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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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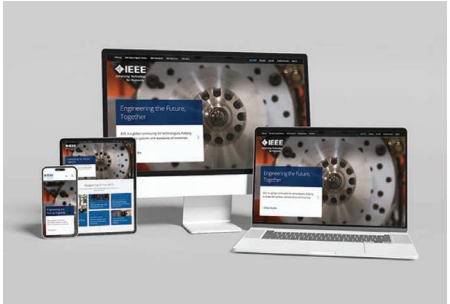
Member Benefits—Did You Know?

Trending News



Exciting News—New IEEE.org Website Is Live!

IEEE.org has been redesigned! Discover a faster and more engaging site with improved navigation, mobile responsiveness, and interactive features. It's built to help you connect, search, and engage with IEEE. This relaunch marks a milestone in IEEE's digital journey.

Check out the new website at ieee.org

From the OES BEACON Editors

Harumi Sugimatsu and Robert Wernli

Welcome to the September 2025 issue of the Beacon. As you'll see in this issue, the OES continues to be very active with excellent support to our student and young professional members.

Reports from our Executive Committee highlight recent and upcoming activities of the society and what we can expect this year and next. The VP for Workshops and Symposia describes the many events recently held, upcoming events this year, and next year's nine planned W&S, that are keeping the society active around the world. Our recent workshops, symposia and conferences that OES was involved in with articles in this issue include: IGARSS 25 in Brisbane, Australia; SusTech 2025, Santa Ana, CA, USA; Making Waves – a Marine Robotics Workshop, Singapore;

Our VP for OCEANS provides a detailed report on the recent OCEANS 2025 Brest conference. Also included is a call for OCEANS conference proposals for 2029-2030. Approved upcoming events include future OCEANS conferences scheduled for Sanya, China, and Monterey, California, in 2026, Aberdeen, Scotland, and Anchorage, Alaska, in 2027, and Adelaide, Australia, and San Diego, CA, in 2028.

Also included from OCEANS 2025 Brest are the Student Poster Competition (SPC) results including articles by the 1st, 2nd, and 3rd place winners and the winning SPC paper.

In addition, from the OCEANS 2025 Brest conference, are reports on the OES Chapter Chair's meeting, Technical Committee Chair's meeting, CNET 25, the Young Professional (YP) and Early Career Panel, YP and WIE Lunch Panels and the UN Ocean Decade Initiative Panel.

The VP for Technical Activities reports on the status and future of the OES Technical Committees and our Distinguished Lecturers (DLs). Reports on the three most recent DL lectures are included. There is also lots of activity ongoing as described in reports from our chapters including Victoria, Hong Kong, Taipei, Maylasia and a new chapter: Kochi Chapter, India. Our Student Branch Chapters are also very active, and we received the reports from ITT Delhi and a new Chapter: Southwest Petroleum Univ., China.

Our VP for Professional Activities gives us the latest on our Young Professionals (YPs) and our Women in Engineering (WIE) and member activities held at OCEANS 2025 Brest. Also included are plans for OES to participate in other upcoming events.

A report on the first OES Ocean Challenge that was held as a global competition is included. First place went to Dalhousie University, Halifax, Nova Scotia's submission, which is included. And don't miss this issue's report on our Who's Who in IEEE OES.

Upcoming workshops and symposia are listed in the Conference Calendar and the Journal EIC again provides a list of recently released papers that are available to our members.

Harumi at OCEANS 2025 Brest.

Bob speaking at the OCEANS 2017 Anchorage conference that has been approved to return to Anchorage again in 2027.

Have you done something exciting lately? Received an award or professional recognition? Be sure to contact your editors about submitting an article. And don't miss the Who's Who in OES article on one of our outstanding members in each issue.

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.

Executive VP Report—Top Tech 2025 in the Ocean

Malcolm Heron, Executive VP

The Administrative Committee (AdCom) is at the top of the management tree of the Oceanic Engineering Society and has the final say in running the society both at the strategic level and for day-to-day activities. Of course AdCom delegates all sorts of activities and planning to committees and working groups. Also, AdCom takes direction and advice from the mother ship IEEE; and in turn IEEE must comply with the terms of its registration as a Charitable Organization.

AdCom makes many decisions at two in-person meetings, and typically four virtual meetings each year. When these decisions change the rules, we have to revise the Bylaws – and sometimes the Constitution.

In its September meeting at OCEANS 2025 Great Lakes, AdCom will be asked to approve a Draft Revision of the Constitution. This will then go to IEEE Technical Activities Board (TAB) to check that it does not clash with IEEE rules. And then the draft Constitution will go out to you, the members of the Society, for a ballot. If you-all accept the revision then it becomes our Constitution. So, in this sense, it is you, the members, who make the final rules.

The Bylaws are also being revised to accommodate decisions of AdCom and also some matters that have been mandated by TAB. The latter, for example, include the decision by IEEE to grant Graduate Student Members the full benefits and responsibilities of Members. The draft Revision of the Bylaws will also go to AdCom in Chicago in September and, if approved, it will go to TAB to ensure that there is no conflict with IEEE rules. Then it is AdCom that will have the final approval of the Bylaws.

These legalities are not the highest career aspirations for this Executive VP, but they are essential for the smooth running of the Society. The involvement of AdCom at the highest level is very important and is to be respected. Each year OES appoints a group of six members who will serve on AdCom for a three-year term. Every member (i.e. all of you) will be asked to vote on a slate of nominees in the next couple of months. And before March 2026 there will be a Call for AdCom nominations for 2027. This is one way that you can step up into the running of the Society.

Please do return your vote – for the Constitution and for the AdCom intake commencing 1 January 2026.

VPTA Column

Shyam Madhusudhana, VP for Technical Activities

As we cross the midpoint of 2025, I'm pleased to share updates on the ongoing work under the Technical Activities portfolio.

We continue to make steady progress in implementing the updated structure and processes for our Technology Committees. One of the key changes approved last year was the use of concise and searchable keyword descriptions for each TC—intended to make their scopes clearer and more accessible. Unfortunately, the finalization of these keywords has been delayed due to slower-than-expected input from some TC Chairs. We are working closely with them to conclude this effort, and hope to have the final keyword list settled within the next month.

Following up on our earlier virtual gathering, the second TC Chairs meeting of the year was held in-person at the recent OCEANS conference in Brest, France. The meeting saw robust participation, and meaningful discussions on a wide range of topics. For those interested, I invite you to read a detailed summary of the meeting written by our TC Coordinator, M. A. Atmanand, featured in this edition of the newsletter.

As Atmanand's term as TC Coordinator concludes at the end of 2025, we are now looking for nominations to fill this key position. Both nominations and self-nominations are welcome. If you know of someone with the vision and energy to support and guide our TCs' activities, or if you are personally interested in the role, please send your recommendations to me in my capacity as VPTA.

Our OES Chapters remain vital for fostering regional activity and member engagement. I am delighted to report the approval of two new Chapters—one in Kochi, under the Kerala Section (India), and another under the Guangzhou Section (China)—expanding our presence in Asia. The Kochi Chapter wasted no time in organizing its inaugural event, which was notably attended by the IEEE President Dr. Kathleen Kramer and IEEE Past President Mr. Thomas Coughlin. You can find

more about this landmark event in the Chapter News section of this edition of Beacon.

The nomination/endorsement phase for the upcoming term of the DL program (2026–2028) concluded recently. I'm happy to report that we received ten nominations — a record number in recent years and a strong signal of interest from our global membership. The Distinguished Lecturer Committee will soon begin evaluating the candidates, and I aim to propose a final slate for approval at the next AdCom meeting, to be held during the Great Lakes OCEANS in September.

Once again, I extend my sincere thanks to all our Chapter leaders, DLs, and TC Chairs for their sustained commitment and contributions to the Society's technical activities. Let's keep the momentum going through the rest of 2025.

From the VP for Professional Activities—September 2025

Bharath Kalyan, Vice President for Professional Activities

OES had a strong presence at **OCEANS 2025 Brest**, held between 16–19 June, 2025, with a well-attended booth that attracted significant interest from attendees. The YP and WIE lunch panels were highly successful, drawing excellent participation and fostering meaningful discussions on professional development. The student mixer and members reception also saw high turnout, providing vibrant networking opportunities and strengthening the OES community spirit.

For the first time, OES also had a booth presence at the **International Geoscience and Remote Sensing Symposium (IGARSS)**, held from 3–8 August, 2025, in Brisbane, Australia. Alongside the booth, OES organized a special session and tutorial, further showcasing the Society's leadership in oceanic and remote sensing technologies.

Looking ahead, OES will deliver a society promotional talk at the European Symposium organized by the **International Network on Offshore Renewable Energy (INORE)**, which will be held in Aalborg, Denmark, from 15–20 September, 2025. In the same month, OES will also have a booth presence at the 7th International Conference on Ocean Engineering (ICOE 2025) at IIT Chennai, India, from 14–18 September, 2025, engaging with the ocean engineering community in India and promoting OES activities.

Figure 1. OES Members Reception at OCEANS 2025 Brest.

Figure 2. WIE Panel at OCEANS 2025 Brest.

A large team of OES volunteers are preparing for our flagship conference, **OCEANS 2025 Great Lakes**, in Chicago, from 29 September–2 October, 2025. Planned activities include a YP speed mentoring session titled *Career Paths in Ocean Science and Engineering—Academia, Industry, or Beyond* on 30 September, a WIE luncheon on 2 October focused on Boost Your Career with Mentorship & Networking, a student mixer on 29 September, and a joint OES–MTS member reception on 30 September. We look forward to meeting and greeting our members at OCEANS 2025 Great Lakes and to further strengthening OES's global visibility and engagement through these upcoming activities.

If you have any feedback, you can contact me at vp-professional-activities@ieeeoes.org. Thank you for your continued support.

Figure 3. Student Poster Competition Winners with SPC Chairs.

From the Vice President for Workshops & Symposia

Gerardo "Gerry" Acosta, VP for W&S

Dear friends and colleagues, I am so happy to inform you about the intense activity our OES is developing regarding the organization of workshops and symposia. As many times we repeated in every forum, our Society aims to be the home for people willing to share experiences, knowledge, and networking around the oceans, from a technological and scientific stand-point. This is why IEEE OES offers their members this great amount of opportunities for networking and learning, all over the world.

Since our last report, some workshops and symposia were held, many of them also reported in this number of the Beacon. They are commented in the sequel.

The *RAMI - Robotics for Asset Maintenance and Inspections - Marine Robots Competition 2025* was held in La Spezia, Italy (from the 29th of June to the 4th of July). Another meeting, in July and in Europe, was the *2025 Symposium on Maritime Informatics and Robotics – MARIS*, held in Syros, Greece, from June 26th to 27th with the hosting by the University of the Aegean.

In North America, OES supported the *2025 IEEE Canadian Atlantic Ocean Symposium (IEEE CAOS 2025)*, organized by local OES Chapter in Halifax, Canada.

Our Oceanic Engineering Society was also participating in the *IEEE International Geoscience and Remote Sensing Symposium IGARSS 2025*, held from 3 to 8 August, 2025, in Brisbane, Australia, sponsored by the IEEE Geoscience and Remote Sensing Society (GRSS). We have recently renewed an important and strategic agreement GRSS-OES.

For the rest of this year, in India, and hosted by the IIT Madras at Chennai, OES will be sponsoring the *7th International Conference on Ocean Engineering (ICOE 2025)* with a theme of Blue Economy and Sustainability, during the dates 14-18 September.

The *Symposium on Innovations and Technologies in Underwater Communications* will be held in New Delhi, India, during the dates 17-18 November, in a hybrid mode.

Metro Sea 2025, the IEEE International Workshop on Metrology for the Sea (https://metrosea.org/) will be held during October (8th to 10th) in Genoa, Italy. Our Society is giving a technical co-sponsorship to this event.

This November, from 9th to 16th we are supporting a new edition of the successful format of the *Breaking the Surface* event, in this case in Limassol, Cyprus. This seventeenth edition promises to be as great as the previous ones (https://bts.fer.hr/). Also in November, we are technically co-sponsoring the *2025 TechDef IEEE International Workshop on Technologies for Defense and Security*, to be held in Rome, Italy, during the 5th to the 7th of November.

For next December, we are waiting for the holding of the *2025 SYMPOL International Symposium on Ocean Technology*, from the 10th to the 12th, in Kochi, India. From OES we are also technical co-sponsors of it.

During the last Brest (France) Administrative Committee meetings, in occasion of the OCEANS 2025 Conference in June, we approved and supported a plethora of events for next year.

Symposium on Marine Robotics for Ocean Sustainability, will be organized in Abu Dhabi, in a date to be defined.

OES traditional and successful competition *Singapore AUV Challenge – SAUVC* will be held again during the first quarter of 2026.

