Welcome to OCEANS 2022 Hampton Roads
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Members are encouraged to submit copy highlighting 1) Chapter Events, 2) People & Company News, 3) Student & Young Professional News, 4) Technology Updates, or 5) other material of broad interest to the OES. Please send to Beacon Editor-in-Chief, Harumi Sugimatsu <harumis@iis.u-tokyo.ac.jp>. Word format, 1-1/2 space; Photos (always encouraged): jpg, 300 dpi preferred. Material becomes property of IEEE-OES. Please send e-mail or physical address corrections or updates to the EIC.

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Member Benefits—Did You Know?

IEEE members can take advantage of exclusive and discounted pricing on insurance and a variety of products and services (where available) that can add up to substantial savings. Discover what IEEE Member Discounts can offer you. (This program is offered exclusively to active IEEE members.)

Go to: https://www.ieee.org/content/ieee-org/en/membership/discounts/

IEEE Oceanic Engineering Society Newsletter, September 2022
Welcome to the September 2022 issue of the Beacon. As we mentioned in the last issue, the international participation in OES is certainly on the increase. This is apparent in the reports on the activities of the University of Zagreb Student Branch Chapter and the very active Malaysia Chapter. In addition, we have a great report from the NATO-STO Center for maritime Research and Experimentation (CMRE) on the OES sponsored RAMI 2022 robotics competition.

Although most of our committee meetings have been virtual, our ExCom and AdCom have been quite busy ensuring the efficient operation of our society in these trying times. Our issue begins with a report from our President, which is followed by reports from our VPs for Technical Activities (VPTA), OCEANS (VPO), Professional Activities (VPPO) and Workshops and Symposia (VPWS). The Journal EIC also provides a list of recently released papers that are available to our members.

As shown in our VP reports, there has been no slow down in planning our workshops, symposia, competitions and OCEANS conferences. And most of them are now returning to in-person events. Not only do they provide networking opportunities, but they help introduce our members to opportunities for professional advancement, such as participation in our technical committees as discussed in the VPTA report. A good example of committee activities can be found in this issue’s report by the Standing Committee on Standards.

Our OCEANS conferences are nicely coming together. The “springboard” approach from OCEANS 2021 San Diego to OCEANS 2022 Hampton Roads, and then to OCEANS 2023 Gulf Coast is working well. The latest from OCEANS 2022 Hampton Roads and OCEANS 2023 Limerick is reported in this issue.

Have you done something exciting lately? Received an award or professional recognition? Be sure to contact your editors about submitting an article. You’ll see good examples from two of our very active members in this issue’s Who’s Who in the IEEE OES and Member Highlights.

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.

By Harumi Sugimatsu and Robert Wernli
From the President

Christopher Whitt, OES President

The countdown is on to the next OCEANS 2022 in Hampton Roads, VA, USA! We are really excited to see you there. If you can’t attend in person, be sure to take advantage of the virtual program. Around the society, many things are happening. There are several workshops and symposia this fall and early next year. We look forward to hearing about the Singapore AUV Competition results soon. While things are not the same as before the pandemic, there are always many ways for us to connect as ocean professionals. Look for events in your local chapter, and virtual events around the world.

Over the past two years the UN Decade of Ocean Science for Sustainable Development has started in earnest. OES was represented this past June at the UN Ocean Conference in Lisbon by me, the VP Technical Activities and the Earthzine editor. We have been developing our own initiative for how OES will participate in the Ocean Decade; you can expect to hear more about this very soon! Information will be available at ieeeoes.org/oceandecade as it becomes available.

Many of our Ocean Decade activities have involved raising awareness about the massive needs and opportunities for research and innovation to support the science needed for the Ocean Decade. However, we expect that very soon we will start to highlight the many ways in which our members are increasingly providing that needed technology contribution to better understanding and management of the ocean. If your research or business involves innovation that does—or could—support ocean science and the Ocean Decade we want to hear about it!

Over the coming months we will have several Society events to look forward to. At OCEANS Hampton Roads we will announce our 2022 Award winners—look for information in the next Beacon issue. Also, at the October AdCom meeting we will elect our 2023 ExCom, which will set the leadership direction of the society for next year. Finally, the Providence Chapter has been diligently working for several years to get an IEEE Milestone recognition for the technology contribution of DSV Alvin. The unveiling of this milestone will occur Friday 21 October, 2022, at Woods Hole Oceanographic Institution, with OES executives and the IEEE President in attendance.

I’m proud to serve the Society and work with so many excellent volunteer friends and colleagues. There is always more to be done to serve our community and members, so if you want to contribute to the community, strengthen your professional network, and be involved in making OES happen, please email me or any Executive member at any time!

VPTA Column

Venugopalan Pallayil, Vice President for Technical Activities, IEEE OES

OES Colleagues,
Greetings!
I am happy to note that more and more conferences are now being organized in hybrid format (from its previous virtual counterpart) and this mode of operation may stay for some time. Many conferences in the Asia Pacific region had been dominated by participants from China and the ongoing travel restrictions have impacted the in-person attendance significantly. In July 2022 I had the opportunity to organize an international conference which saw almost all of the researchers from China presenting their papers virtually. Nevertheless, we had over 160 participants from other parts of the world attending in-person and it is a matter of satisfaction that the participants see a value in meeting face to face and networking despite the risks, though minimal, associated with the Covid-19 infection. Some details of the said conference have been covered in a separate article in this Newsletter under ‘Member Highlights’ for your reading pleasure.

We are in the third quarter of the year, and it is great to know that some of our technical activities, which have either been at a standstill or delayed due to lack of funding support, could get a renewed start. There will be limited funding available to the chapters, TCs and DLs in support of their technical activities. The details are covered in the relevant sections below. Unfortunately, the late availability of 2022 funds, which must be spent this year, has resulted in insufficient time to receive, and evaluate proposals. This should not be an issue in 2023.

Technology Committees (TC)
It is time to find new leadership for many of our TCs. The extended term of current TC Chairs ends on 31 Dec 2022. We would like to invite interest from the OES community for the
new 3-years term of TC Chairs starting from 01 Jan 2023. You will soon see a call for new TC Chairs by the TC Coordinator, and we hope to see great recommendations from our OES communities, especially from past TC Chairs. We also believe some restructuring of the TCs are inevitable; some inactive TCs will have to be disbanded and proposals for new TCs can be considered if they are relevant and not overlapping largely with the scope of current TCs.

As envisaged in our Policy and Procedures (PnP), TCs are the driving force for technology areas for OES and they have a duty to foster the development of their technology field of interest, to encourage applications in science and engineering and to ensure that benefits are delivered for the benefit of mankind. They have an active role in the Distinguished Lecture Program, in organizing and running technical session tracks at OES-(co)sponsored conferences and establishing single-stream Workshops and Symposia in conjunction with Chapters and other Organisational Units or OUs. So, make sure the nominees for the TC Chair positions will be able to discharge their duties well and as envisaged in the relevant PnP.

Limited funding is now available under the Technology Activity Funding (TCAF) scheme for promoting TC activity such as symposia and workshops. This year a funding support to the tune of 3.5K has been awarded to the Autonomous Maritime Systems (AMS) TC for the participation of a TC nominee in the IEEE/OES AUV 2022 Singapore Symposium.

Chapter Activities
As a follow up to my last Beacon report, we have sent out a call for participation of the chapters in the UN Decade of Ocean activities through the IEEE OES Ocean Decade initiative. Chapters will be awarded up to $2000 depending on the type of the activity proposed and its relevance to Ocean Decade. The deadline for the proposals is 31 Aug 2022, which would probably have passed by the time this issue of the Beacon Newsletter gets out. Nevertheless, I would like to encourage the Chapters to prepare their proposals for consideration for funding in the year 2023. A similar call for the year 2023 is expected to be out later this year. This would be a great opportunity for OES volunteers to contribute to a global cause and also get noticed among the international communities.

The chapter activity funding scheme (CHAF) for this year has some funds for disbursement. The funding is usually provided to chapters who plan to run short workshops and symposia under its umbrella. Due to uncertainties associated with the fund availability, the chapters were unable to plan for such events and hence make use of the funds that are now available for use.

Distinguished Lecturers (DL)
The call for new DL appointments ended on 31 July 2022. Unfortunately, only two proposals were received. One proposal came through a TC, while the other was received upon request from VPTA. The proposals will be evaluated by the DL Committee and, if found suitable, will be submitted for AdCom approval.

