, but did not stop the exodus of graduating club members. In October of 2022, three new Phyto-Finders, their teacher, and one of their OES mentors, supported by OES funding, attended OCEANS 2022 Hampton Roads to jump start the rebuilding process. Those students have written about their experience and future plans in the short essays below.

Their mentors, the ocean engineer and the molecular biologist, visited them at FFHS in January. The mentors made several presentations to classes and led discussions afterwards. That effort, supported by the three students who joined us in Virginia Beach, convinced eight additional students (and counting) to join the Phyto-Finders and started two or three new research projects. Look for those papers in a future OCEANS Conference. Our investment in the future is still paying dividends.

Katie Kilburn, Senior: When I learned of the conference, I thought it sounded like a good opportunity, a chance to personally experience the scientific community. I went with an open mind and while I'm not sure what I was expecting, it was not to be one of the only people there who did not have an advanced degree! This was, at first, overwhelming, so we made our way to the Student Poster Contest area in the Exhibit Hall. Most of the students were in graduate school. They were very welcoming, happy to explain their projects to us in layman's terms, and able to answer our many questions. This was different from the speaker sessions, where I heard many unfamiliar acronyms, such as ADCP, GLOBEC, or OBS. Luckily our OES mentor, Dr. Todd Morrison, and our science teacher, Ms. Kathleen Neller, attended most of the sessions with us and were able to interpret and explain when needed.

Aside from the projects and sessions, my group and I were introduced to many people, including a lovely group of female college students from Canada and the chief scientist of NOAA, Dr. Sarah Kapnik, all of whom took the time to speak with us! With 35 countries represented at the conference, it was intriguing to hear the differences in how countries study the ocean and climate in their research and experiments. Being from a small barrier island town, that, being welcomed by and interacting with people from far and wide, with and without advanced degrees, had a very positive impact on me and my career goals.

Fenton McKown, Senior: For as long as I can remember, I've had a deep fascination with the study of nature. In recent years, I've been looking for ways to pursue a career in science, specifically biology, so when I was presented with the opportunity to attend an international ocean science conference, I immediately knew that I had to go. This conference was my first real taste of the scientific community, which I found is extremely welcoming. Everybody was so passionate about their work and enthusiastically willing to share what they have learned with us, even knowing we are still in high school. Being able to speak with scientists from other countries was one of my favorite parts of the conference. I found it very interesting to see how scientists around the world approach ocean science. I also found a great sense of unity in knowing that people from the complete opposite side of the planet have the same passion and drive to solve environmental issues as people here in the United States.

Talulah Morris, Katie Kilburn, and Fenton McKown enjoy breakfast at the end of a busy and successful week at OCEANS 2022 Hampton Roads.

Overall, the OCEANS 2022 conference was a fantastic introduction to the ocean science community. I think more kids my age should engage in opportunities like this one. Being welcomed by such a group is a really great feeling, especially in a field as crucial as this one. I hope one day I can present a paper of my own at this conference, explaining the research I will be doing with the phytoplankton club on the Outer Banks of North Carolina.

Talulah Morris, Sophomore: My first OCEANS will forever be one of the coolest things I've ever experienced. We were the youngest age group present and from that perspective, well, there are a LOT of topics that fall under the OCEANS blanket. The student poster projects were particularly fascinating and fun. The project by Jacquelynn Veatch, which looked at physical mechanisms in the marine food web ("it's a phytoplankton grocery store") was even pertinent for our own phytoplankton monitoring. That intrigues and inspires me in my own just-beginning studies of the role of plankton in the oceans of the east coast, specifically my own coast, the Outer Banks of North Carolina.

Living on a coastline, essentially a sandbar, we grow up swimming, fishing, surfing, and just enjoying the ocean. But now we are learning to look more closely, to study what actually happens below the surface and back and forth with the tides. The Phyto-Finders, with Ms. Neller and Todd and Hilary Morrison, have made this possible. And it's important for kids my age and younger to study marine biology, to try to understand and help protect the world we live in. It's all a cycle that connects to other cycles and to us. If we don't take care of one part, then another part will go off kilter, and then another, until they are all off. Then what do we do? Why not go ahead and try to fix our mistakes? We start by learning how we have affected our atmosphere and oceans. We start by learning about them before it's too late.

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Start planning your next OCEANS!

Save the dates for **OCEANS 2023, June 5-8** and join us in Limerick, Ireland.

The OCEANS conference is the flagship event of the IEEE Oceanic Engineering Society (OES) and the Marine Technology Society (MTS). The event is recognized as the premier forum for the international marine community to meet and discuss technical innovations and current trends in the marine technology sector. OCEANS brings together engineers, industry practitioners, government officials, public-sector executives, researchers and academics from all aspects of the oceanic spectrum.

OCEANS 2023 will be hosted at the beautiful University of Limerick campus, located on the outskirts of Limerick City. It is the first time that OCEANS will be held in Ireland. The event will feature all aspects of oceanic engineering, science and technology. The conference theme is **"Blue Ocean Planet Earth"**.

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