The *Underwater Robotics: Hands-on Remotely Operated Vehicle (ROV) Workshop for Primary and Secondary School Students in Malaysia - ROV Workshop 2026* will be held in Malaysia, in May, 2026, to empower STEM education in schools. Also in Malaysia, and with similar objectives about motivating young students, but during October, the *Underwater Robot Challenge 2026 (URC 2026)*, will be organized also by the local OES Chapter.

In Halifax, Canada, a second edition of the Canadian Atlantic Ocean Symposium – CAOS 2026 will be held from 20th to 22th of July.

RAMI 2026 - Robotics for Asset Maintenance and Inspection, a marine robots' competition, is foreseen to happen in La Spezia, Italy, tentatively during July.

The *Underwater Communications and Networking conference (UComms 2026)*, a NATO-owned event co-sponsored by OES, will take place in Italy, during late August/early September, next year.

One of our most important symposia, the AUV 2026, will be co-sponsored with the University of Southampton, and will take place in this UK city, during September 1st – 3rd of 2026.

The *IEEE 11th International Conference on Underwater System Technology: Theory and Applications (USYS2026)* will take place during September, 2026, in China.

The 2026 edition of *Breaking the Surface (BtS)* will take place in Croatia in late September/early October.

Finally, a new edition of *MetroSea* will also take place in Croatia, during October 2026, with the support of OES.

As we can see, our presence and visibility are a tangible reality of our strategic plan, with concrete actions that are truly helping to advance technology for humanity.

If you wish to get involved in these workshops, symposia or conferences, or propose new ones, please contact me at vp-workshops-symposia@ieeeoes.org. In addition, keep in mind that our OES offers the possibility of both technical and financial sponsorship. In order to consider the latter in the budget, it is necessary to submit requests for support during the first half of the calendar year. Specifically, until the first days of June for the W&S that will be held during the following year. So,

requests for financial sponsorship should be made up to mid-May every year. On our website, there is a detailed guide for these presentations (https://ieeeoes.org/conferences/workshops-and-symposia/) and if you have any questions, do not hesitate to contact me. In particular, for 2027 events that need Administrative Committee approval, the next meeting will take place in Sanya, China, in occasion of the OCEANS 2026 (May 25–28), one of the flagship events of next year.

Have a safe and pleasant navigation and always tell me how I can help you!

VP OCEANS Report

Venugopalan Pallayil, Vice President for OCEANS (VPO)

Dear OES Colleagues,

Greetings from Singapore!

OCEANS 2025 Brest was held during 16th to 19th June 2025, and it was yet another successful conference. I will not go into the details of the conference organization as there are many reports in this edition of Beacon covering various activities that was carried out by our Society volunteers. I am happy to have contributed to this conference both as a keynote speaker as well as judging the Student Poster Competition. Some of our future OCEANS conferences, such as Sanya 2026, Monterey 2026 and Aberdeen 2027, were showcased at Brest as part of conference promotion.

We are fast approaching the OCEANS 2025 Great Lakes. This conference is a milestone in the OCEANS Conference series as it marks the end of a long-term partnership with Marine Technology Society (MTS), the other Co-Sponsor. On behalf of IEEE OES, I would like to thank the MTS leadership for supporting OCEANS over years and also contributing to make it the leading technical conference in the areas of marine science, engineering and technology. I hope that MTS will continue to contribute technically for our future OCEANS conferences as well.

Great Lakes will feature over 250 paper presentations, including posters and 12 Student Poster Competition (SPC) papers. The conference is planning 13 Town Halls as listed on the website here: https://greatlakes25.oceansconference.org/experience/townhalls/. A couple of tutorials are also being offered. One of the Town Halls will be organized by IEEE OES and is titled 'AI/MI Standards for Oceanic Sciences and Technologies.' The main idea of the townhall, as provided on the conference website, is to bring together a panel of interdisciplinary experts from industry, academia, and other sectors using AI/ML technology to discuss the grand challenges facing AI/ML applications to oceanic science and underwater technology. There will be close to 80 exhibitors from around the world showcasing their recent products and technologies. Registrations are picking up fast and as of last week we have close to 500 registrations. There was an initial apprehension on the success of this conference due to the restructuring of economic policies of the government and possible cuts in the Federal Grants that would see a hit at the participation level. Our North American Conferences have 75 to 80% participation from local delegates, and many used to be supported on the Federal Grants. However, the hard work put in by the LOC has made it possible to overcome many hurdles and gear things towards yet another seemingly successful OCEANS conference.

The OCEANS 2027 North American (NA) conference has now been confirmed. It will be held at the Dena'ina Convention Center, Anchorage, Alaska, during September 20-23, 2027. We held the first OCEANS at Anchorage in 2017, and it was the

Figure 1. Welcome sign at the Convention Centre, the venue for OCEANS 2028.

Figure 2. Mal is all excited about this welcome sign.

Figure 3. The Convention Centre is just a walk across the bridge from Oval Stadium.

third most successful NA conference after Washington DC 2015 and Monterey 2016. So, if you have missed the 2017 conference, here is a great opportunity to catch up at Anchorage. The AdCom held in Brest just before the conference had approved San Diego as the location for OCEANS 2028, North America. A call for future OCEANS for the years 2029 and 2030 has been included in this edition of Beacon. If you are passionate about running OCEANS, send your expression of interest before 30 November 2025 to VP OCEANS.

OCEANS 2026 Sanya preparations are progressing well. The call for abstracts is available elsewhere in the Beacon Newsletter. Similarly, preparations for OCEANS 2026 Monterey is also being progressed as required. From 2026 onwards, OCEANS conferences will be offering uploading of the posters to the IEEE Xplore database, if requested by the presenters. This will be a separate category of submission. We also encourage authors who have recently published their research output in Journal of Oceanic Engineering, or similar reputed journals, to share it with your fellow colleagues in all of our future conferences.

On my way to IGARSS conference in Brisbane, Australia, (a report on this has been provided separately in this edition of Beacon), I spent a day at Adelaide to visit the convention center facilities where the OCEANS 2028 will be hosted. Prof Malcolm Heron, one of the prominent LOC members, and also our Executive VP, joined me during this visit. We were touched by the warmth and hospitality extended by the Convention Centre management towards us during our visit. The venue has world class facilities with flexible space arrangements. We also explored the possibility of hosting the Gala dinner at the Oval Stadium (those who are cricket fans would understand this better) right across from the Convention Center and connected by the bridge.

From the Journal Editor's Desk

Karl von Ellenrieder, Journal Editor-in-Chief

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

- Yen-Pin Lin, Ching-Jer Huang, Sheng-Hsueh Chen. Evaluation of a GNSS Buoy with Real-Time Precise Point Positioning Ability for Monitoring Tides and Ocean Waves.
  https://10.1109/JOE.2025.3569341
- Andrea Trucco, Silvana Neves. Regularized PCA-Based Prediction of Wind Turbine Underwater Noise from Few Unbalanced Observations.
  https://10.1109/JOE.2025.3565788
- Guibing Zhu, Junhui Li, Yong Ma, Songlin Hu. FT-ILOS-Based Adaptive Fuzzy Path Following of USVs Under Input Saturation via Parallel-Self-Triggered Approach.
  https://10.1109/JOE.2025.3551038
- Wei Gao, Jin Liu, Jiamao Zhi, Zhongdai Wu. A Ship Tracking Method in Inland Waters Based on Fusion of Video and AIS Data.
  https://10.1109/JOE.2025.3550983
- Pengfei Yang, Yanhui Wang, Wei Ma, Wendong Niu, Yu Song, Qiutong Li. Fused Spatial–Temporal Graph Convolutional Networks for Ocean Currents Forecasting Using Underwater Glider Measurements.
  https://10.1109/JOE.2025.3573004
- Daniel Bosser, Gustaf Hendeby, Magnus Lundberg Nordenvaad, Isaac Skog. Broadband Passive Sonar Track-Before-Detect Using Raw Acoustic Data.
  https://10.1109/JOE.2025.3573066
- Zhiheng Chen, Yiqiang Dai, Shijun Wu, Canjun Yang. Active Pressure-Compensation Technology for Deep-Sea Fluid Samplers.
  https://10.1109/JOE.2025.3558814
- Sumit Ranjan Kumar, Ahmad Ali. Robust Controller Design for Ship Course Control in the Framework of Equivalent-Input-Disturbance Approach.
  https://10.1109/JOE.2025.3563608
- Mengna Liu, Xu Cheng, Xin Qin, Fan Shi, Tianwei Zhang, Houxiang Zhang, Shengyong Chen. A Novel Frequency-Based Global-Scope Adaptive Mixer for Sea State Estimation.
  https://10.1109/JOE.2025.3545221
- Chao Li, Xiaoming Cui, Haocai Huang, Yong Zhou, Min Xu, Siyuan Cang, Li He, Shuyuan Du, Hongxing Cui, Jinping Cheng, Ziwei Huang, Huayong Yang. A High-Responsivity

Subsurface Buoy System with a Fiber-Optic Acoustic Vector Sensor for Continuous Low-Frequency Acoustic Monitoring in the Deep Ocean: Development and Sea Trials.
https://10.1109/JOE.2025.3545248

- Junwoo Jang, Maani Ghaffari. Contrastive Learning in NMPC Behavior Cloning for Generalized Trajectory Tracking of Marine Vehicles.
https://10.1109/JOE.2025.3565046
- Yifan Wang, Jiang Zhu, Minhao Zhang, Xingbin Tu, Yan Wei, Hongde Qin, Fengzhong Qu. PBiGAMP-Based Joint Channel Estimation and Data Detection Under Nonuniform Doppler Shifts.
https://10.1109/JOE.2025.3565111
- Victor Villagran, Jose I. Cifuentes, Oscar Pizarro, Nadin Ramirez, Pablo Oliva, Kevin Hardy, Carolina E. Gonzalez, Osvaldo Ulloa. Versatile Data Acquisition and Control System for Free-Fall Underwater Vehicles: Exploring Hadal Waters.
https://10.1109/JOE.2025.3553884
- Jingjing Wang, Shuai Jiang, Meng Wang, Wei Shi, Lingwei Xu, Shefeng Yan. A Deep Learning Model for Marine Mammal Call Classification.
https://101109/JOE.2025.3559196
- Talmon Alexandri, Roee Diamant. Ship Underwater Radiated Noise and Automatic Identification System Track Association.
https://101109/JOE.2025.3568070
- Mingyang Li, Qian Ma, Chao Sun. Environmental-Parameter-Importance-Informed Robust Matched Field Processing in Uncertain Shallow Water.
https://101109/JOE.2025.3578696
- Mingyuan Zhang, Jun Tao, Liang. An, Broadband Beamforming Aided Symbol Detection for Single-Carrier Underwater Acoustic Communications.
https://101109/JOE.2025.3577434
- Evaggelia Nivolianiti, Yannis L. Karnavas, Florent Becker, Youcef Belkhier, Jean-Frederic Charpentier. Hybrid AC Shipboard Microgrid Time Delayed LFC and AVR Controllers Tuning Through Gazelle Optimization Algorithm and Real-Time HIL Implementation.
https://101109/JOE.2025.3576522
- Zhengyong Wang, Liquan Shen, Qiuyu Zhu, Pengyu Liu, Mei Yu. UMPAN: Multipriors Aggregation Network for Single Underwater Image Enhancement.
https://101109/JOE.2025.3577515
- Cong Zhang, Yaqi Tian, Tao Peng, Lei Kang, Fucai Hu. Experimental Study on the Acoustic Radiation Contribution of an Underwater Shell Based on the Reciprocity Principle.
https://101109/JOE.2025.3574564
- Shuai Yao, Qingyun Kuang, Qiwei Liu, Yixuan Zhang, Chenxin Xiao, Qisong Wu. Noise PSD Estimation Based on Time–Frequency Signal Presence Probability Sensing for Noncooperative Underwater Acoustic Pulse Signal Enhancement.
https://101109/JOE.2025.3573787
- Ao Zhang, Zhuo Wang, Hongde Qin, Yifan Xue. Underactuated Autonomous Underwater Vehicle Time-Varying Formation Consensus Control with Multiple Actuator Constraints.
https://101109/JOE.2025.3573794

Young Professional and Early Career Panel at OCEANS 2025 Brest
Exploring Career Paths in Ocean Science and Engineering: Academia, Industry, or Beyond. – A Speed Mentoring Session

Sridhar Krishnamoorthy, Karen Rojas, IEEE OES YP BOOST for 2025–2026

The **Young Professional and Early Career Panel held during the OCEANS 2025 conference in Brest**, France, on **17 June**, brought together a diverse and dynamic community of emerging ocean professionals and seasoned experts. Hosted at the Le Quartz Conference Centre, this special lunchtime session was organised by the IEEE Oceanic Engineering Society (OES) and the Marine Technology Society (MTS) to provide early-career researchers and students with an engaging platform to explore career opportunities in ocean science and engineering. With over 40 enthusiastic participants in attendance, the panel offered valuable guidance, inspiration, and direct mentorship across academic, industry, government, and entrepreneurial pathways.