Funds to the tune of $2K are available for DL support. Chapters or organisers of DL could tap into this to provide limited short haul support or one night’s stay if such situations are warranted. Such funding support will have a cap of $500 per DL. Prior approval from VPTA should be sought before to ensure fund availability for the proposed DL activity.

UN Ocean Decade (2021–30) Conference
The second UN Ocean Decade Conference was held at Lisbon, Portugal, from June 27th to July 1st of 2022. Three OES members participated as IEEE (OES) representatives. These were the President, VPTA and Earthzine magazine Editor, who are also IEEE OES Ocean Decade Initiative Committee members. Participation in the conference helped to network with various stake holders and like-minded people and has resulted in opportunities for collaborations between OES and other scientific and industrial partners. A report on the related activities will be carried separately.

I am also happy to state that two of the IEEE OES activities, the IEEE/OES AUV 2022 Symposium, and the Singapore AUV Challenge, have been endorsed by the UN Ocean Decade Committee and are now listed on their website. This is significant because it increases the visibility of IEEE OES among the Ocean Decade community and in some ways an acknowledgement of our potential to contribute to the Ocean Decade program.

Feedback
What are your thoughts about IEEE OES Technical Activities? I welcome constructive suggestions and comments on VPTA activities. It would help to look at things from different perspectives and bring new ideas, and thus make our technical activities more appealing and useful. Email me at vp-technical-activities@ieeeoes.org.
Preparing to Meet our Members with Opportunities

Brandy Armstrong, VP Professional Activities

It’s been a busy year and I am ready to meet some more IEEE Oceanic Engineering Society (OES) members at OCEANS 2022 Hampton Roads. This year we have been focusing on strategic planning and member benefits. We have lots of great opportunities coming up for our members and volunteers.

OCEANS Members Reception

In appreciation of our members, we will be holding a member’s reception at OCEANS 2022 Hampton Roads. This is a great opportunity for our members to meet with Society leaders and learn how to get more out of membership and volunteering.

Senior Membership Drive

Our Membership Development Chair, Rajat Mishra, is planning a Senior Membership Drive at OCEANS. Senior member is the highest grade for which IEEE members can apply. Those eligible for Senior Membership should bring their resume and work with our senior member volunteers to apply at the OCEANS Society booth. We’ll help with the process; all you need to bring is your experience.

YP BOOST and WIE PROPEL

The application process will begin again this fall to select two new YP BOOST and WIE PROPEL laureates. Please keep an eye out for the call and encourage young professionals and supporters of women to apply. We will publicize the opportunity and the call at the YP and WIE Breakfast panels at OCEANS 2022 Hampton Roads.

Wondering What Our Laureates are Up to?

Our current YP BOOST laureates are involved in:

- Strategic planning
- Organizing WIE and YP breakfast panels at OCEANS
- Planet Positive 2030 (and initiative of the IEEE Standards Association)
- Ocean Decade ECOPS initiative
- Organizing Berths of Opportunity with Schmidt Ocean Institute
- Beacon and Earthzine contributions
- Promoting OES on social media

Our current WIE laureates are:

- Dr. Giulia De Masi is organizing a WIE panel at ROSE2022 (https://rose2022.ieee-ims.org/): “Women in Robotics and Engineering: challenges and possible paths during the early career and beyond.”
- Dr. Lu Ma held a symposium on “How to Promote Women to Play a Greater Role in the Field of Engineering Science and Technology.”

See More of OES, Online

Did you know that many of our special panels and programs have an online presence? You can find YP and WIE Panels, distinguished lectures, awards, testimonials and more at our IEEE OES YouTube Channel.

Do you know who are next YP BOOST or WIE PROPEL Laureate might be? Be sure to share the call for applicants this fall!
From the Vice President for Workshops & Symposia

Fausto Ferreira, Vice President for W&S

We are now in the busiest trimester of OES Workshops & Symposia as you can see in this article. In parallel, the Policies and Procedures for VPWS have been approved by the OES Administrative Committee (AdCom) and by the time this newsletter is out, I hope AdCom will already have approved the nominations for the Workshops & Symposia (W&S) Committee. Moreover, with OCEANS 2022 Hampton Roads coming up and most people returning to travel again, we are planning a meeting of the W&S Committee at OCEANS as well as a meeting with all OES conference organizers attending OCEANS. The latter one has the goal of improving the coordination of the different W&S, share experiences and best practices and hear suggestions for improvements from the organizers. Finally, I would like to encourage every member and colleague to attend the event that fits best their research/interest as there are plenty of options in several places, times, and formats!

Robotics for Asset Maintenance and Inspection (RAMI) Marine Robots 2022 Competition

The first RAMI Marine Robots competition was held at the NATO STO Centre for Maritime Research and Experimentation (CMRE) in La Spezia, Italy, from 10 to 15 July 2022. It was a successful competition after 2 years of COVID-related interruption. Please find a full report elsewhere in this newsletter. In addition, check the related virtual competition on object recognition in https://metricsproject.eu/inspection-maintenance/rami-cascade-campaign-marine/

Underwater Communications and Networking (UCOMMS) 2022

By the time you will be reading this, the 2022 Sixth Underwater Communications and Networking (UCOMMS) will already taken place in Lerici, Italy, from 30 August to 1 September. Over 30 papers are expected to be presented and over 80 people were registered at the time of writing. Three high-quality keynote talks on timely and interesting topics complement the technical program. The 10th anniversary of this high-quality single-track conference is marked by a commemorative plaque acknowledging the LOC efforts. The next Beacon edition will include a full report on UCOMMS. https://ucomms.net/

2022 IEEE OES Autonomous Underwater Vehicles (AUV) Symposium

The IEEE OES Autonomous Underwater Vehicles (AUV) 2022 is taking place in a hybrid format, both in Singapore and online from the 19th to the 21st of September, 2022. Over 40 papers are expected to be presented and over 70 attendees are registered at the time of writing. Three excellent plenary talks complement the technical program. http://auv2022.org/

This symposium will be followed by the Singapore AUV Challenge from the 23rd to the 26th of September https://sauvc.org/

Breaking the Surface (BTS) 2022

For the 14th year in a row, the International Interdisciplinary Field Workshop of Maritime Robotics and Applications—Breaking the Surface (BTS) 2022—will take place in Croatia. This edition is co-organized by the OES University of Zagreb Student Chapter and is being held from the 25th to the 30th of September in Biograd na Moru, Croatia. For all updates and photos during the event, follow the Facebook page https://www.facebook.com/BtSCroatia and the official website https://bts.fer.hr.

2022 IEEE International Workshop on Metrology for the Sea (MetroSea 2022)

The 2022 IEEE International Workshop on Metrology for the Sea (MetroSea 2022) will take place from the 3rd to the 5th of October in Milazzo, Italy. This is a conference co-organized by our OES Italy Chapter together with other IEEE societies. For more information check out the official website on https://www.metrosea.org/

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

USYS 2022 will take place from the 5th to 6th of December in Kuala Lumpur, Malaysia, and online. USYS 2022 is being organized by our OES Malaysia Chapter. The call for papers is now closed but if you are interested in attending you can register at an early-bird rate until the 19th of November. More details can be found on https://oes.ieeemy.org/about-us/ieee-usys-2022/

2023 IEEE Underwater Technology (UT)

The International Symposium on Underwater Technology (UT23) will take place from the 6th to the 9th of March, 2023, in Tokyo, Japan. The call for papers is open until 16 September so make sure you submit your abstract on time! A nice feature of this edition’s preliminary program is the Workshop on Career Path Benefits of AUV/ROV Competitions on the 6th of March. For more information check http://www.ut23.org/

Future Plans for 2023

As mentioned before, there are several confirmed workshops for 2023. Besides UT 2023, OES is supporting Breaking the
Surface 2023, to take place in Montenegro, and MetroSea 2023, to take place in Malta, making sure we widen our geographic reach and attract new people to our society. More news on these events will come at a later stage.

Finally, I would like to remind any OES members that wish to get involved in current workshops, or propose new ones, to contact me at vp-workshops-symposia@ieeeoes.org and check the updated guidelines on https://ieeeoes.org/conferences/workshops-and-symposia/. 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!

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**OCEANS 2022 Hampton Roads and After**

*John Watson, OES Vice-President for OCEANS*

The OCEANS 2022 Hampton Roads (Virginia Beach Conference Center, 17–20 October 2022) conference is now almost upon us. You may even be there by the time you read this. The Local Organizing Committee have pulled out all the stops to make this event a dynamic OCEANS. All the expected OCEANS content is there: the student poster competition, regular technical sessions, an up to the minute exhibition of industrial, commercial and academic companies and institutions. OCEANS kicks-off with its traditional plenary and keynote sessions featuring talks from senior academics, industrialists, those from government institutions and the US NAVY. The latest news from Hampton Roads is that both NASA and the US NAVY are helping to co-Chair specific sessions and meetings in the conference (more on this on the web-site). As is becoming the norm, this OCEANS will be hybrid in nature with a fine mix of on-line and live content. It is hoped that the recent world-wide relaxations in COVID-19 restrictions will allow a much higher number of registrants and attendance of in-person delegates. This will be a welcome return to some degree of normality! The call for papers has now closed so I hope you have managed to meet the deadline and have had your contributions accepted.

See the OCEANS web-site for the latest program/events and registration details. See https://hamptonroads22.oceansconference.org.

As we move into 2023, we have Limerick on the west coast of Ireland to look forward to in June 2023. The Limerick LOC (co-Chairs Daniel Toal and Edin Omerdic) are well ahead in their preparations for a very exciting conference. I am sure we can all look forward to some traditional Irish hospitality. Following that we will return to the Gulf Coast for the next North American OCEANS in 2023. The Gulf Coast is always a memorable event and many of you will have experienced several trips to Biloxi for previous OCEANS’ on the Gulf Coast.

As I mentioned in my last OCEANS review, I can confirm that the European 2025 OCEANS will be held in Brest, France and the 2025 North American OCEANS will be on the Great Lakes, in Chicago. The last time OCEANS was in Brest was in 2005 and was one of the first I attended as General Chair for the 2007 OCEANS in Aberdeen. OCEANS has never been to Chicago before and with the conference setting on the edge of the Great Lakes promises to be an exciting venue.

The General Chairs for Brest and Great Lakes are Prof René Garello, who is well known to many of you, and Hans Van Sumeren, respectively. We wish them both well in their preparations.

See you in Hampton Roads.
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:

- “Multilabel Classification of Heterogeneous Underwater Soundscapes with Bayesian Deep Learning”, B. Beckler; A. Pfau; M. Orescanin; S. Atchley; N. Villemez; J.E. Joseph; C. W. Miller; T. Margolina.
- “Active Underwater Target Detection Using a Shallow Neural Network with Spectrogram-Based Temporal Variation Features”, Y. Choo; K. Lee; W. Hong; S.-H. Byun; H. Yang.
- “Multipath Data Fusion with Recursive ML-PDA and Generative ML-PMHT for VLO Targets in Underwater Environment”, C. Franzini; F.A.N. Palmieri; P. Willett; Y. Bar-Shalom.
- “A Transformer-Based Regression Scheme for Forecasting Significant Wave Heights in Oceans”, P. Pokhel; E. Ioup; J. Simeonov; M. T. Hoque; M. Abdelgierfi.
- “Virtual Maps for Autonomous Exploration of Cluttered Underwater Environments”, J. Wang; F. Chen; Y. Huang; J. McConnell; T. Shan; B. Englott.
- “Compounding Approaches for Wind Prediction from Underwater Noise by Supervised Learning”, A. Trucco; A. Barla; R. Bozzano; E. Fava; S. Pensieri; A. Verri; D. Solarna.
- “Detecting Marine Organisms Via Joint Attention-Relation Learning for Marine Video Surveillance”, Z. Shi; C. Guan; Q. Li; J. Liang; L. Cao; H. Zheng; Z. Gu; B. Zheng.
Passing of Claude Brancart

Robert Wernli and Harumi Sugimatsu, BEACON Editors

Unfortunately, it has come to our attention that one of our most active members, Claude Brancart, passed away last December. Claude was a former AdCom member, our representative on the OTC Board, OES Secretary, Chairman of OCEANS ’96 MTS/IEEE and was OES President in 1997–1998. We will provide an article in the December Beacon that addresses his career and the significant impact he had on the OES. If you would like to add a personal comment, please send to your Beacon editors before the 14 November deadline.
IEEE Oceanic Engineering Society

2021 - 2022

2022 - 2023

2023 - 2024

ARE YOU OUR NEXT Laureate?

Apply for YP BOOST and WIE PROPEL Fall of 2022

HTTPS://IEEEOEES.ORG
Chapter News

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

Malaysia Chapter
3rd Multi-Object Collision Avoidance for a Riverine Autonomous Surface Vehicle
Reported by Zainah Md. Zain & Mohd Shahrieel Mohd Aras

The 3rd technical talk, organized by IEEE OES, was presented by Assoc. Prof. Ir. Dr. Rosmiwati Mohd Mukhtar, who is a Deputy Dean (Academic, Career & International), School of Electrical and Electronics Engineering, University of Science Malaysia. She is the former secretary of IEEE OES Malaysia Chapter. This talk was held on 19 May 2022, virtually in FB live at IEEE Oceanic Engineering Society—Malaysia Chapter. During the talk, she explained multi object collision avoidance for a riverine autonomous surface vehicle.

USYS’22: Kick off Meeting with Northwestern Polytechnical University China
Reported by Zainah Md. Zain & Mohd Shahrieel Mohd Aras

The 9th IEEE International Conference on Underwater System Technology: Theory and Applications (USYS’22) is a hybrid conference that will be held in collaboration with International Islamic University of Malaysia (IIUM) and Northwestern Polytechnical University, China (NWPU) on the 5 to 6 December 2022. This conference aims to provide a platform for researchers, scientists, engineers, academicians, and industrial professionals from around the world to share, discuss, and disseminate their current research and development activities and experiences in the field of underwater system technology, including relevant theories and applications. The 9th IEEE USYS 2022 focuses on developing new engineering strategies for the preservation of the oceans’ eco-system, as well as providing a specialized forum for discussing the future of underwater system technology. The 1st online meeting with all collaboration members including from NWPU has been held on 24 May 2022 via VooV. In this meeting, the USYS’22 planning and work flow has been discussed.

Research and Innovation Engineering Day 2022 (RADIATE’22)
Reported by Mohd Shahrieel Mohd Aras & Zainah Md. Zain

The RADIATE 2022 Committee, Faculty of Electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTeM) in collaboration with seven FKE Committees and the FKE student association (SAFEE) have successfully organized a program that was held for the first time, namely Research and Innovation Engineering Day 2022 (RADIATE’22). This program has combined 4 presentations of FKE student projects in Semester 2-2021/2022 which includes students of Year 2,3,4 Bachelor Degree in Electrical Engineering (BEKG), Bachelor Degree in Mechatronic Engineering (BEKM) and Diploma in Electrical Engineering (DEK) at FKE. This program was held face-to-face at FKE’s laboratories and administration building on 15 June 2022 from 8.30 am to 2.00 pm which ended with the Closing Ceremony & Prize Giving Ceremony.

This program is one of the evaluation instruments used in highlighting and unearthing the creativity and innovation of students. During the evaluation process, students’ soft skills,
project success and impact on industry and society were evaluated. RADIATE 2022 has handed out 35 RADIATE Awards which crown the 10 best projects from each category of FYP, IDP, ProDip and the 5 best projects from EPIC, while 17 Industry Special Awards which are contributions from RADIATE’22.

Recipient of special industry award (IEEE OES Malaysia Chapter).

Some of FKE UTeM students involved in RADIATE’22.

Upcoming Events: Underwater Robot Challenge 2022 & The IEEE 9th International Conference on Underwater System Technology: Theory and Applications (USYS’22)

The next event that has been planned is the Underwater Robot Challenge 2022 that will be held on 19 November 2022. This event is opened to all primary school and secondary school in Malaysia. Next, The IEEE 9th International Conference on Underwater System Technology: Theory and Applications (USYS’22) will be held on 5–6 December 2022. This is the 1st USYS conference that will be held after pandemic COVID’19 with hybrid mode (face to face and online) after USYS’20 has been cancelled due to pandemic.
A Fresh Look at Systems Engineering Methods for Ocean Observations

Stephen Holt, Christoph Waldmann, OES Standing Committee on Standards

Systems engineering is a well-known concept for engineers in different disciplines. It has moved into ocean sciences when the complexity has risen above a certain level, for instance in the planning and design of new observing platforms and systems.

The core of the concept is formed by the collection and documentation of all requirements and subsequently linking them to the context and the system components.