The session featured the presence of several OES representatives, including both OES Leadership, such as Elizabeth Creed (OES President), and former OES Young Professionals, such as Francesco Maurelli and Filippo Campagnaro. The session was also attended by part of the current OES YP-BOOST Ambassadors (Gaultier Real, Karen Rojas, Marvin Wright, and Sridhar Krishnamoorthy) that coordinated the preparation and execution of the event.

The Panel opened with a warm welcome and an insightful presentation by **the moderator, Chris Ostrander, CEO of MTS,** who shared his professional journey, tracing his evolution from marine scientist to organisational leader. He

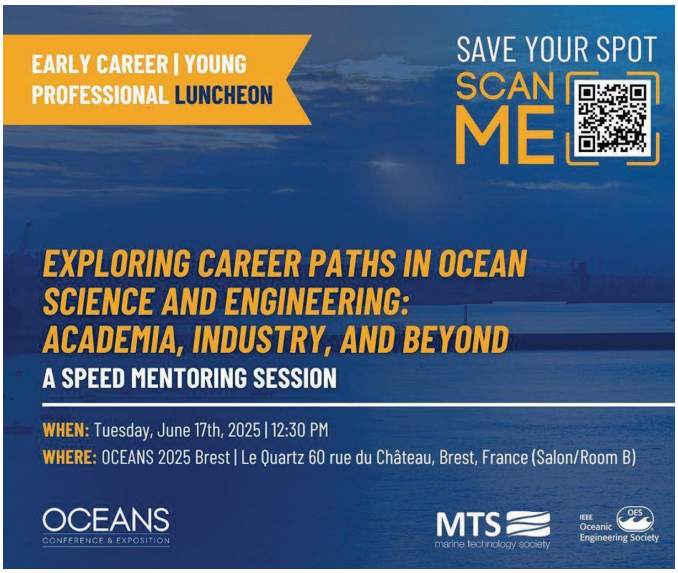


Figure 1. Young Professional and Early Career Panel at OCEANS 2025 Brest.

emphasised how careers in ocean engineering are rarely linear and highlighted the importance of adaptability, mentorship, and active involvement in professional societies. His reflections set the tone for an afternoon of candid storytelling and knowledge exchange.

The panel featured a distinguished group of professionals, each representing a unique sector within the ocean science landscape. **Justin Manley, President of Just Innovation Inc.**, brought a powerful perspective from the world of philanthropy and entrepreneurship. He shared his personal experience of resigning from a secure position in pursuit of more meaningful work—an emotional and professional leap that underscored the importance of aligning one's career with passion and purpose. Justin's story resonated strongly with attendees who may themselves be contemplating change or seeking greater fulfillment in their careers. He also spoke about the challenges of work-life balance, particularly when building a career that spans multiple roles and responsibilities.

Amy Gibson, Project Manager at Subnero, represented the industry and startup sector. She spoke about the unique environment of innovation-focused companies and the collaborative nature of startup culture. Drawing from her hands-on experience, Amy discussed how success in such roles requires not only technical expertise but also adaptability, cross-functional teamwork, and an open-minded approach to problem-solving. Her story was particularly inspiring to those interested in emerging technologies and entrepreneurial ventures within the blue economy.

From academia, **Dr. Francesco Maurelli, Associate Professor at Constructor University**, is a former OES YP-BOOST ambassador and currently serves on the OES AdCom. He provided valuable insights into life in higher education and research. He spoke about the balance between teaching, publishing, grant writing, and mentoring students. Francesco also emphasised the importance of global exposure, interdisciplinary thinking, and academic perseverance. His experience helped demystify the academic pathway and clarified the expectations and rewards of a career in education and research.

Joining from the government research sector, **Dr. Gaultier Real, Senior Scientist and Project Leader at the NATO Centre for Maritime Research and Experimentation (CMRE)**, and one of the active OES YP-BOOST ambassadors, offered an impactful perspective on the world of defense and government-led marine science. Gaultier shared his experience working in high-stakes, collaborative international projects, highlighting the importance of scientific rigour, cross-border cooperation, and navigating the interface between research and policy. His reflections on adaptability, long-term vision, and the fulfilment that comes with public service deeply resonated with many attendees interested in government and institutional research roles.

After the speaker introductions, the session transitioned into the highly anticipated Speed Mentoring Roundtables. The audience, comprising over 40 participants, was divided across roundtables as each panelist rotated through the room over three dedicated rounds. Each round allowed approximately 8 minutes of direct conversation between the panelists and small groups of attendees.

The discussions were focused yet wide-ranging, built around five thematic pillars:

Figure 2. Chris Ostrander, CEO of MTS and session moderator, commenced the event with a presentation on his professional journey, followed by formal introductions of the panelists.

Figure 3. During the speed mentoring session, each panelist was seated at a separate table, engaging in focused discussions with participants in a rotating format.

Figure 4. Group photograph taken during the Young Professionals and Early Career Panel at OCEANS 2025 Brest, featuring some participants from diverse backgrounds, including students, early-career researchers, and young professionals.

- **Career Pathways** – Advantages, expectations, and transitions across sectors.
- **Skills & Competencies** – Must-have technical and soft skills for success.
- **Opportunities & Challenges** – Funding, innovation, and global ocean trends.
- **Mentorship & Networking** – Role of IEEE OES, MTS, and peer networks.
- **Work-Life Balance & Adaptability** – Strategies for growth without burnout.

These intimate conversations provided participants with the opportunity to ask specific questions, seek career advice, and gain real-world insights in a format that encouraged openness and connection. The rotation enabled each attendee to interact with multiple panellists, thereby fostering diversity in thought and experience.

This panel was not only a knowledge-sharing forum—it was an incubator for inspiration, collaboration, and community-building.

Key outcomes from the session included:

- **Clarity and Confidence:** Attendees gained a clearer understanding of career options and actionable guidance for pursuing their goals.
- **Mentorship Connections:** Many left with meaningful mentor-mentee connections to carry forward beyond the conference.
- **Engagement in Professional Societies:** The value of societies like IEEE OES and MTS was reinforced, encouraging more young professionals to join, lead, and contribute.
- **Recognition of Diversity in Journeys:** Every career is unique, and the stories shared helped normalise non-linear, exploratory paths.
- **Empowerment:** The event empowered early-career professionals to take ownership of their careers, embrace uncertainty, and seek interdisciplinary growth.

The session concluded with a group photo, capturing the vibrant energy and collective commitment to shaping the future of ocean science through collaboration, mentorship, and community.

This powerful session exemplified what can happen when experienced leaders generously share their stories and young professionals are given space to engage, ask, and grow. Events like this not only inspire but also activate the next generation of ocean engineers, scientists, and change-makers.

Upcoming Call for New OES YP-BOOST Ambassadors

The OES YP program provides an opportunity for young professionals to become involved in the Society, expand their professional network, and take advantage of the variety of activities that the OES offers. One of the possible activities to join is the YP-BOOST Ambassador Program. OES YP-BOOST Ambassadors actively participate in the leadership of the Society. They are responsible for the YP events held at each OCEANS Conference, including development of the event content, advertising and hosting the event itself. They can also attend the Society's Administrative Committee (AdCom) Meetings as observers, are responsible for the content of the quarterly OES YP Newsletter, are encouraged to participate in one or more of the OES Technical Committees (TCs), and assist with other Society activities as needed. These activities provide the YP Ambassadors with leadership experience, exposure to facets of oceanic engineering outside of their area of expertise, and an expanded professional network.

The application process for YP-BOOST Ambassadors opens on September 15 and closes on October 31 at 11:59 pm UTC of each year. Successful candidates will be immediately immersed in OES activities and if funding permits, they will attend 2 events each year (OCEANS and/or Workshops/Symposia) at OES expense.

You could be one of the next OES YP-BOOST Ambassadors, if interested have a look at the OES YP page. In case of any questions, please contact the OES YP Coordinator, Roberto Petroccia (young-professionals@ieeeoes.org).

Next Event at OCEANS 2025 Great Lakes

We are excited to continue the momentum at the upcoming OCEANS 2025 Great Lakes Conference, which will feature another engaging session tailored specifically for Young Professionals (YPs) and Early Career Ocean Professionals (ECOPs). This next event will once again bring together a diverse group of early-career researchers, students, and thought leaders from MTS, IEEE OES, and the Great Lakes Local Organising Committee. Attendees can look forward to inspiring discussions, mentorship opportunities, and interactive networking designed to support and accelerate careers in ocean science and technology.

Stay tuned for announcements, and be sure to register and participate via the official OCEANS 2025 Great Lakes website: https://greatlakes25.oceansconference.org

IEEE OES is calling future leaders!

BECOME AN IEEE OES AMBASSADOR

Apply now to become an IEEE OES Young Professional or Women in Engineering Ambassador.

APPLY HERE!

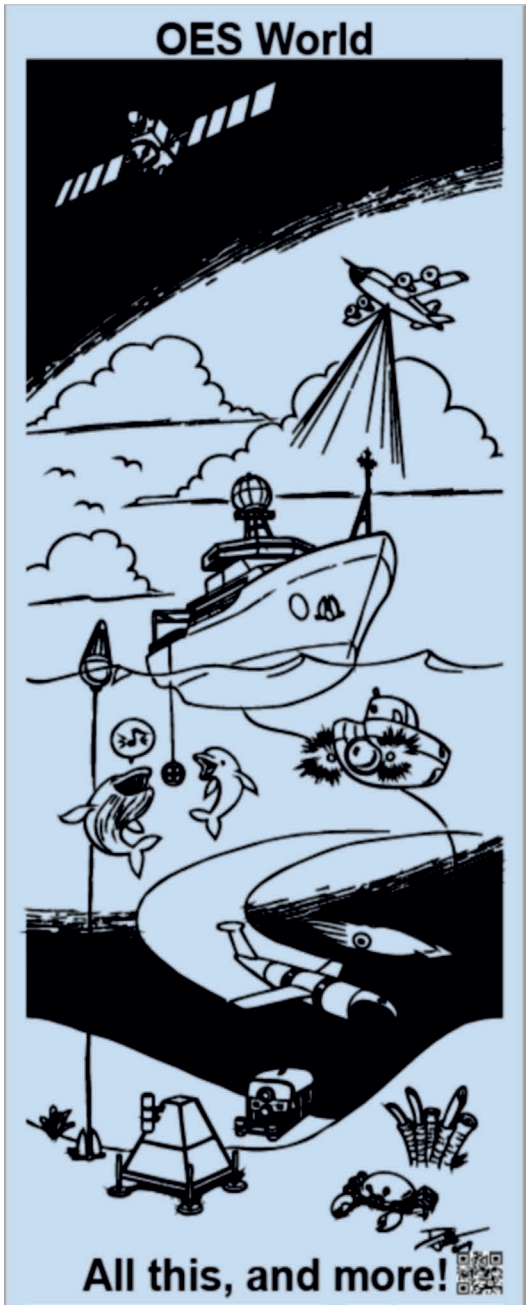
- ✅ Gain mentorship from global leaders
- ✅ Build your professional network
- ✅ Represent your peers on the international stage
- ✅ Make a lasting impact in oceanic engineering

One ambassador will be selected per program, for a two-year term beginning in January. Candidates are selected in December of the preceding year.

Boost your career. Amplify your voice. Lead the future of oceanic engineering

Application Deadline: October 31, 2025 11:59 PM UTC

IEEE Oceanic Engineering Society



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Chapter News

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

Victoria Chapter

Tour of Ocean Networks Canada (ONC) Engineering Facility

Reported by Nicholas Hall-Patch, OES Victoria Chapter Treasurer

Ocean Networks Canada (https://www.oceannetworks.ca/) is an ocean observing organization, which is an initiative of the University of Victoria. It is responsible for extensive underwater cabled observatories, as well as mobile and community-based observing networks, which provide large amounts of ocean-related data to scientists in Canada and around the world, as well as providing oceanographic information to the general public. A map of the networks on Canada's Pacific Ocean coast can be seen in Figure 1, portraying hundreds of kilometres of subsea cable that convey power to underwater nodes as well as providing fibre optic Internet connections to thousands of sensors attached to those nodes.

The responsibility for designing and maintaining this extensive underwater network and its accompanying instrumentation is in the hands of the Observatory Physical Operations department, with engineering work taking place at the Marine Technology Centre north of Victoria, BC.

Seven members of the OES Victoria Chapter were fortunate to be given a tour of the workshops and staging areas of the ONC facilities at the Marine Technology Centre on 21 May 2025, hosted by Matt Tradewell, Associate Director, Observatory Physical Operations at ONC. Matt's time was much appreciated, as the facility was in the midst of preparing equipment that was to be deployed from two different ships, both for maintenance of the NEPTUNE (**N**orth **E**ast **P**acific **T**ime-series **U**ndersea **N**etworked **E**xperiments) observatory offshore from Vancouver Island, as well as for other oceanographic deployments.

The group first toured the indoor workshops, being shown commercial instruments such as ADCPs that were to be attached to observatory nodes. These nodes (example Figure 2)

Figure 1. Map of infrastructure from ONC website.

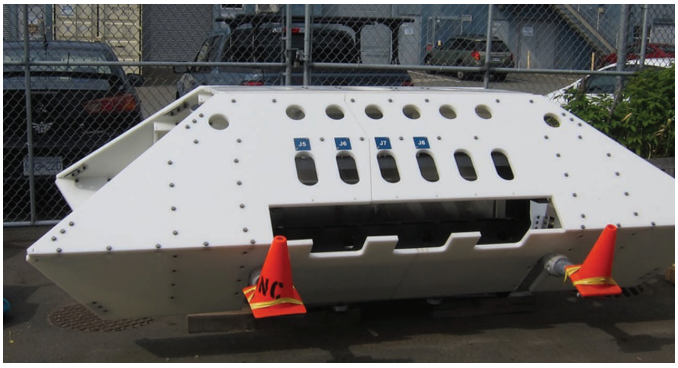


Figure 2. Science Node Housing.

are powered with thousands of volts DC from land, converted to 400 volts DC within the node, and then to voltages suitable for the attached instrumentation.

The Chapter members were also shown equipment that was not part of the observatories, but provides additional oceanographic data for ONC. For example, flow-through water monitoring systems that had been installed, along with weather stations, to two of the ferries that connect Vancouver Island with mainland British Columbia. These were fitted into the ships' hulls, and now provide high resolution oxygen, temperature, salinity, turbidity, and chlorophyll data while the ships are underway. There was some discussion of problems found with adding similar systems to newer ferries as some hull designs are more prone to entrain bubbles, which then corrupt the resulting data.

The tour continued through areas where returned instrumentation was prepared for further deployment. Discussion here was about problems of biofouling on pressure cases during long periods underwater, and how much effort in the past had been required to clean up the cases before a new deployment. The engineering group now encases pressure cases in PVC shrink wrap tubing which not only resists biofouling to a degree, but can be easily renewed with new shrink tubing after removing the old wrap and disposing of it along with the accumulated growth.

With so many sensors to mate with various underwater nodes, underwater connectors and cables are a big concern for ONC. The engineering facility now pots connectors onto cables themselves, using in-house 3-D printed molds, rather than subcontracting out the work, and the tour was able to examine some of the results of this technique.

The group then progressed into the outdoor staging area where a frame with instrumentation was being prepared. In addition, the Chapter members were able to examine equipment deployed in a 175,000 litre saltwater tank, as well a large vertical profiler system designed for ONC (Figure 3), which releases a tethered float from a frame on the sea floor, taking

Figure 3. Fixed Vertical Profiler System.

measurements at various depths, then reels the float back down, to wait for the next release.

As this was a group with a great deal of experience with underwater hardware, there were a number of interesting discussions concerning ONC's work throughout the tour (Figure 4), so it was a stimulating way to spend a portion of an afternoon.

Figure 4. Matt Tradewell discussing a deployment with the group.

Hong Kong Chapter

Hong Kong IEEE CT/OES Joint Chapter runs the Young Engineer Conference (YE-24) at the Hong Kong Saint Francis University

Reported by Paul Hodgson (Hong Kong Chapter Chair) and Lorenz Gonda

The YE-24 conference marks the fifth edition of the Hong Kong IEEE CT/OES Joint Chapter Pre-University Student Conference, a significant platform for young innovators. Originating in 2020 with YE-19, this year's event took place at one of Hong Kong's newest Universities, Saint Francis University (SFU) in Tiu Kin Ling near Tseung Kwan O. Apart from a very large nursing faculty, the university is a leader in AI projects and new application technology.

Figure 1. YE-24 Conference Poster.

Figure 2. The Saint Francis University (SFU) located at Tseung Kwan O.

For those not familiar with the conference, The Hong Kong CT/OES Joint Chapter provides a chance for students to pursue a real-life problem of their interest. They begin by initiating research on their chosen topic, and are then guided through the process of producing three things; a poster, presentation, and paper. Successful completion earns them IEEE credentials,

enhancing their university applications and providing a published paper on ResearchGate.To promote innovation, students are essentially given free rein in what they pursue. However, at the CT/OES, we want to reduce the impact humans have on the planet, particularly ecosystems, and so there are two simple pieces of criterion kept in mind. One, the slogan from IEEE, which is "Advancing Technology for Humanity," and two, the United Nations Sustainable Development Goals. With this in mind, the conference program has been building momentum and increasing quality projects since it was conceived. Momentum has been building in terms of the number of presenters and schools involved.

The Goals of these projects.

Students collaborate in teams of up to four or work independently. They can operate as a school based or independently. The students select a topic of interest and present a Research Question and draft abstract (without results) to the conference vetting committee. Once approved, the student then works on the project. Criteria for YE-24 conference acceptance were that the project should be in-line with the United Nations' 17 Sustainability Development Goals and the students should apply or advance technology to address the problems facing Humanity. Basically, the IEEE motto: *"Advancing Technology for Humanity."* General project organization is carried out by members of the HK CT/OES when requested or needed.

The space concept projects continued with more CubeSat applications as well as a more intensive project using the NASA JOVE Radio Telescope. Local projects included more work on determining the location of the calderas of the super volcano beneath Hong Kong. ROV projects included a DC powered servo motor claw, and a special tool fitted to an ROV for rock sampling in flooded mining passages. New sensor projects included a coral bleaching/blanching sensor based upon the CoralWatch principle. New computer hardware design ideas showed a simple quantum computer based on light, and Thomas Young's double slit experiment, was first carried out in 1801. The result was a quantum level random number generator. Impressive for a 14-year-old school student. Lucas is currently contemplating a desktop fusion reactor. Other key projects included a new non-invasive sensor for breast cancer, a way to become biologically carbon neutral, and an easy way to collect mineral samples in a narrow water-filled mining shaft.

The conference, held on November 23rd and 24th, 2024 was inaugurated by Professor Anthony Chan, Dean of CIS. Father Arturo De La Turre gave a keynote speech that emphasized technology's ethical responsibilities and the pivotal role of students in shaping the future. Followed by HK CT/OES Chairman Paul Hodgson, with a talk on the history of the Young Engineer's Conferences and the future of the Future Explorers. Lastly, it ended with a special message from Professor Ray Cheung, Chairman of IEEE HK Section.

Figure 3. CIS Dean and Department Head Professor Anthony Chan.
Figure 4. Father Arturo De La Turre. (L to R).

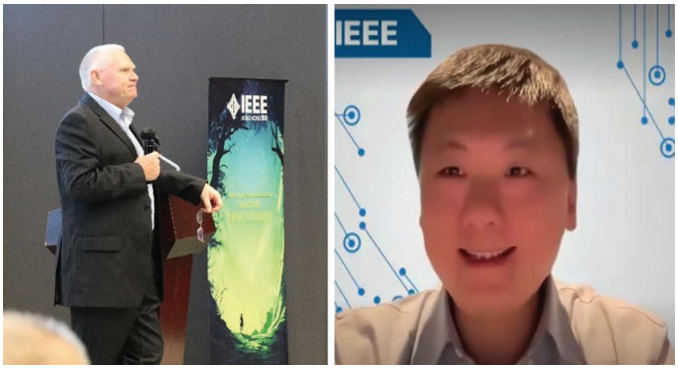


Figure 5. HK CT/OES Chairman, Paul Hodgson.
Figure 6. Professor Ray Cheung Section Chairman of IEEE HK Section. (L to R).

The diversity of projects in YE-24 continued from past years and covered a very wide range of topics addressing many of the issues that humanity currently faces. The list is below:

1) *Simple Quantum Computer*
2) *Hong Kong Super volcano's earthquakes*
3) *Domestic CubeSat*
4) *Arduino powered CoralWatch Sensor*
5) *Sleep Inducer*
6) *Measuring gravity waves*
7) *JOVE Telescope – Jupiter Storms*
8) *Bird Calls – daily changes in pitch*
9) *Traffic Lights – making them more intelligent*
10) *ROV Servo Grabber using 12VDC control*
11) *Mineral collection using ROV and collector*
12) *Biologically Carbon Neutral using mangroves*
13) *Hoi Ha Wan Moon Island Coral Health*
14) *Hoi Ha Wan fish population revisited*
15) *Skin Cancer detection*
16) *Breast cancer detection*
17) *Axial Chirality for making medicine*
18) *Calories detector for health*
19) *Photovoltaics on buildings*

20) *Using Peltier to generate electricity*
21) *Traffic Issues at ISF with solutions*
22) *Maximizing storage in domestic and industrial locations*
23) *Exoskeleton for enhancing human performance*
24) *Intelligent road crossings*

YE-24 showcased a diverse array of projects addressing pressing global issues. Over the past five years, 126 projects and 179 presenters have participated. This student-driven project / problem-based effort has generated some interesting statistics. These are shown in the right column:

The total gender make-up is just under the one third ratio normally reported in technological industries, so there is no surprise there. This suggests that perhaps even more effort is needed to close this gap. The per year data shows that this is possible. The project selection data has also been included in

Figure 7. Judge Prize and Credit Recognition to the Holistic Innovation School.
Figure 8. Project Distinction to the Saint Paul's Co-education School. (L to R).

Figure 9. Maximizing Volume: An Intelligent Approach to Packing Items demonstration from the SKH Tang Shiu Kin Secondary School.
Figure 10. YE-24 closing conference celebration. (L to R).

Figure 11. Use of Capacitor Antennas for Gravitational Detection in Hong Kong presentation from ISF school.
Figure 12. Servo ROV Gripper with Conventional Motor Control from OCL school. (L to R).

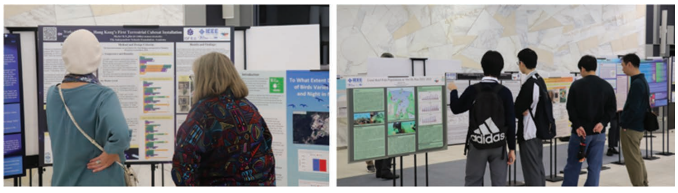
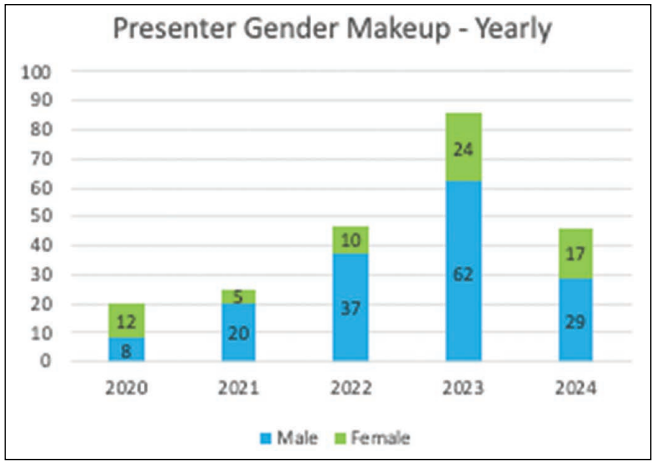
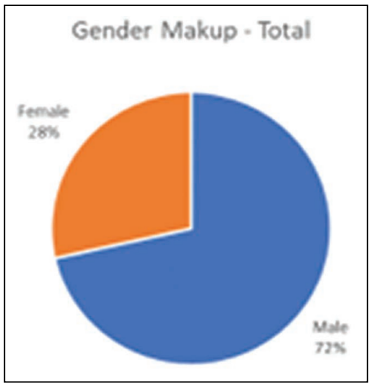
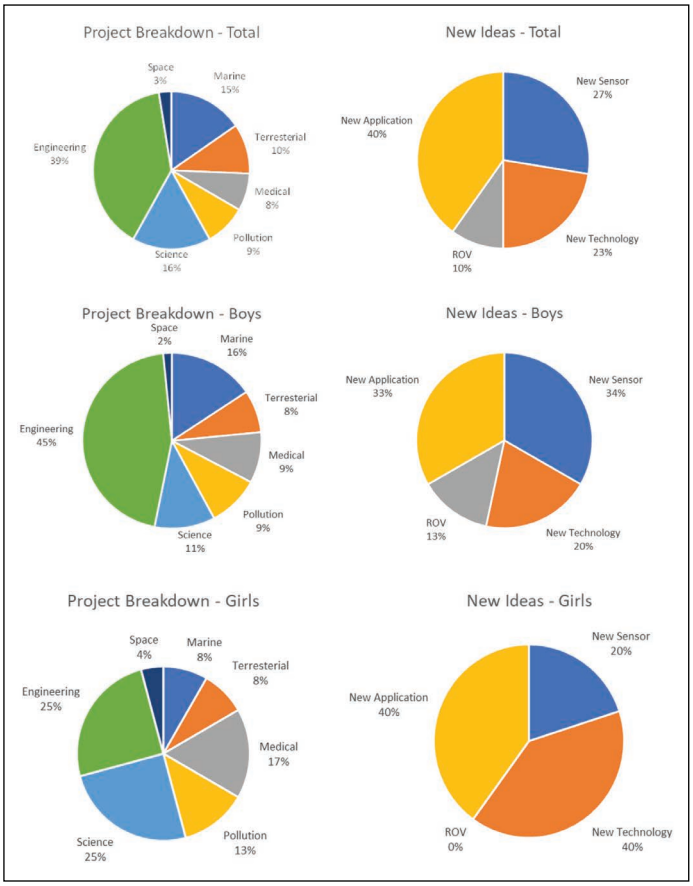


Figure 13. YE-24 poster setup 1.
Figure 14. YE-24 poster setup 2. (L to R).







an attempt to show the topics that concern the current young generation.