The field of Ocean Engineering embraces the practices of formal Systems Engineering as part of its process. As such, the IEEE Ocean Engineering Society Standards Committee cooperates closely with the IEEE Systems Council Standards Committee on matters related to Ocean Systems Engineering. The IEEE Systems Council Standards Committee does not produce new standards related to the discipline of systems engineering since this field is involved more with processes and methodologies than with a set of specific standards per se. However, these two IEEE Standards Committees can recommend, as guidance, specific documents, texts, guidelines, etc., related to employing systems engineering principles, which are commonly accepted in academia, industry, and government from various countries. A list of examples follows on their website at: ieeesystemsCouncil.org/standards.
IEEE OES OCEAN DECADE INITIATIVE

recent activities

- Ocean Decade Ambassador program
- Earthzine coverage of Ocean Decade event
- Ocean Decade Chapter funding
- Design the Future Ocean workshops
- Expert plenary talks
- Planet Positive 2030 campaign by IEEE

general activities

- Support Young Professionals (YP) of IEEE OES to engage with the UN Ocean Decade Early Career Ocean Professionals Programme
- Increase community awareness in coastal communities
- Facilitate the expansion of ICT into ocean observations, data assimilation, modelling etc. through workshops, and special events.
- Increase pre-university awareness high-school competitions relevant to Ocean Decade actions.
- Promote the engagement of developing countries in Ocean Decade activities.
ABOUT THE
IEEE OES OCEAN DECADE INITIATIVE

Vision
Increase Ocean Decade awareness and support the global ocean science and technology communities in achieving the Ocean Decade and Sustainable Development Goals.

Mission
Using OES as a resource for engineering expertise and a place to learn about technological advancements for “the Science we need for the Ocean we want”.

Project
Boot-strapping the participation of OES and our members in the UN Ocean Decade.
Promoting recognition of members and their activities that align with the goals of the Ocean Decade.
Creating incentives for members and OES communities to become aware and make others aware of the Ocean Decade.
IEEE OES OCEAN DECADE INITIATIVE

EXPECTED OUTCOME

Through this initiative, we expect,

- a majority of our membership to be aware of the Ocean Decade
- a measurable increase of awareness in conference attendees and exhibitors
- a significant number of presentations at our workshops and symposia that specifically address technology challenges posed by the Ocean Decade.

Elements of the initiative will be integrated into the normal operations of various parts of the society, including chapters, technology committees, workshops, symposia and the OCEANS conference.

THE OCEAN DECADE
10 Years. 10 Challenges. 1 Ocean.

1. Understand and beat marine pollution
2. Protect and restore ecosystems and biodiversity
3. Sustainably feed the global population
4. Develop a sustainable and equitable ocean economy
5. Unlock ocean-based solutions to climate change
6. Increase community resilience to ocean hazards
7. Expand the Global Ocean Observing System
8. Create a digital representation of the Ocean
9. Skills, knowledge and technology for all
10. Change humanity’s relationship with the ocean
The ‘Ocean Decade’,

is a ‘once in a lifetime’ opportunity for ocean actors across the world to come together to generate knowledge and foster the partnerships needed to support a well-functioning, productive, resilient, sustainable and inspiring ocean.

Oceans are our largest and most important ecosystem for human survival on Earth.
The United Nations Decade of Ocean Science for Sustainable Development 2021-2030 (referred to as ‘the Ocean Decade’) was proclaimed by the 72nd Session of UN General Assembly (UNGA) on the 5th of December 2017. The Decade is being coordinated by a small team (referred to as the Decade Coordination Unit - DCU) within the Secretariat of the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) in an effort to promote transformational, large-scale change to advance urgent action on moving from the ‘ocean we have’ to the ‘ocean we want’.

WWW.OCEANDECADE.ORG
OES Conference Calendar

Qianyi Yang and Muhammad Mohsin, OES Calendar Coordinators

OCEANS 2022 Hampton Roads
October 17–21, 2022
Hampton Roads, Virginia
https://hamptonroads22.oceansconference.org

OCEANS 2023 Limerick
June 5–8, 2023
Limerick, Ireland

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
AUV 2022
September 19–21, 2022
Singapore
https://www.auv2022.org

SAUVC 2022
In-Person, September 23–26, 2022
Singapore
https://sauvc.org

BTS 2022
September 25–October 2, 2022
Biograd na Moru, Croatia
http://bts.fer.hr

MetroSea 2022
October 3–5, 2022
Milazzo, Italy
https://www.metrosea.org

USYS 2022
December 5–6, 2022
Kuala Lumpur, Malaysia

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

Non-OES
RobotX Challenge 2022
November 11–17, 2022
Sydney, Australia
https://robotx.org/programs/robotx-challenge-2022/

Please contact us if you have any information about non-OES events that OES members are involved in.
NATO-STO Centre for Maritime Research and Experimentation (CMRE) has been organising Student AUV Challenge—Europe (SAUC-E), the premier European student competition for underwater vehicles, since 2010. Over the years, we have been fostering the use of heterogeneous robots in our competitions. In SAUC-E we have given teams the possibility to deploy also marine surface vehicles, introducing tasks that required robot cooperation. In fact, only teams composed of cooperative heterogeneous robots can be effective in solving complex tasks in real world scenarios. This interest led CMRE to locally organise the euRathlon 2015 Grand Challenge at Tor del Sale power plant site (Piombino, Italy) in September 2015. euRathlon 2015 Grand Challenge, organised in the framework of the euRathlon EU project, was the first world’s multi-domain robotics competition. Disaster response tasks were proposed to teams composed of land, sea and air robots. The inspiration came from the Fukushima 2011 accident.

This formula of multi-domain competitions has continued with the European Robotics League (ERL) Emergency. ERL is a common framework for robotics competition funded by the European Union. ERL was launched in 2016 in three vibrant fields of robotics: industrial, service and emergency robots. The first season culminated with the ERL Emergency 2017, a multi-domain competition again locally organised by CMRE at the Tor del Sale power plant site in Piombino. ERL Emergency 2018 and 2019 took place again in La Spezia and were planned to take place in 2020 and 2021 but the COVID-19 pandemic made it impossible to have physical competitions.

For 2022, we have started a new competition named Robotics for Asset Inspection and Maintenance (RAMI). RAMI is part of the ERL Emergency League and is organised in the framework of the EU-funded METRICS project (https://metricsproject.eu/) aiming at addressing Inspection & Maintenance (I&M) tasks achieved in risky and/or hostile environments where human intervention is challenging or impossible, where direct link with an operator could not be guaranteed and where autonomous decisions are necessary to reduce operational time of the inspection tasks and ensure repeatability while maintaining an appropriate safety level for the mission. RAMI competition has events for aerial robots, organised by CATEC (Spain), and for underwater vehicles organised by CMRE. RAMI 2022 is the first RAMI event which we have conducted at La Spezia in July 2022.

The Competition
CMRE hosted this year the RAMI 2022 robotics competition from 10 to 15 July after a two year interruption due to COVID-19 pandemic. The competition took place in CMRE water basin. The areas were prepared to simulate an Oil&Gas plant in a harbour connecting it to the general theme of the RAMI competition: inspection&maintenance (I&M). To support teams’ growth, we also proposed tasks similar to those present in ERL Emergency 2019.

Underwater robots were challenged to inspect a pipe structure, reach several waypoints and pass through a validation gate. In addition, several buoys of four possible colors had to be detected, localised and their colour recognised. A different action was requested of the teams depending on the buoy color: for instance, turning around the buoy in a clock-wise circle or stopping for 30 seconds increasing the depth. The objective was to force teams to integrate perception with adaptive mission planning in a realistic environment such as CMRE water basin. Finally, three manipulation tasks were added: staying into contact with the pipe, valve closing and picking up a stick bringing that to the surface in a controlled way. These tasks were the only ones allowed to be performed through teleoperation (ROV mode), while all other tasks had to be performed autonomously. As in the previous editions, the challenges were held at the CMRE waterfront sea basin, which is a sheltered harbor, providing participants with the opportunity to grapple with real-life sea conditions, including limited visibility and salty water, but within a safe, controlled environment. The limited visibility added severe difficulties to object recognition by AUVs, even if the targets were bright orange or red in color.

Nonetheless, several teams were able to tackle the tasks, achieving many goals. Out of the 4 marine teams registered, all tested their vehicles in the water. We tried to provide the teams as much time as possible to test their robots in the water basin.