This data gives a great insite into the types of issues the younger generation are interested in. The surprises were the lack of general interest in projects involving pollution. The reason given was that many people are already working on that issue so effort needs to be directed elseware. Males were more inclined towards engineering projects with the females more interested in science. Females were more engaged in space projects, but were not interested in developing new technology for ROVs. These data will help guide our awareness effort for future conference projects.

The HK CT/OES Joint Chapter is very grateful to Saint Francis University for allowing us to hold this conference at the Tseung Kwan O Campus and gave us a lot of support to make it a great two days for everyone.

The YE conferences have significantly impacted student engagement with IEEE, offering various benefits that extend their learning experience. Key motivations for students include:

1) **IEEE Certificates:** These validate their participation and achievements, enhancing their university applications.
2) **Conference Attendance:** Participation in IEEE conferences provides networking opportunities and exposure to real-world engineering challenges.
3) **Published Papers:** Students can showcase their research, making their applications stand out, especially for engineering programs. Universities nearly always inquire about the project and the paper during admissions, emphasizing their importance.

These elements help students understand how IEEE can further their careers. Many express interests in joining student chapters at universities, with some planning to serve as Chapter Officers, contributing to the IEEE community as they study abroad.

Key Statistics (2019–2024)

- **Membership Growth:** Over 400 new members have joined IEEE through the YE conferences. (Latest known – Lall Ravi – May 2025)
- **New Student Chapters:** 6 student chapters have been established by former ROV or YE participants (1 in Australia, 3 in Asia, 2 in the USA).
- **Leadership Roles:** The current IEEE OES Australia Secretary, Leo Chiu-Leung, and 7 Chapter Officers have emerged from these initiatives.

Since 2019, YE program papers on ResearchGate have achieved a Research Interest Score of 314.5, ranking in the top 20% among members. They have accumulated 25,623 reads—36.54% as full-text reads and 24.98% as other reads. Additionally, they have received 255 citations (37.53% of engagement) and 14 recommendations (0.9540% of total). Currently, 56 papers are published, with 28 pending, showcasing ongoing contributions to research and scholarly communication.

The increase in membership created by this activity highlights the increasing importance of the YE program within IEEE. This growth reinforces the organization's role in shaping future engineers and leaders, as the YE conferences not only enhance learning but also foster lasting connections within the IEEE community. For pre-university programs, participation begins before individuals can directly join the organization, allowing them to benefit from the IEEE network. This conveys a powerful message about IEEE's goals and its role within the community.

Special mention and thanks for the hard-working people who made the event happen, particularly, Professor Anthony Chan, Dr. Cheung Chi Keung, William, Arokiasamy Lourdusamy, Lorenz Angelo Aguila Gonda, CHENG Chin Kuen Kenny ……Johnathan Yung, Cheung Tsz Yee, David Irah Aguila Gonda, Kin Fung Sze, Lee Kit Chow, Tsang Ching Man, King Zhang, Lam Yu and Tony Pang.

Looking ahead, the next conference, YE-25, is tentatively scheduled for November 22nd–23rd, 2025. Project submissions are now open; for details, visit www.hkctoes.com.

Join us in celebrating the innovation and dedication of our young engineers as they continue to explore the frontiers of technology for a sustainable future!

Taipei Chapter

IEEE OES Taipei Chapter Announces Leadership Transition

Reported by Jen-Hwa Guo, Secretary of Taipei Chapter

The IEEE Oceanic Engineering Society (OES) Taipei Chapter announces a leadership transition effective June 2025. The Chapter extends its sincere gratitude to outgoing Chair Professor Forng-Chen Chiu for his dedicated service and leadership, which has strengthened the Chapter's activities and fostered collaboration in ocean engineering and technology, particularly in naval architecture and underwater vehicles.

Dr. Chen-Fen Huang, Professor and Director of the Institute of Oceanography at National Taiwan University, has been elected as the new Chapter Chair. Professor Huang brings extensive expertise in ocean acoustic tomography, underwater signal processing, and geoacoustic remote sensing. Her internationally recognized research encompasses acoustic current mapping using moving vehicles, statistical inference of

Leadership transition of the IEEE OES Taipei Chapter (left: outgoing Chair Professor Forng-Chen Chiu; right: incoming Chair Professor Chen-Fen Huang).

seabed properties, and advanced sonar signal processing for marine applications.

Professor Huang's distinguished career includes Fellowship in the Acoustical Society of America, the prestigious Medwin Prize in Acoustical Oceanography, and service as Associate Editor for IEEE Transactions on Aerospace and Electronic Systems. This combination of academic excellence and professional leadership positions the Chapter for continued growth and innovation.

Under the new leadership, the Taipei Chapter will strengthen its commitment to advancing underwater acoustics and marine technology innovation while fostering both international and local collaborations. The Chapter aims to enhance student participation and professional development opportunities, ensuring the next generation of ocean engineers receives strong support.

Additionally, the Chapter will work to showcase Taiwan's significant contributions to global ocean engineering through technical forums, workshops, and networking events. The Chapter looks forward to building on its strong foundation and continuing to serve as a vital hub for the ocean engineering community in Taiwan and throughout the Asia-Pacific region.

OES New Chapter Establishment – Kochi Chapter

Dr. Sooraj K. Ambat, Chair, IEEE Kerala Section OES-Kochi Chapter

Inauguration of IEEE Kerala Section OES-Kochi Chapter

The IEEE Kerala Section OES-Kochi Chapter was officially inaugurated on 22 July, 2025, at Le Méridien, Kochi. This landmark event marked the formal launch of the OES Kerala Chapter, strengthening the presence of OES in India and providing a new platform for oceanic engineering professionals and enthusiasts in the region.

Despite an unavoidable last-minute change in venue, the event saw enthusiastic participation from over 60 IEEE members and a large number of students, reflecting the strong interest in ocean science and technology across Kerala.

Key Guests and Program

The inauguration was carried out by Dr. Kathleen Kramer, IEEE President, in the esteemed presence of Mr. Thomas Coughlin, Past President, IEEE, Dr. Duvvuri Seshagiri (Director, NPOL), and Dr. B. S. Manoj, Chair, IEEE Kerala Section. Distinguished dignitaries from academia, industry, and the IEEE community also graced the occasion.

Highlights of the Program Included:

- Presidential Address & Inauguration by Dr. Kathleen Kramer (IEEE President)
- Special Addresses from Mr. Thomas Coughlin (Past President, IEEE), and Dr. Duvvuri Seshagiri (Director, NPOL)
- Welcome Address by Dr. B. S. Manoj (Chair, IEEE Kerala Section)
- Introduction of OES Kerala Chapter's activity plan by Dr. Sooraj K. Ambat, Chair, IEEE Kerala Section, OES Chapter
- Vote of Thanks by Er. Simon Akkara (Chair, IEEE Kochi Subsection)

Attendance

The event was attended by more than 60 IEEE members and a considerable number of enthusiastic students from local institutions, providing excellent networking opportunities and fostering excitement around the newly established chapter.

Office Bearers

The current office bearers for the IEEE OES Kerala Chapter are:

- Chair: Dr. Sooraj K. Ambat
- Vice Chair: Dr. Anupama Jims
- Secretary: Mr. Sunil Paul
- Treasurer: Dr. Unnikrishnan K. C.
- ExCom Member (R&D): Dr. Santhakumar Mohan
- Advisers: Dr. K. Ajith Kumar, Dr. Duvvuri Seshagiri, and Dr. P. Saseendran Pillai

Scenes from the IEEE OES Kerala Section OES-Kochi Chapter Inauguration Ceremony at Le Méridien, Kochi.

Special acknowledgment goes to the entire team for their dedication and outstanding effort in making this event a grand success. Among the many who played a pivotal role in the successful formation of the chapter, a special acknowledgment is due to Dr. Duvvuri Seshagiri, Director of NPOL. His proactive leadership in initiating and driving a significant membership campaign at NPOL not only strengthened the local IEEE OES community but also directly contributed to the realization of the Kerala Chapter.

Outcomes and Future Plans

The event provided inspiration and encouragement for future activities and set a roadmap for upcoming initiatives and collaborations in the Kerala region. The Chapter looks forward to supporting students, facilitating research, and promoting oceanic engineering through events, workshops, and outreach activities.

IEEE OES Kochi Chapter: Event Highlights (June–July 2025)

The IEEE OES Kerala Section – Kochi Chapter, in collaboration with various institutions, organized a series of impactful events during June and July 2025, focused on fostering technical knowledge and awareness around ocean engineering and sustainable ocean practices.

1. Innovating for a Sustainable Ocean: The Role of Ocean Engineers and IEEE OES Student Chapters
Date: 8 June 2025, Venue: Online

To commemorate World Oceans Day 2025, the Chapter co-hosted a webinar titled "Innovating for a Sustainable Ocean: The Role of Ocean Engineers and IEEE OES Student Chapters." The event explored the thematic focus of "Wonder: Sustaining What Sustains Us," underscoring the importance of scientific curiosity in ocean conservation and innovation.

The keynote address was delivered by Mr. Sridhar Krishnamoorthy (Chair, IEEE OES IIT Madras SB Chapter & OES YP Boost 2025–2026), who emphasized the significance of student initiatives, interdisciplinary collaboration, and technological advancements in achieving sustainable ocean goals. The session engaged over 60 participants, including students, young professionals, and faculty, and featured interactive discussions on the future of ocean engineering and the role of IEEE OES Student Chapters.

2. Community Outreach and Beach Cleanup at Fort Kochi
Date: 8 June 2025, Venue: Fort Kochi

The IEEE OES Student Chapters of KMEA Engineering College and Chinmaya Vishwavidyapeeth, Kochi, partnered to conduct an ongoing community-focused initiative at Fort Kochi—an iconic tourist location. Led by Sunil Paul (KMEA Chapter Advisor), Anupama Jims (Chinmaya Chapter Advisor), and supported by Sooraj K. Ambat (OES Kerala Chapter Chair), the program centers on regular beach cleanup drives.

Beyond the tangible impact of environmental service, the clean-up events serve as platforms for social outreach: chapter members actively engage with local fishermen to understand

Beach Cleanup Drive: Engaging with local communities while restoring the beauty of Fort Kochi's shoreline.

their traditions and challenges, establishing meaningful connections that form the basis for future solution-driven projects.

The initiative also sets the groundwork for a longer-term objective—providing STEM (Science, Technology, Engineering, and Mathematics) training for the children of the local fishing community. By making logistics accessible and enjoyable, with boat rides from Marine Drive, Ernakulam, to Fort Kochi the program combines community service, experiential learning, and genuine engagement with often underprivileged coastal communities.

3. Beneath the Waves: Architecting ROVs and Excelling in Autonomous Underwater Competitions
Date: 24 July 2025, Venue: Online

As part of the ongoing technical talk series, the Kochi Chapter organized a session led by Sunil Paul (Professor of Practice, Christ College of Engineering, Irinjalakuda). The session titled "Beneath the Waves: Architecting ROVs and Excelling in Autonomous Underwater Competitions" provided practical insights into the design, development, and competition-readiness of Remotely Operated Vehicles (ROVs) and other autonomous underwater systems.

The event attracted engineering students and professionals keen on underwater robotics, providing them with both theoretical background and best practices for participating in competitions at the national and international levels.

Flyers highlighting IEEE OES Kochi Chapter's technical webinars organized during June–July 2025.

Outcomes & Impact:
These events reinforced the Chapter's commitment to knowledge dissemination, technical skill development, and engagement of the OES student and professional community in Kerala. Active participation and feedback from attendees highlighted the relevance and timeliness of these topics in current ocean engineering challenges.

The events were organized by IEEE OES Kerala Section – Kochi Chapter, in collaboration with IEEE OES SB CVV (Chinmaya Vishwavidyapeeth) and IEEE OES KMEA.

Technology Committee Chairs Meeting at OCEANS 2025 Brest

Prof. M. A. Atmanand, Senior Member IEEE, OES Technology Committees Coordinator

A **Technology Committee (TC) Chairs Meeting** was held on the **17th of June 2025** during the **OCEANS 2025 Brest** conference. The meeting was conducted in **hybrid mode** to ensure broad participation across time zones and regions.

To foster familiarity, especially among new members, the session began with a round of **introductions**. The primary focus of the meeting was the **finalization of key words** associated with each Technical Committee, a step essential for enhancing clarity and visibility on the newly developed **TC website**. Members actively contributed their suggestions, and the finalized list of keywords will be published online soon.

Another key topic of discussion was the **nomination of Distinguished Lecturers (DLs)**. The need to nominate a greater number of DLs was emphasized, and the nomination process was clearly outlined during the session. I believe the discussions were fruitful, given that the TC Chairs have made a grand total of ten endorsements/nominations this year.

In an effort to **broaden the outreach of IEEE Oceanic Engineering Society (OES)**, it was proposed to organize workshops and special events alongside **various conferences**, extending beyond the traditional OCEANS conferences. Members are requested to engage with **regional conference organizers** to plan and host sessions, workshops, or events aligned with the objectives of IEEE OES.

The **Student Poster Competition (SPC)** evaluation was carried out by a dedicated team of volunteers who undertook the challenging task of reviewing the submissions and selecting the winners. Some glimpses from the evaluation meeting, along with photographs of the participating students, are included below:

With SPC participating students and reviewers.

IEEE OES Distinguished Lecture Series: 8 May 2025

Opportunities and Challenges of Combining Wave with Offshore Wind Energy Together

Ye Li, IEEE OES Distinguished Lecturer, Founding Director, China- Australia a Joint Center for Offshore Wind and Wave Energy Harnessing Technology/Professor, Southern University of Science and Technology

An IEEE OES Distinguished Lecture was delivered by Dr. Ye Li in collaboration with IEEE OES Spain Chapter on May 12th, 2025. The lecture was given at Universitat Politècnica de Catalunya (UPC), at Vilanova i la Geltrú Campus and the title was "Opportunities and Challenges of Combining Wave with Offshore Wind Energy Together" as Dr. Ye Li's second lecture in 2025. This talk does not only cover the power generation study for industrial utilization but also the potential of supplying power for marine observation platforms devoted to environmental monitoring. By combining marine renewables with observation platforms (buoys, moorings and observatories), it is possible to extend their autonomy and robustness, improving their ability to monitor scientifically-relevant phenomena in our changing oceans.

Ye Li is the Founding Director of China-Australia Joint Center for Offshore Wind and Wave Energy Harnessing Technology and a Professor at Southern University of Science and Technology, China. He is a senior member of IEEE, a Fellow of American Society of Mechanical Engineers (US), Fellow of Society of Naval Architects and Marine Engineers (US) and Fellow of Royal Institution of Naval Architects (UK). He is internationally recognized for his expertise in ocean renewables and technology for his extensive works in theoretical, numerical and experimental studies on fluid-structure interaction. He has been on the editorial board of Wind Energy, Applied Ocean Research, Journal of Ocean Engineering and Marine Energy, and many others. Until now, Dr. Li has published over 100 papers in archived journals and over 100 patents. Prior to current position, he has been a senior scientist at U.S. National Renewable Energy Laboratory where he led the ocean power effort, and then a Professor at Shanghai Jiaotong University where he served as Founding Director of 300 meter long Multiple Function Tank.

Abstract: Offshore renewables, including offshore wind, wave, tidal and ocean thermal energy, have been considered as one of the alternative solutions for climate change. However, up to now, only offshore wind has been fully commercialized but nevertheless faces challenges from its high cost in deep water and ocean sites far offshore. In recent years, combination of offshore wind and wave technology together has been proposed by several researchers as a possible means of resolving the foregoing challenges. In this talk, the speaker will highlight the advantages and disadvantages of this method as well as opportunities and challenges for the future, especially for the field measurement instrumentation power supply.

Figures from the Talk:

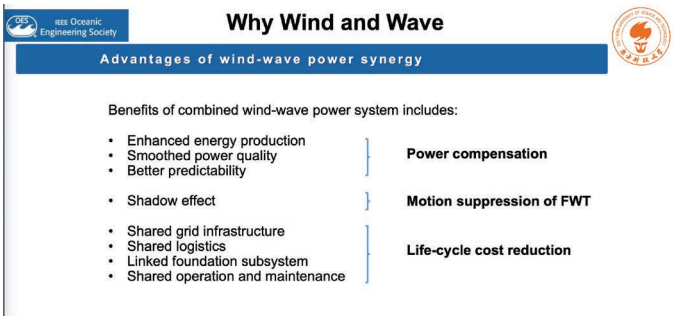


Figure 1. Advantage of Combining Offshore Wind and Wave Together.

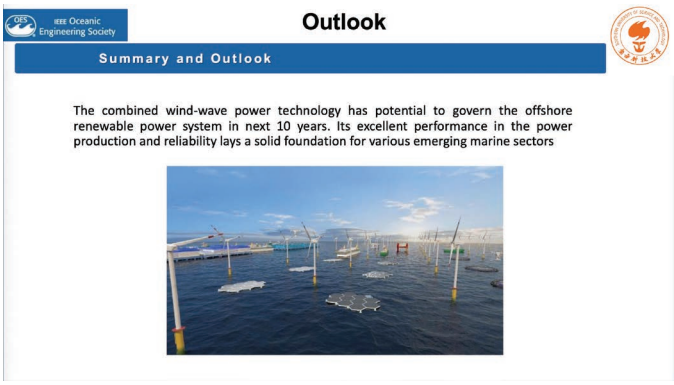


Figure 2. An Artist Expression for Future Sustainable and Green Coastal Region.

Figure 3. Visiting and Discussion with UPC Group.

Ocean Noise Issues and Sustainable Use of Underwater Sounds

Tomonari Akamatsu, IEEE OES Distinguished Lecturer, Professor, Research Organization for Nano & Life Innovation, Waseda University

Istanbul, with its rich mosaic of Roman, Persian, and European cultural influences, is a city where East meets West in both history and geography. Situated at the strategic Bosporus Strait—a vital artery for global maritime traffic—it stands at the crossroads of continents and oceans alike.

While Turkey currently lacks a local chapter of the IEEE OES, its importance as a maritime nation is undeniable. As an IEEE OES Distinguished Lecturer, I had the honor of presenting a lecture titled "Ocean Noise Issues and the Sustainable Use of Underwater Sounds" at Istanbul University (Fig. 1). The event was made possible through the support of Professor Bayram Öztürk and Dr. Amaha Öztürk of the university's Marine Biology Department.

In recent years, the issue of underwater noise has gained international attention. Major human-made sources include commercial shipping, the construction and operation of offshore wind farms, seismic airguns used in oil and gas exploration, and sonar systems used in defense. These sound sources typically emit energy at low frequencies—below 1 kHz—which unfortunately overlaps with the hearing range of many marine animals (Fig. 2).

Figure1. DL talk at University of Istanbul, June 25th, 2025.

In the Bosporus strait, many of animals such as fish, dolphins and birds are observed, co-existing with busy maritime traffic. However, not much research on effects of noise on these aquatic animals in the strait have been conducted. In the DL lecture, I first reviewed existing research on the presence of dolphins and harbor porpoises in the strait[3]. I then shared findings from Japan's first offshore wind farm project off the coast of Choshi, Chiba Prefecture. Clear dismissing of porpoises during construction was observed, but the acoustic presence recovered after one year. The porpoises presented in the area mostly in the night. These findings suggest the time-sharing strategy may work to separate natural and anthropogenic use in the same area.

During my visit to Istanbul, I had the opportunity to join a research cruise aboard a vessel operated by the Turkish Marine Research Foundation. As we sailed toward the northern end of the Bosporus Strait, near its opening into the Black Sea, we encountered a group of bottlenose dolphins (Fig. 3). Dolphins swimming alongside cargo ships, with seabirds wheeling overhead and the silhouette of a towering bridge in the background. This snapshot of coexistence illustrates the complex interactions between marine life and human activity in one of the world's busiest waterways. Although animals and vessels may temporarily share the same waters, the potential impacts of

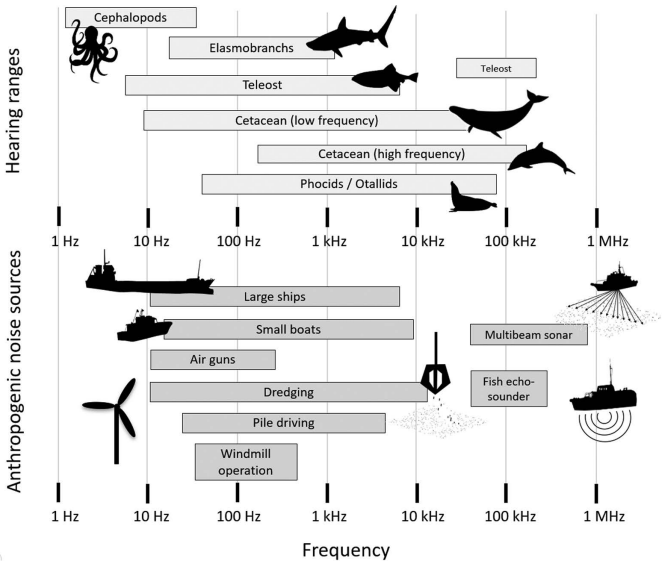


Figure 2. Hearing range of aquatic animals and frequency range of anthropogenic noises. Based on Duarte et al. (2021)[1] & Slabbekoorn et al. (2010)[2] with relevant information incorporated.

Figure 3. Bottlenose dolphins in red circles swimming in the northern mouth of Bosporus strait close to Black Sea, nearby the third bridge (upper) and with a cargo ship (lower).

human-induced noise and disturbance cannot be overlooked. It is a reminder that as we continue to pursue economic development at sea, we must also take responsibility for managing and preserving ocean ecosystems.

To protect marine ecosystems while supporting economic development, we must plan wisely. Marine Spatial Planning (MSP) offers a way to allocate ocean space sustainably. In my lecture, I emphasized that MSP should not only account for geographic space but also time. For instance, in the Bosporus Strait, the presence of dolphins and fish varies seasonally. If the shipping slow down or construction can be scheduled outside the biologically active windows—such as avoiding nighttime in spring, when dolphins and porpoises are most common—the impacts of noise can be significantly reduced. By understanding when and where marine life is most vulnerable, we can take informed steps toward a future where both nature and industry can thrive in harmony. Marine Spatial-Temporal Planning (MSTP) is needed.

References

1. Duarte et al. (2021). Science, 371(6529), eaba4658.
2. Slabbekoorn et al. (2010). Trends in ecology & evolution, 25(7), 419–427.
3. Dede et al. (2014). Journal of the Marine Biological Association of the United Kingdom, 94(6), 1195–1202.

Distinguished Lecturer Program: A Vehicle for Enhancing Inter-Chapter and International Communications

Peng Ren, OES Distinguished Lecturer 2024-2026, China University of Petroleum (East China)

The Distinguished Lecturer Program serves as a valuable platform for academic exchange, especially in its role as an effective vehicle for fostering connections among IEEE OES chapters.

As part of my 2024 Distinguished Lecturer schedule, I was honored to be invited by Robert Gordon University, Aberdeen, UK, to deliver a webinar lecture on August 22, 2024, jointly organized by the IEEE OES UKRI and Italy Chapters (both in Region 8: Europe, Middle East & Africa). The event was initiated by Zonghua Liu, Lecturer at Robert Gordon University and Committee Member of the IEEE OES UKRI Chapter, and hosted by Radhakrishna Prabhu, Professor at Robert Gordon University and Chair of the IEEE OES UKRI Chapter. My lecture focused on cutting-edge research in self-organized underwater image enhancement, a topic recently explored by my research group. The session sparked lively discussions, ranging from technical aspects of ocean observation to broader opportunities for future collaboration, laying the groundwork for strengthened inter-chapter ties.

Opportunities arise when we remain proactive. In early 2025, Hao Zhang, Associate Professor at Qingdao University of Technology, Qingdao, China, secured support from the China International Talent Exchange Foundation to coordinate the China Exchange Program for Young Professionals (CEP). Given our shared location in Qingdao City, Shandong Province, China, this CEP program presented an ideal opportunity to invite young professionals from the IEEE OES UKRI Chapter to visit the newly established IEEE OES Shandong Chapter (in Region 10: Asia & Pacific). This initiative received strong endorsement from Haiyong Zheng, Founding Chair of the

Distinguished Lecture Webminar for both IEEE OES UKRI and Italy Chapters, hosted by Robert Gordon University.

Distinguished Lecture for both IEEE OES Shandong and UKRI chapters, hosted by Qingdao University of Technology.

Visitors from IEEE OES UKRI Chapter at Shandong Chapter.