Figure 1. The new vehicle developed by AUV Team TomKyle.
Only testing the robots in the water can allow teams to solve the technical issues and to prepare the robots for the proposed tasks. To support the practice at sea, a test arena containing the objects to be detected and one manipulation console was also prepared next to the competition area. This allowed the teams to collect data, for instance to acquire images of the colored buoys to train and test their classifiers.

We have noticed with pleasure that, despite the COVID-19, teams performance generally has grown over the past years. We have seen significant and steady progress in several teams and a constant look for improvement. The two top teams had accomplished several tasks, mainly in navigation, survey and manipulation. The rookie team managed to score some points as well. A fourth team had a significant hardware issue during the week that prevented full runs in the competition arena.

### The Participant Teams

This year 4 teams (of which one joint team by two universities) participated. Although initially more teams expressed their interest (including teams from the U.S.), uncertainty regarding COVID-19 travel restrictions made some teams cancel their participation. It is to be noted that after 2 years without competitions, some teams lost continuity as students graduate and there was no overlap between older generations and younger ones. This is why it is important to organise annual competitions, to support team participation and the succession with the required handover of experience. To start after the COVID-19 period, we think it is pivotal to involve people, to strengthen the community, contacting possible participants and sponsors. This year, we had the participation of two teams that had attended many of our past events. One team participated again in our events, after ERL17. A new team was also present. This was possible through a joint international venture, between two universities. This followed previous collaborations the two institutions had in the framework of the EUMarineRobots project, an EU-funded project aiming to make marine robotics infrastructures available to researchers for some specific projects. That team was mentored by a previous participant in SAUC-E 2012, which shows the virtuous circle of students participating in our events that later find a job in marine robotics and then become mentors. Of the competing teams, three had previously participated in our competitions, showing how ERL/SAUC-E is today a fixed appointment for several European research groups.

### The Participant Teams Were

1. **AUV Team TomKyle;** from the University of Applied Sciences of Kiel, Germany. This team has participated since 2014 in our competitions yearly.
2. **UNIFI Team;** from the University of Florence, Italy. A veteran of our competitions (first participation in 2012).
3. **OUBOT;** from the Obuda University, Budapest, Hungary. This team had participated in euRathlon 2015 and ERL Emergency 2017. In these competitions, they participated thanks to an AUV loaned by the organisation. This year, they participated with a robot they built.
4. **Black Pearl;** from the University of Pisa (Italy) and Jacobs University (Germany). This team participated for the first time and included graduate students from Italy and undergraduate students from Germany.

### The Winners

RAMI 2022 was a hard-fought competition for the three days dedicated to three different Task Benchmarks (TBMs): Pipeline area inspection on Wednesday, Intervention on the pipeline structure on Thursday and finally the Complete mission at the plant on Friday. AUV Team TomKyle and UNIFI Robotics Team challenged in the three TBMs, each one winning one TBM and having a draw in the Intervention on the pipeline.

![Figure 2. (Left) TomKyle detection and classification of a red buoy. (Right) An image of the manipulation console with a number to be recognised. The valve and the stick to be grabbed are visible.](image)

![Figure 3. Teams with their awards.](image)

![Figure 4. The winners with Gabriele Ferri.](image)

IEEE Oceanic Engineering Society Newsletter, September 2022
AUV Team Tomkyle was finally awarded with the first RAMI 2022 award, by evaluating the results in the three TBMs and considering the results in the presentation the teams gave to the judges about their robots.

The winners of the RAMI 2022 were:
• 1st Place—AUV Team TomKyle.
• 2nd Place—UNIFI Robotics Team
• 3rd Place—Black Pearl.

Other prizes awarded were:
• “Best Rookie Award”—Black Pearl.
• “Persistency Award”—OUBOT.
• “Best Presentation”—AUV Team TomKyle

Feedback
The feedback from both the participants and the judges was very positive. Teams reported good results in tasks, which are becoming harder and harder every year in order to support the gradual growth of participant teams and to push in some cases the state of the art. At the same time, it is felt the need to keep or create some simple tasks for the newcomers. We will try to achieve this trade-off in the future, to be attractive both for new entries, and for more experienced teams, which require more challenging tasks for developing and testing their capabilities. The realistic scenario, which attract participants, is also central to involve end-users and companies. This year, for instance, we had one judge from SAIPEM and one from ROSEN group. Following previous feedback, during the assessment of team performance, more points were awarded to achievements involving autonomy. This is thought to push teams to focus on autonomy and advanced perception. Results of RAMI 2022 showed good performance for autonomous navigation, mapping, imaging and tele-operated manipulation, while further work is needed for real-time perception and autonomy. This will be addressed in next year’s competition. Furthermore, to develop teams’ perception skills and algorithms, a virtual RAMI challenge is ongoing. In the virtual challenge we provide teams with an underwater image dataset for developing image processing software. This is also important since in the underwater domain there is lack of available datasets for developing and validating new image processing algorithms.

The Judges
This year we had a large pool of judges and visitors coming from all over Europe and the U.S. We are pleased to thank IEEE OES, Italian Army, Italian Navy, SAIPEM (Italy), ROSEN Group (Germany), Robonation (U.S.), Office of Naval Research (ONR) (U.S.) and the H2O Robotics (Croatia) who provided exceptionally qualified judges, increasing the quality of the competition. Dr. Fausto Ferreira (University of Zagreb, Croatia), the OES VP for Workshops & Symposia, was the Head Judge and visited us in the framework of the IEEE OES committee Marine Autonomous Systems Competitions Coordination (MASC2), working globally to standardise student marine robotics.

The local community was also engaged. Local schools from the La Spezia area were also involved in the framework of Giona’s Project. This allowed around 20 students close to high school graduation to come and interact with the teams.

Sponsors
As in previous years, IEEE OES played a fundamental role as the Main Sponsor. One of the RAMI goals is to educate future multi-disciplinary engineers. Therefore, the sponsorship of ‘Breaking the Surface’ 2022, the 14th Interdisciplinary Field Workshop of Marine Robotics and Applications, is well aligned with our mission. The organisers of ‘Breaking the Surface’ provided 1 complimentary registration to the best rookie team, 1 to the best team and 1 to the second best. These students will have the opportunity to participate in the 14th edition of this multi-disciplinary and educational workshop that, since 2019, counts with the IEEE OES sponsorship.

As in the past, we had again the marine robotics commercial sector involved. Blue Robotics gave a Ping echosounder to the team that won the Persistency award.

Our aim is to continue to develop RAMI as a unique event that challenges teams with realistic conditions, with an emphasis on precise metrological evaluation. These achievements were made possible thanks to the fundamental support of IEEE OES and all our other sponsors. We thank all the teams, judges, presenters, visitors, staff and everyone involved, who made RAMI 2022 such a successful event.
AUV SYMPOSIUM 2022, 19-21 SEP IS GOING HYBRID!
WITH BOTH VIRTUAL & IN-PERSON PROGRAMS
EARLY-BIRD REGISTRATION DEADLINE: 31 JULY
NOW ACCEPTING NOMINATIONS FOR AUV MID-CAREER RISING-STAR AWARD & LIFETIME ACHIEVEMENT AWARD
DETAILS AT AU2022.ORG
SINGAPORE AUV CHALLENGE is back

23-26 SEPTEMBER 2022
SINGAPORE POLYTECHNIC

DESIGN TO COMPETE.
DESTINED TO EXPLORE.

OCEANS 2023 Limerick

5 – 8 June, 2023
Limerick, Ireland
Blue Ocean Planet Earth

1000+ ATTENDEES, 500+ TECHNICAL PAPERS,
60+ EXHIBITORS, UNLIMITED OPPORTUNITIES
limerick23.oceansconference.org

IEEE Oceanic Engineering Society Newsletter, September 2022
2022 25.09. - 2.10.
Biograd na Moru, Croatia

BREAKING THE SURFACE
14th INTERNATIONAL INTERDISCIPLINARY FIELD WORKSHOP
OF MARITIME ROBOTICS AND APPLICATIONS

Registration for Breaking the Surface 2022
are now open at bts.fer.hr/registration

Early bird deadline: 1st July

> 140 ATTENDEES

25 LECTURES

10 TUTORIALS

5 PROGRAMME TRACKS

bts@fer.hr
bts.fer.hr
facebook.com/BTS Croatia
Submit the abstracts by September 16!