IEEE OES Shandong Chapter. Together, Hao Zhang, along with Haiyong Zheng and I, successfully organized the event, welcoming four young professionals from Robert Gordon University and the IEEE OES UKRI Chapter, including Zonghua Liu, for an academic visit to the IEEE OES Shandong Chapter, hosted by Qingdao University of Technology from June 30 to July 4, 2025. As part of the activity, on July 1, 2025, I delivered a Distinguished Lecture titled *Underwater Image Captioning with Multi-Dimensional Representations*, further demonstrating the Distinguished Lecturer Program's role in bridging chapters across regions.

My subsequent Distinguished Lecturer Program activities up to date this year were fulfilled by speaking on underwater image captioning at Hong Kong Polytechnic University on July 14, 2025, and communicating on FPGA-based seismic imaging at the University of Auckland, New Zealand, on August 4, 2025. These activities expanded the academic reach of IEEE OES, reinforcing the Distinguished Lecturer Program's value in fostering global communications.

Through these engagements, I am convinced that the Distinguished Lecturer Program is a powerful platform for strengthening inter-chapter communications and advancing international partnerships in ocean engineering and related fields.

The UN Ocean Decade Initiative: Tackling Ocean Plastics and Other Forms of Pollution Through Science, Technology, and Policy Panel at OCEANS 2025 Brest

Karen Rojas, Session Coordinator and YP Ambassador – IEEE OES

The IEEE OES sponsored Ocean Decade Panel was an inspiring meeting, where technology met science to address an understudied topic of ocean pollution, in particular, plastics, an essential material in our daily life, but also one of the most significant ocean pollutants. While eradicating plastics entirely is unrealistic, the goal remains to manage their disposal in an eco-friendly and sustainable way.

The panel brought together experts for a productive and nuanced discussion around plastics and other pollutants in the ocean. Moderated by Professor M. A. Atmanand and Professor Francesco Maurelli, the panel explored the scientific, technological, and political challenges of ocean pollution.

Among the panelists, we had distinguished voices such as Prof. Renè Garello, President of IEEE France. Rene highlighted the need to address the full life cycle of plastics in our environment and the lack of regulations currently in place to manage their use and degradation.

Prof. Jay Pearlman offered a historical parallel, recalling how industry and policy aligned in the 1970s to phase out ozone-depleting substances, a success driven as much by industry innovation as by regulation. While oil spill incidents have decreased due to regulation and double-hull technology, plastic

Moderators Prof. Francesco Maurelli and Prof. M. A. Atmanand with panelists (left to right) Dr. Gwenaële Coat, Prof. Renè Garello, Prof. Jay Pearlman, Prof. Mal Heron, and Dr. Zoi Konstantinou during the "Tackling Ocean Plastics" panel at OCEANS 2025 Brest.

waste continues to rise and is projected to double within 15 years. Jay proposed a phased approach: banning single-use plastics in the short term, implementing extended producer

responsibility in the medium term, and achieving a measurable reduction in plastic waste through international agreements in the long term. He emphasized the urgent need for harmonized methodologies, common vocabularies, and interoperable data to standardize how plastics are monitored across the globe.

Panelists, moderators, some of the audience, and organizers gather for a final photo to commemorate the impactful discussion on ocean plastics and pollution during the Ocean Decade Initiative panel.

Prof. Mal Heron addressed the challenge of detecting micro- and nanoplastics in the ocean. He clarified that while plastics are essential to modern life, the danger lies in their smallest forms, nanoplastics (typically <10 micrometers), which, in high concentrations, can penetrate fish brains and human tissues. These particles originate from fragmented microplastics, urban runoff, laundry, cosmetics, and industrial processes. Detecting these particles is scientifically challenging due to their minute size and extreme dilution in ocean waters, requiring large volumes of water for accurate sampling. Mal underscored the urgent need for toxicological thresholds and global standards for nanoplastics, much like those that exist for radiation exposure.

Prof. Francesco Maurelli then shifted the conversation toward institutional responses, asking Dr. Zoi Konstantinou about the European Union's efforts to address these challenges. Zoi explained the Marine Strategy Framework Directive and how it has harmonized coastal litter monitoring across 22 EU coastal states. However, she also acknowledged the remaining gaps, particularly for seafloor and floating litter, as well as microplastics. The EU currently relies heavily on citizen science (e.g., Marine Litter Watch) and alternative methods like data from trawling and autonomous vehicles. Zoi stressed the importance of establishing a globally accessible, cost-effective observing system, especially in light of the upcoming UN Plastics Treaty negotiations in August 2025.

Dr. Gwenaële Coat provided a broader ecological context, connecting plastic pollution to the "triple planetary crisis" of climate change, biodiversity loss, and pollution. She illustrated how plastics affect every part of the marine food web, from phytoplankton to zooplankton, and may even alter carbon sequestration in coastal ecosystems. Gwenaële noted that the fragmentation and bioaccumulation of plastics may darken the ocean's surface, affect oxygen levels, and potentially re-enter the atmosphere through aerosols. She also provided economic insights, citing projections that the cost of plastic pollution could range from $229 to $731 billion globally between 2030 and 2050 if current trends continue. She advocated for a strong and enforceable international plastics treaty to set global reduction targets, list chemicals of concern, and establish equitable financing mechanisms for mitigation.

A full room of engaged attendees actively participating in the panel on ocean pollution, reflecting the growing concern and global interest in tackling marine plastics.

The panel concluded with interactive questions from the audience, covering concerns such as the lifecycle responsibility of plastics manufacturers and the economic implications of a circular plastic economy. Several speakers emphasized the complexity of reforming not just environmental practices, but the economic structures that drive pollution.

Prof. M. A. Atmanand concluded by suggesting that under the framework of the UN Decade of Ocean Science, and in pursuit of the Sustainable Development Goals, today's dialogue should serve as a catalyst for deeper partnerships, stronger research, smarter technologies, and above all, more equitable and sustainable ocean governance. Prof. Francesco closed the session with a call to action: What decisions will we make now to shape a sustainable future? The panel was not simply a forum to share knowledge, it was a collective reflection meant to steer both public awareness and concrete action.

Conclusion

The panel on *Tackling Ocean Plastics and Other Forms of Pollution* made it clear that solving the plastic crisis requires coordinated action across science, technology, policy, and society. While innovative monitoring tools and citizen science are paving the way, regulatory frameworks, extended producer responsibility, and equitable funding mechanisms must follow.

The Ocean Decade Initiative provides a unique platform to connect diverse voices and drive global collaboration. As we move toward the upcoming UN Plastics Treaty negotiations, we must carry forward the momentum generated at OCEANS 2025 Brest and commit to long-term, systemic solutions that protect both ocean health and human well-being.

First IEEE OES Ocean Challenge 2025: Inspiring Innovation for the Future of Our Oceans

Giulia De Masi and Francesco Maurelli, OES AdCom Members

The IEEE Oceanic Engineering Society (OES) inaugurated its first-ever Ocean Challenge in 2025—a global competition designed to ignite creativity, foster innovation, and develop actionable solutions to some of the most urgent issues facing our oceans today. Aligned with the United Nations Decade of Ocean Science for Sustainable Development (2021–2030), the challenge provided a platform for students, early-career professionals, and multidisciplinary teams to turn cutting-edge ideas into impactful contributions, addressing at least one of the UN Ocean Decade challenges, contributing to the achievement of the UN Sustainable Development Goals (SDGs) and supporting sustainable ocean development.

The original draft idea was born during the IEEE Young Professionals event that happened in Lisbon in 2024 (see Beacon June 2024, Volume 13, Number 2, pages 10-11), and was then perfectioned in discussion with key OES members who helped in shaping its overall process.

The inaugural edition attracted 12 groups with a total of 45 proposers, making an average team size of 3.75 members. The smallest team had just one proposer, while the largest boasted 11. Participants hailed from 8 countries representing their institutions—Brazil, Canada, Colombia, India, Pakistan, Peru, Singapore, and Switzerland—spanning America, Europe, and Asia. The proposers' nationalities showed an even richer picture of diversity, with 10 countries represented: Brazil, Cameroon, Canada, Colombia, France, India, Morocco, Pakistan, Peru, and Sri Lanka—reaching across America, Europe, Asia, and Africa.

From the pool of submissions, five finalist groups were selected after a rigorous review process—with thanks to the dedicated reviewers, including OES Technical Committee Chairs, who assessed each proposal's technical merit, innovation potential, and alignment with sustainable ocean goals.

A Q&A session was held for the five finalists, offering them the opportunity to refine their ideas, engage with experts, and receive constructive feedback ahead of the final judging.

The winners of the First IEEE OES Ocean Challenge 2025 were announced and celebrated during the Gala Dinner at the OES Reception at OCEANS Brest, a highlight event of the year for the oceanic engineering community.

- **1st Place:** A Magnetic Induction Sea-Ice Communication Link for CTD Data Collection
  Team: Dalhousie University, Halifax, Nova Scotia — Boris B. Nges, Hunter Alloway, Parisa Rangraz, Mohammed Khalaf; Assistance: Mohammad Saber, Nathan Day, Ehsan Malekshahi, Mayssa B. Ghoula; Supervisor: Dr. Jean-François Bousquet

  This groundbreaking project developed a novel magnetic induction communication system for transmitting Conductivity-Temperature-Depth (CTD) sensor data through sea ice—enabling critical data collection in harsh polar environments where conventional communication methods fail.

- **2nd Place:** Litter Coast
  Proposer: Millena Junger (Vice President of OES UFF – IEEE Student Branch at Federal Fluminense University) and her team

  This AI-based system detects improperly discarded waste through user-submitted images processed in a cloud computing environment—harnessing citizen participation and machine learning to tackle coastal pollution.

- **3rd Place:** Smart Buoy
  Team: Alexandre de Montleau and the team—Engineering graduates from École Polytechnique Fédérale de Lausanne (EPFL)

The organizers of the Challenge Franceco Maurelli, Giulia De Masi and the OCEANS 2025 Brest General Chair Prof. Rene' Garello.

The representatives of the winning team: Hunter Alloway, Boris B. Nges, together with the Challenge organisers Francesco Maurelli and Giulia De Masi.

This innovative buoy locates lost and abandoned trawl nets, helping address ghost fishing and marine debris hazards.

The IEEE OES Ocean Challenge 2025 has set the stage for an enduring tradition of global collaboration and innovation in ocean engineering. As we look ahead, the challenge promises to continue nurturing visionary ideas, fostering global participation, and driving technological breakthroughs in service of our shared blue planet.

IEEE OES invites more innovators, researchers, and young professionals to join future editions—because the ocean's future depends on the ideas we dare to imagine today!

A Magnetic Induction Sea-Ice Communication Link for CTD Data Collection

Hunter Alloway, Dalhousie University, IEEE Oceanic Engineering Society Ocean Challenge 2025 Winner

The high-arctic functions as a global climate regulator, and to monitor the health of this fragile and important region, a magnetic-inductive (MI) communication link was developed by our team to equip users with an ability to collect and transmit essential ocean variables wirelessly across the water-ice-air boundary.

Sea-ice is the great moderator of the north, exchanging heat, moisture, and salinity in polar regions. As sea-ice retreats, more of the ocean surface is exposed. This allows for greater heat exchange between the ocean and the atmosphere, which, when saturated, falls back onto land as rain. Rain that falls over arctic territory, in some cases, freezes on contact with the ground, and makes it challenging for livestock to graze. This impacts both the livelihood and survival of Inuit communities that depend on them. In addition to the impact on livestock, the erosion of ice sheets poses a major threat to the protection of coastal infrastructure. Ice sheets serve as natural buffers for shorelines, and their loss exposes these regions to increased storm activity and turbulence, accelerating coastal erosion and creating extreme conditions that make these environments increasingly difficult to inhabit.

At the start of this competition, our team set out to determine the best approach of creating a device to contribute to challenge 7 of the United Nation Ocean Decade Challenge for sustainably expanding the global ocean observing system:

"What drove us was understanding the real-world impact of receding ice sheets on Inuit hunting territories,"
– Hunter Alloway, Masters Candidate at Dalhousie University

The UWSTREAM(Underwater Sensing and Transmission using Electro-Acoustic Modem) laboratoryfocuses primarily on solving challenges related to underwater communications. We decided that to better inform scientists and researchers of an increasing melt-rate of ice in the high-arctic, creating an accessible link for extraction of essential ocean variable data was the best approach. To validate the product and verify it's functionality, the team set out to achieve the following objectives:

- Develop an end-to-end communication link for collection of conductivity, temperature, and depth (CTD) information in a marine aquatic test environment.
- Wirelessly communicate this digital data across the air-ice-water boundary layer using a magnetic inductive link.
- Relay the surface data to a host computer using a UART (Universal Asynchronous Receiver-Transmitter)
- protocol, allowing for real-time acquisition and visualization.