International Symposium on Underwater Technology
March 6-9, 2023
In Person Meeting (with webinar option)
IIS Conference Hall “Haricot” Tokyo, Japan
- Advanced Underwater Technology for the Ocean –
URL: http://www.ut23.org

The University of Tokyo is delighted to welcome international experts for the International Symposium on Underwater Technology (UT23). UT23 will provide you with a thematic umbrella under which attendees will discuss the problems and potential long-term solutions that concern not only the Pacific Rim countries, but the world in general.

Conference Scope
- Environmental Monitoring, Marine Robotics, Marine Mineral Resources
- Renewable Energy, Marine Construction, Observatory and Disaster Mitigation
- Fishery Engineering, Acoustics and Communications, Sensors
- Special Topic: Remote Observation and Cloud Computing

Important Dates
- Abstracts submission page open: April, 2022
- Deadline for Abstract Submission: September 16, 2022
- Notification of Acceptance: October 14, 2022
- Deadline for Paper Submission: December 9, 2022
- Deadline for Early Registration: January 20, 2023
- Symposium Dates: March 6-9, 2023

Organizers
- IEEE Oceanic Engineering Society (IEEE/OES)
- IEEE/OES Japan Chapter
- Institute of Industrial Science (IIS), the University of Tokyo
- Earthquake Research Institute (ERI), the University of Tokyo

Exhibition Opportunities

In conjunction with UT23, there will be a limited number of booths for technical exhibition. We hope you would take this opportunity to display your products at the symposium. There are also opportunities for supporting the symposium. For more information, please contact the secretariat at info@ut23.org

For more information about UT23, please contact:
- UT23 Secretariat: info@ut23.org

IEEE Oceanic Engineering Society Newsletter, September 2022
A Blast from the Past! ... Student Poster Competitions

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

A major effort in OES is to ensure that we have an excellent Student Poster Competition (SPC) at each OCEANS conference. Why? To expose these students to our society, the technologies that we address and introduce them to networking with other professionals. Does it work? It certainly does. As an example, AdCom member and our Technology Committee Coordinator, Shyam Madhusudhana, is shown in the below photo as he participated in the OCEANS 2010 Bremen conference SPC.

OCEANS 2010 Bremen—Norman Miller and students and young researchers Shyam Madhusudhana, Adrian Bodenmann, and Tania Lado Insua.

OCEANS '18 Kobe—Harumi Sugimatsu judging the poster of Christopher Tomaszewski.

OCEANS '21 San Diego—First Place Winner of the Norman Miller Award — Schuyler Nardelli, Rutgers Univ.

OCEANS '19 Seattle SPC judging.

OCEANS '11 Santander—Student Poster Winners.

OCEANS '10 Seattle—Student Poster Student Michael Shives and Norm Miller.
OCEANS 2022 Hampton Roads is on the Horizon

Ray Toll, OCEANS 2022 Hampton Roads Co-Chair

OCEANS 2022 Hampton Roads is just a few months away, and all the planning since 2017 is about to bear fruit. Our Local Organizing Committee is unusually large, strong and diversified, resulting in a true whole of government/community approach to our conference theme, COASTAL RESILIENCE: ADAPTING TODAY TO SECURE TOMORROW. Our schedule is getting full as interest remains high with close to 600 abstracts received and processed. We have an impressive list of speakers to set the tone for what should be a very productive and informative week for all attendees at the Virginia Beach Convention Center.

A few highlights that make OCEANS 2022 Hampton Roads unique:

• For the first time in conference history, NASA is playing a leadership role in conference planning and participation thanks to our NASA co-chair Laura Rogers.
• Also, for the first time, Atlantic Submarine Headquarters is playing an active role with SUBLANT Technical Director Dr. Marty Irvine as an honorary chair. Through his leadership, Naval Sea Systems Command and many Navy Labs are participating in some capacity.
• We are honoring the late Dr. Larry Atkinson, Old Dominion University Professor, who not only lead the nation in coastal resilience research and integrated ocean observing, but played a key role in both OCEANS 2012 Hampton Roads and this year’s conference.
• We have created the Educational Village on the exhibit floor, allowing Universities and NGOs, and small businesses to showcase their products and research in marine technologies.
• Among the special panels being organized, A Decade of the Oceans panel will address the cross-cutting themes identified by the UN Decade Committee.

Another key aspect to this conference is how we are promoting the mutual technologies and organizations from West Coast to East Coast, springboarding from OCEANS 2021 San Diego this past September to Hampton Roads, followed in 2023 by the Gulf Coast. For example, the US Navy’s largest fleet concentration areas exist in San Diego and Norfolk, followed by the Gulf Coast. A key priority for these conferences has been an attempt to link the problem areas and challenges identified in OCEANS 21 San Diego to potential solutions in OCEANS 22 Hampton Roads. The technical tracks and exhibits will therefore follow similar themes in both.

OCEANS 2022 Hampton Roads is a hybrid conference (in person and virtual), and supported by many schools in the region led by Old Dominion University.

We therefore expect a lively and informative conference with in-water demonstrations. We look forward to seeing you October 17–20, 2022.

Visit us at hamptonroads22.oceansconference.org for all conference information and updates.
The Oceanic Engineering Society invites you to join us at OCEANS 2022 Hampton Roads for the following Society sponsored events:

**Throughout the Week**

**Senior Membership** Drive at the Society booth

Learn about Ocean Decade Initiative opportunities at the Society Ocean Decade booth

**Monday, October 17**

Student Mixer 4:00-5:30*

**Tuesday, October 18**

OES Annual Meeting and Awards Ceremony

Special Panel: Engineering and Scientific Challenges of Ocean-Based Carbon Dioxide Removal

OES Members Reception

**Wednesday, October 19**

Young Professionals (YP) Breakfast*

**Thursday, October 20**

Women in Engineering (WIE) Breakfast*

Women's Leadership Luncheon and Town Hall*

We Hope you can join us! OCEANS 2022 Hampton Roads Registration Early Bird Deadline is September 12th.

*Co-sponsored with the Marine Technology Society
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".

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 4km 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 at OCEANS?

- 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

Contact us
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.
I have been an active member of IEEE OES for about 15 years, and I am thankful to the Beacon’s editors for giving me this opportunity to share a bit about myself. My career trajectory has been somewhat eclectic, and I believe retracing some of it would make for a good story here. Before that, let’s get some usual suspects out of the way—I like coffee, IPA, peaty single-malt scotch and mezcal; I listen to classic rock (Led Zeppelin, Cream), metal (Tool, Metallica, ACDC), grunge (Pearl Jam, Nirvana) and Carnatic music; I enjoy running, hiking, and I love to travel. 

Growing up in land-locked Bengaluru in south India, I couldn’t have, in the wildest of my fantasies, imagined a calling in an ocean-related discipline. In fact, it was only much later, in my thirties, that I even learned to swim. During my high-school years, having discovered that I was good at computer programming, I spent most summers learning new programming languages and developing computer games. It seemed like I was well poised to ride the wave (no pun intended) on the imminent software industry boom in India in the late 90s/early 2000s. After a bachelor’s in computer engineering, goals evolved and I moved to sunny San Diego, California, in 2005 to pursue a master’s in computer science. Within a year, I landed a job in a company that developed automatic speech recognition software. But it soon dawned on me that gigs in software industry weren’t going to be fulfilling in the long run. Also, I didn’t want to see myself surrounded by computer screens and keyboards for the rest of my life.

Fortunately, I did catch a whiff of the “outside world” during my master’s. And that, ... was compelling enough! My research thesis involved automating analyses of blue whale vocal activity in passive acoustic recordings from the Pacific. With random luck, I got on a research cruise, on a vessel managed by the Scripps Institution of Oceanography (SIO). My tryst with IEEE OES began in 2008, when I attended the OCEANS conference in Kobe, Japan, as a candidate in the Student Poster Competition (SPC), where I presented a part of my master’s research. After a second SPC participation, at OCEANS Bremen in 2009, I developed an appreciation for being involved with a professional society. Of course, the natural choice then was the OES. While working fulltime in the software industry, I continued to remain engaged with my master’s supervisor, Marie Roch, and other researchers at SIO. With weekends dedicated to playing cricket, I had to “find” time during weekdays to volunteer for OES. After helping resurrect OES’ San Diego Chapter, I served as its Secretary and Treasurer for two years. I was even involved in the early stages of planning San Diego OCEANS (2013).

My no-turning-back-now moment happened in 2012, when out of the deep blue (again, no pun intended), I received an email from a Christine Erbe—a name unknown to me at the time—with an offer for pursuing a doctoral degree in marine related research. Turned out that my continued engagement in this field did have its dividends, a huge one. Needing to move to Australia and switching disciplines to a profession that I had not much knowledge about, indeed made me anxious. But, needless to say, I went with the flow (sorry, this is the last one, I promise) and grabbed the opportunity. I completed my PhD, in applied physics, from Curtin University in 2016, and have since been very much engaged in ocean-related research. 

Whilst in Australia, I was looking to get back into being involved with OES. Along with Malcolm (Mal) Heron and a few others, I was involved in the formation of OES’ Australia Chapter in 2013. I also served as the Secretary of the new Chapter for three years. Following the completion of my PhD, I had a short stint as a research associate at the Centre for Marine Science & Technology, Perth. By this time, I had also

Who’s Who in the IEEE OES

Shyam Madhusudhana
Administrative Committee, Chair of Student Poster Competitions, Coordinator of Technology Committees

Engaged in my favorite sport—cricket. (San Diego, USA, 2007).

With my former supervisors, Marie Roch (master’s; right) and Christine Erbe (PhD; left) at a conference in St Andrews, UK, (2013).
gotten into using passive acoustic monitoring (PAM) technology in terrestrial applications. In 2017, after moving back to India, I joined the National Institute of Oceanography as a research associate, where I was engaged in project design and fieldwork planning. It was then that I become more heavily involved with OES. Thanks to Mal, the then VP of Technical Activities (VPTA), who had recognized my volunteer efforts (while in Australia), I was appointed as the Coordinator of Technology Committees, in 2018. Shortly after, in 2019, I was inducted into OES’ inaugural YP-BOOST program for young professionals. And, almost immediately, John Watson, who was then the Chair of SPCs at OCEANS conferences, passed on the baton to me.

It was in 2018, that I returned to USA; this time, to NY, for a postdoc at the Center for Conservation Bioacoustics, Cornell University. Originally hired to develop deep learning-based tools for PAM, I have since been engaged in a wide variety of projects—monitoring of endangered baleen whales in the Atlantic and Southern Oceans, developing novel cutting-edge solutions for the effective and efficient automation of analyses of hundreds of terabytes of underwater acoustic recordings, monitoring katydids in Panamanian forests and gibbons in east Asia, helping researchers in central Africa effectively monitor poaching activity, and data collection and assessment of underwater soundscapes around (both in time and space) US Navy’s ship-shock trials. As a scientist involved in multiple aspects of cross-disciplinary projects, I now also hold a document that calls me a ‘certified tree climber.’ I believe in open research, and I actively contribute to the global scientific community. One of my biggest contributions in recent years is the open-sourcing of the toolbox Koogu (https://shyamblast.github.io/Koogu), which facilitates rapid development of machine learning solutions in animal bioacoustics.

At present, I continue to work at Cornell University, and am engaged in multiple projects with global collaborations. Looking back, for someone that wanted to run away from a fulltime desk job, I couldn’t be happier with where I have gotten. If I am not at my desk coding and debugging programs, or volunteering for OES, you could find me either on a tree or on a boat.
Member Highlights

Contact the editors if you have items of interest for the society

International Institute of Acoustics and Vibration (IIAV) and International Congress on Acoustics and Vibration (ICSV)

Venugopalan Pallayil, VPTA (2021–22), IEEE OES has been elected as a member of Board of Directors of IIAV. His 3-year term starts from 01 Jan 2023. In this capacity he will be providing volunteer services to the IIAV community in its organizational matters. He was the General Co-Chair for the IIAV’s flagship conference, namely ICSV, held in Singapore during 25–28 July, 2022, at the Sands Expo and Convention Centre. The conference held in hybrid format had 162 in-person participants and over 200 virtual participants, largely from China. A couple of interesting aspects of this conference are two social events where the contributions from the members and session chairs are valued. There is a session chairs cocktail reception (including plenary speakers) and a ‘Member’s Nite,’ where the members of the society are hosted for a dinner and drinks. This was one of the ideas for proposing an OES member’s get-together during OCEANS 2022 Hampton Roads. Such activities can also be used for the promotion of memberships in our society.

The virtual sessions in this conference were held using pre-recorded author presentation videos, but with live Q&A sessions. Each virtual session was also handled by a session chair as if it were in the in-person conferences. 4 to 5 parallel sessions were run over two days to cover the virtual presentations. Most virtual presentations were from Chinese delegates as they were inconvenienced by the travel restrictions. The overall conference was run relatively well and largely accepted by the participants.
AdCom Election Results

The election results are in for the 2023–2025 Administrative Committee members. This year we had a great list of 12 candidates from around the world (see their bios in the last issue of the Beacon) and the results were very close. Congratulation to the following six candidates who were elected:

Welcome aboard. Now…let’s get to work!

Welcome New and Reinstated Members

**Australia**
- Kevin G Eastment
- Vijay Kumar Oad

**Canada**
- Duane Hawkins

**China**
- YuLin Bai
- Yuanbo Bi
- Zhihao Fan

**Egypt**
- Omar Mohamed

**France**
- Allan Badian
- Barbara Nicolas

**Colombia**
- Hilber Ricardo Lopez
- Moyano
- Astrid Daniela Pena
- Rodriguez
- Brian Rojas
- Juan David Rueda Quiroga

**Germany**
- Laura Meyer
- Giulio Sistilli

**Australia**
- Shyam Madhusudhana
- Nikola Miskovic
- Karen A. Panetta

**Canada**
- John Watson
- Albert (Sandy) J. Williams 3rd
- Stephen Wood
Introduction

It was a busy start of the year for members of the IEEE OES University of Zagreb Student Branch Chapter. As most COVID-related measures have been relaxed, many of the long-due field trials finally got completed. Field trials in bay Bistrina near Dubrovnik as part of the InnovaMare roadshow and field trials in Venice are just some of the sea trial events our members attended lately. Besides that, as every year we participated in the Croatian Festival of Science and took a prestigious award at the 13th International Agriculture Innovation Fair AgroArca in Prelog, Croatia. Most of all, we are excited that our small branch community is growing as visiting students joined our research group and happily shared their experience about working and staying in Croatia.

Field trials in Bistrina bay, Croatia, April 2022

As a part of InnovaMare project, a so-called roadshow demo event named “Transforming Blue Economy for Sustainable Adriatic Sea” was held on the premises of the Laboratory for Mariculture, University of Dubrovnik in Bistrina bay, Croatia. Our members Anja Babić, Nadir Kapetanović, Vladimir Slošić and Kristijan Krčmar prepared the equipment for the demos on site April 25th-28th, while the main demo event took place on April 29th.

The main objective of the demo was to showcase our autonomous vehicles capabilities and ongoing equipment integrations. This included the autonomous surface vehicle (ASV) Korkyra and its subsystems used in autonomous inspection missions, i.e., surveillance camera, integration with Blueye Pro...
ROV, a tether management system (TMS) for the ROV, a landing platform for a UAV, and WaterLinked UWGPS G2 system for acoustic underwater localization of the ROV.

In spite of the issues such as the punctured hull of the ASV Korkyra that was luckily detected on the first day and fixed right away on the next day, most of the performance tests went well. On Wednesday, April the 27th, while ASV Korkyra’s hulls were getting dried, we managed to have a secondary setup of the underwater acoustic system deployment, so a rubber boat acted as the baseline of the SBL system. This was followed by a successful integration of the GNSS equipment with the UWGPS G2 system for relative-to-global coordinate frame reprojections. Also, the TMS, controlled based on the measured distance of the ROV from the ASV, was successfully tested both on Wednesday and on Thursday, April the 28th, when the ASV was deployed in the sea.

The other main demonstration was that of the newly developed surface unit for the Multifunctional Smart Buoys project. The field trials at Bistrina marked the first deployment of the buoy unit, as well as another test for two previously deployed underwater acoustic sensor units.
The units were deployed in the bay for 3 days total, with the sensor units gathering water quality data and sending it to the surface unit, while the surface unit collected temperature, GPS, and camera data, and relayed all of the acquired information to an online dashboard for user-friendly visualization.

On the last day of our stay in Bistrina bay, Friday, 29th of April, we set up two nearby demo locations for our showcase. Autonomous buoys and sensor units were presented in front of the main building, while ASV Korkyra and its subsystems were showcased at the deployment location nearby. A large gazebo was set up to enable Anja and Nadir to show video streams and measurements from various subsystems on a large screen TV.
The attendees of the demo were very interested in all aspects of the equipment that was presented to them and wished to see these systems developed even further and hopefully even commercially available.

**Festival of Science, May 2022**

After two years of online events, we finally welcomed another live edition of the Festival of Science in Croatia. The Festival of Science is a manifestation that has been continuously organized in Croatia since 2003 with the aim of bringing science closer to the public through informing about activities and results in the field of science, improving the public perception of scientists, and motivating young people to research and acquire new knowledge. We were all born curious; as small children we wonder why the sky is blue and the grass is green, and when we grow up we become productive members of society. The yearning for additional knowledge and the stimulation of inner curiosity at all ages is a worthy goal for which the Festival of Science stands. The organizers of the Festival are Universities of Split, Zagreb, Rijeka, Zadar and Osijek in cooperation with the Nikola Tesla Technical Museum and the British Council, under the high patronage of the Ministry of Science and Education.

As it was the case in previous years, the IEEE OES UNIZG student chapter and the Laboratory for Underwater Systems and Technologies were happy to participate in one of the 200 or so events at this year’s Festival of Science with the theme—LIFE. As we all know, life on Earth began in water, and science and robots continue to make life easier and better every day. What is the connection between robots and water, what does the underwater world look like in virtual reality, and how robots can help fish and mussel farming were just some of the interesting topics participants could find out about at the Technical Museum Nikola Tesla. For those who were interested in how research robots were brought to life and how they became autonomous and wanted to try controlling underwater and surface robots, presentations were held at the LABUST laboratory at the Faculty of Electrical Engineering and Computing. Visitors of all ages got the chance of achieving a truly immersive experience and got a different perspective on life and science, because introducing science from a young age means in turn a better future for all of us.
The 13th International Agriculture Innovation Fair AgroArca, Prelog, Croatia, May 2022

Nadir Kapetanović and Kristijan Krčmar participated in the competition programme of the 13th International Agriculture Innovation Fair AgroArca. The fair took place in the small town of Prelog in Croatia, on 13–15th of May, 2022. It was organized by the Croatian Association of Innovators and the City of Prelog and gathered 130 exhibitors from 11 countries.

As a part of the HEKTOR project, they showcased the ASV Korkyra and its subsystems—the landing platform, the tether management system, as well as the acoustic localization system and Blueye Pro ROV integrations. Our colleagues from LAR-ICS laboratory at the Faculty of Electrical Engineering and Computing University of Zagreb showcased their all-terrain mobile robot (ATMR) ViV that is developed for autonomous inspection and spraying in steep karstic vineyards.

ASV Korkyra won the Grand Prix, while ATMR won the Golden medal. On that occasion, President of the Croatian Association of Innovators, prof. dr. sc. Miljenko Šimpraga commented on the importance of innovations in agriculture and especially emphasized the development of innovations in cooperation with the academic community. A total of 16 gold, 18 silver and 21 bronze medals in the categories of young innovators and senior innovators were awarded at AGRO ARCA 2022.

Intelligent Autonomous Systems—IAS-17 Conference Zagreb, June 2022

17th international conference on Intelligent Autonomous Systems (IAS-17) was held in Zagreb from June 13th to June 16th, 2022. The conference was organized by Intelligent Autonomous Systems Society, Faculty of Electrical Engineering and Computing, KoREMA, ACROSS and DATACROSS. At the conference, our member, Vladimir Slošić, presented the paper...
“Acoustical Underwater Localization of a Remotely Operated Vehicle in Mariculture” as one of the coauthors. At the beginning, project HEKTOR was presented and its main challenges, after that the integration of the catamaran Korkyra was explained and shown to the audience. At the end, results of the testing of acoustical underwater localization in the pool and at sea were presented and discussed. All the gathered data was made with the Waterlinked Underwater GPS system.

**Venice InnovaMare Trials, June 2022**

As a part of the InnovaMare project, joint field trials between project partners were held in Venice on 20–22 June. Anja Babić and Martin Oreč participated in the experiments as representatives of LABUST, joined by researchers from the Consiglio Nazionale delle Ricerche (CNR) in Genoa and Venice.

The main objective of the trials was to demonstrate the possibilities of cooperation in innovation on robotic and sensor solutions. Thus, the LABUST Multifunctional Smart Buoy surface unit and the CNR catamaran-like surface vehicle SWAMP (Shallow Water Autonomous Multipurpose Platform) were integrated into a single environmental monitoring and surveying system.

The vehicles communicated via Wi-Fi, with the buoy serving as a relay, sending collected data to an online IoT dashboard, providing real-time access to the status of the SWAMP catamaran as it went about an algae mapping mission.
The trials were successful and served as an excellent logistics challenge, offering opportunities to test and practice buoy deployment, retrieval, and mooring options in a variety of conditions, as well as a stress test for the buoy.

**Internship Story by Allan Badian**

In June our SBC got another member—Allan Badian from the Microelectronics & Automation department of engineering school Polytech Montpellier from Montpellier, France. He stayed with us for two months on an internship. Below is the story about his internship experience:

“To validate my 4th year of electrical & automation engineering studies, I carried out a 2-month internship at LABUST. It was my first experience with underwater robotics. I joined the team of Nadir Kapetanović to work on the Tether Management System (TMS) mounted on the autonomous surface vehicle (ASV) Korkyra developed in the scope of the HEKTOR project.

“I polished and refactored the code of the system, and also made a lot of tests in both computer simulation and pool tests with ASV and Blueye ROV in the laboratory. The TMS links the Blueye ROV to the ASV Korkyra and uses underwater acoustic localization (UWGPS) to track the ROV in order to wind/unwind the right amount of tether cable automatically.

“The first challenge was to achieve an in-depth understanding of the way that the TMS operates. As I was going through refactoring steps, I discussed with Nadir about some new ideas and features and a tracking method for the ROV in order to use the TMS motor less. It was really great to debate about what approaches were better to solve problems we had.

“The setup for the pool tests was a bit challenging because the acoustic localization is not as precise in an 8x4x3m pool (due to multipath issues) as in the open sea, but overall it worked quite well.

“During my time in Croatia, I also did a quick trip to Split. I spent time near Diocletian’s Palace, in the old town, and along the Riva promenade. I used one full day to join a group tour by boat to visit Komiža (island of Vis), Stiniva Cove, Budikovac and Town Hvar. Unfortunately, we couldn’t go to the famous Blue Cave because the waves were too big to enter safely.

“Finally, I really enjoyed working with the LABUST team and the project was interesting. It was a great introduction to underwater robotics. I also deepen my experience in projects, programming using ROS, microcontrollers and developing software in Linux OS. It feels good to realize and apply what I learned at school. I would definitely come back to Croatia some day!"

**Conclusion and Future Plans**

Finally, it was a busy but fruitful start of the year at the IEEE OES University of Zagreb Student Branch Chapter. All the hard
work finally got validated in pool and sea trials and experiment results got accepted or published in 10 conference and 3 journal papers this year. Beside presenting at the aforementioned IAS-17 conference, our members sent four of their publications to the upcoming 14th IFAC Conference on Control Applications in Marine Systems, Robotics and Vehicles (CAMS 2022) and five research papers to the OCEANS 2022 Hampton Roads conference, happening in October this year. Two papers got published in the April and May editions of the MDPI Sensors Journal, and another one got accepted for the Marine Technology Society (MTS) Journal.

In future plans, one of the biggest yearly events co-organized by our SBC, “Breaking the Surface 2022” workshop, is coming up from September 25th to October 2nd this year. As always, our members are preparing a dedicated social event night related to IEEE OES, many exciting demos and tutorials during the week-long workshop and a novelty of this edition - the Acoustic Localization Challenge. Participants of the challenge will be asked to locate a hidden submerged pinger using nothing but passive acoustic receivers. Teams are going to be guided by world leading underwater acoustics experts through lectures and tutorials on the topic, and the team that obtains the most accurate estimate of the pinger’s location will be awarded. More information about the whole event and registration options at bts.fer.hr.

**OTC Asia 2024**
Offshore Technology Conference Asia
Dates: 2/27/2024 – 3/1/2024
Venue: Kuala Lumpur Convention Centre (KLCC), Kuala Lumpur, Malaysia
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https://ieeoes.org/publications/ieee-journal-of-oceanic-engineering/

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DON’T MISS YOUR CHANCE
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".

limerick23.oceansconference.org