With the deadline of the project approaching, our team had to work quickly to compartmentalize key roles and responsibilities. We decided to split the team up into three groups, each having an individual objective in mind for the day we would be testing and implementing the communication device.

Embedded System

Integration of the digital sensors onto an analog link for collection, modulation, amplification and transmission of digital data into an acoustic waveform was critical, and it was the objective of this group to achieve clear communication of the information on an Zybo-Z7 SoC FPGA for real-time streaming.

Hardware Integration

Hardware and assembly of the cages, enclosures, and mounts were necessary to anchor the acoustic hardware, transmitter and

Members of the Dalhousie University team that won this year's IEEE Oceanic Engineering Society Ocean Challenge.

receiver for the magnetic induction link, to ensure alignment. This group took charge of marrying the equipment into a fashion that would enable seamless transition to an aquatic environment. A crane suspending the receiver facilitated alignment to improve voltage amplitude and coupling between coils in the near-field.

Data Visualization and Interpretation

Once the acoustic data was relayed to the surface, interpretation of the information to demonstrate the capacity of the link to wirelessely communicate meaningful information to scientists was critical. Integration of a spectrogram and customized graphic user interface to visualize CTD data accomplished this goal.

The team learned valuable lessons from this project as expressed by Boris Nges, PhD candidate at Dalhousie University:

"It was a transformative experience that pushed the boundaries of my skills and challenged me to find real-time solutions to real-world problems under pressure."

Ultimately the collaboration within our team led to a timely completion of the first prototype, which achieved the wireless range of three meters and will be improved in the future with ongoing modifications made to improve the signal strength.

OES Conference Calendar

Contact BEACON Editors, OES VPWS and VPTA

OCEANS

OCEANS 2025 Great Lakes
September 29–October 2, 2025
Chicago, USA
https://greatlakes25.oceansconference.org

OCEANS 2026 Sanya
May 25–28, 2026
Sanya, China
*Call for abstracts is in this issue

OTC

OTC Brazil
October 28–30, 2025
Rio de Janeiro, Brazil
https://otcbrasil.org

OTC Asia 2026
March 31–April 2, 2026
Kuala Lumpur, Malaysia
https://www.otcasia.org

OES Sponsored (financial or technical)

ICOE 2025
September 14–18, 2025
Chennai, India
https://ge.iitm.ac.in/icoe2025/

Metro Sea 2025
October 8–10, 2025
Genova, Italy
https://metrosea.org

TechDef 2025
November 5–7, 2025
Rome, Italy
https://techdefense.org

SYMPOL 2025
December 10–12, 2025
Kochi, India
http://sympol.cusat.ac.in

OES Patronaged

BTS 2025
November 9–16, 2025
Limassol, Cyprus
https://bts.fer.hr

Non-OES but OES Members are Involved in

Non

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

Making Waves – Marine Robotics Primer Workshop for High-School Students

Hari Vishnu, Sharadha Sathiakumar and the workshop committee of OES Singapore Chapter

The OES Singapore chapter organized a marine robotics workshop aimed at introducing secondary school students to the basics of marine robotics. The event was held on March 13, 2025, just before the commencement of the Singapore AUV Challenge (March 14–17). It was held at the Singapore Polytechnic. The aim was to get the students to appreciate the fundamentals and challenges in this field and get a hands-on experience with basic marine robotics concepts via talks from robotics experts and the use of robotics kits, which they assembled and tested in a swimming pool.

The program featured engaging sessions led by oceanic engineering researchers, offering introductory talks on key robotics concepts. The students learnt about the application, design, programming, and operational aspects of autonomous underwater vehicles, followed by an online simulator coding session to understand how to program embedded systems and work with sensors used in their systems. This was followed by a hands-on session at the Singapore Polytechnic swimming pool. By engaging with experienced participants and mentors, students gained valuable insights to potentially inspire their own journey in oceanic engineering and robotics.

A registration process was implemented to gauge interest from participants. From the set of 8 registrants, the following 6 secondary school teams were shortlisted, with around 6 participants per team:

- National Public school International, Grade 9
- "Team Innomakers" from St Joseph's Institution
- "JurongVille Jags" from Jurongville Secondary School
- National Public school International, Grade 11
- "Hot potatoes" from Nanyang Girls High school
- National Public school International, Team 3

Special effort was made to reach out to girl's schools during the outreach for this event to get them interested, and as a result we got registrants from two girls-only teams (NPS team 3 and Nanyang Girl's high school). Totally, 40 students attended the inaugural robotics workshop session. Teachers from four of the schools also attended.

The introductory seminar session with talks from the volunteers.

Objectives

1) Inspire and motivate school students to pursue careers in oceanic engineering and related STEM fields by showcasing relatable role models.
2) Provide students with firsthand insights into the diverse range of oceanic engineering professions and their real-world applications in sustainability and environmental conservation.
3) Promote inclusivity and diversity within oceanic engineering education and careers.
4) Foster curiosity, critical thinking, and a passion for scientific exploration among students.
5) Empower students to challenge career stereotypes and embrace their full potential in oceanic engineering and STEM fields.
6) Offer students the chance to understand the dynamics of the SAUVC competition, including design, programming, and teamwork involved in autonomous underwater vehicle projects.

As part of the outreach, our volunteers also engaged with local schools to educate them on the thrills of marine robotics to get them interested in this field. Our volunteers, Luyuan and Sharadha, delivered a talk at Nanyang girls' school in the assembly, attended by 300 girl students, to a roaring reception and excellent feedback. As part of the outreach initiative, this event also provided students with the opportunity to gain a deeper understanding of how the SAUVC competition worked, so that they could aim for participating in it in the future.

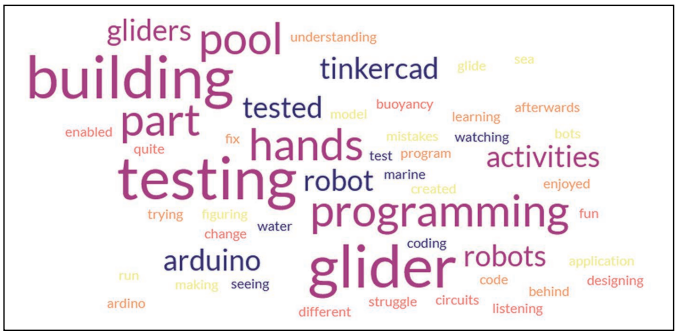
How the Event Unfolded

After registration, in the morning session the workshop included:

1) **Introductory seminar session:** Talks were given on an introduction to the world of marine robots and technology (by Luyuan and Sharadha), some applications of robots

Luyuan giving a talk at the Nanyang Girls school assembly on the thrills of using marine robots and their applications.

Teams hard at work programming and building their robot during the hands-on session!



Word cloud summary on responses on what the participants enjoyed the most.

(Hari and Rajat), and a talk on Glider basics (by Abu Bakr). Researchers also took turns sharing their educational and career journeys, highlighting challenges and rewards in oceanic research. Tailored for middle to high school students in public schools, these sessions ensured engaging and accessible content.

2) **Hands-on programming session:** Following these presentations, students were split into teams and provided with robotics kits. After this, Dr. Ercan undertook a rigorous training for the students on programming the Arduino in the robotic kits. This session used the TinkerCAD online simulator as a start, guiding them through each task such as programming the LEDs, controlling the buoyancy engine, and programming the system to achieve all the required tasks. All the volunteers involved in the process helped the students through this learning.
3) **Robot building:** Now it was time to get hands dirty with some bot-building. Through the rest of the workshop, the teams assembled and programmed these kits using the skills and tips they learnt through the hands-on sessions prior to this.
4) **Pool testing – the water test!** In the afternoon, it was time to test the glider bots that the teams had built, in the pool. The teams were taken to the pool one by one, and made to test their systems so they could see the results of their efforts. The idea was to give a feel of hands-on robotics to illustrate key concepts and spark student curiosity. Needless to say, Murphy's law struck and not all the systems worked as expected, but of course this was part of the learning process in understanding that things can go wrong in complex robotic systems! The students took this learning experience in their stride and rallied behind the few bots that worked, which were demonstrated in the pool. Following this, there was also a demonstration of another remote-controlled surface robot. Organizers of the SAUVC competition also shared their experiences and interesting anecdotes from the event, highlighting their learning journeys and the challenges they faced along the way.

Action time! Pool testing of the gliders and a demo of an ROV.

5) **Conclusion and reflection session:** At the end of the event, the teams were brought back to the workshop and participation certificates were given. Students were also encouraged to ask any final questions they may have had.

Rousing Feedback

After the event, we provided the teams with a google form to get feedback from them, also to enable our planning of the event in coming years. We obtained pretty positive feedback from the teams on the event. There were 29 responses.

Q: How would you rate the overall workshop experience? The average response was 4.32/5.
Q: How useful did you find the workshop content? Average response was 4.3/5.
Q: How easy was it to follow the instructions during the hands-on exercises? Average response was 4.4/5.
Q: Has this workshop helped you gain a better understanding of marine robotics? 27 responded "Yes", 2 responded "Somewhat".

We also had an open-ended question for feedback, and most of the comments were positive. Some felt the session should not have gone beyond the planned half a day, while some felt it was too short and wanted more days! And some students wanted to do more of the coding all by themselves.

Conclusion

The inaugural marine robotics workshop was intended to introduce high-school students to the world of marine robotics and give a hands-on experience to this exciting field, hopefully with the intention that this would excite at least some of them to follow this field in the future. The idea was to give basic level training with content accessible for school students. The event was also intended to bridge with the Singapore AUV Challenge, which has now evolved into a larger and more competitive event spanning more teams and tasks. The event aligns with one of the Ocean Decade goals of a more accessible and inspiring Ocean.

We, the committee, feel satisfied at the outcome of the first session of this workshop. It was a fairly challenging task to put this together, and was especially time-consuming to learn and pre-assemble the glider kits to get a good understanding, and then put together the workshop content. But given how it turned out, it was a great experience both for the students and us, the organizers. For future events, we hope to put together a more coherent workshop content, with hopefully more volunteers. In this round, our volunteers included 4 students, including one high school student! The workshop was supported by the IEEE STEM Grant, complemented with sponsorship money received for Singapore AUV Challenge from IEEE Oceanic Engineering Society, and for this we are grateful.

The organizing committee (minus the photographer Rajat).

SusTech2025

Ed Perkins, Past Chair and Technical Program Chair of SusTech 2025

The **12th IEEE Conference on Technologies for Sustainability** (SusTech 2025) took place **in person** with remote access at the Embassy Suites by Hilton Santa Ana Orange County Airport, Santa Ana, CA, from April 20–23, 2025.

The conference included a four-day program with workshop, poster contest, receptions, dinner, technical presentations, keynotes and plenary talks and panels.

Conference Sessions on Tuesday and Wednesday, April 22–23, included over 120 paper presentations in 24 sessions in the IEEE SusTech Thematic areas; plus 5 keynotes and 2 panel sessions.

Sustainability Forum on Monday, April 21, featuring distinguished speakers and a panel (with CEU/PDH) was included with SusTech 2025 registration.

Special Events

Interactive Workshop on "Technologies for a Circular Economy," Sunday, April 20, 8:00 am-4:00 pm**,** a **Hybrid workshop included with SusTech registration**, organized by the **IEEE Future Directions** SusTech Initiative in collaboration with SusTech 2025.

Speakers:

- Introduction to Circularity – Maike Luiken
- Workshop Organization – Wei-Jen Lee
- Learning from Nature's Approach to a Circular Economy -Alan Booker
- Circular Electronics - Ravinder Dahiya
- Fireside chat on Lithium Batteries Recycle and Reuse – Babu Chalamala and Wei-Jen Lee
- Carbon Dioxide Pollution – David Snyder
- Q&A / Panel about Circularity – All Authors, Wei-Jen Lee moderating
- Breakout Groups
- Conclusion and Next Steps – Maike Luiken and Wei-Jen Lee

SusTech 2025 Student Poster Competition, a *Virtual* Session, on Sunday, April 20, 2025, from 4:00–6:00 pm.

Welcome Reception, Sunday, April 20, 6:30-7:30 pm
Networking Reception & Panel, Monday, April 21, 5:30- 8:00 pm, sponsored by IEEE YP & WIE. Speaker: "Creating and Crossing Capitalism's Continuum of Chasms," with Maurice Gunderson, PE, Autotech Ventures, Managing Director Emeritus. Followed by a panel of Young Professionals sustainability discussion afterwards.
Panelists: Young Professionals in Sustainability
Moderator: Taylor Noh

Panelists:

- Syed Ahmed Raza Naqvi, Senior Power Electronics Modelling Engineer at TAE Technologies Inc
- TAE Technologies developing commercial fusion technology and is based in Lake Forest, CA
- Puneeth Murthy, Staff Electrical Hardware Engineer at Rivian Automotive Rivian Automotive is an American electric vehicle manufacturer
- Arev Markarian, Geographic Information Systems Technician at Arroyo Seco Foundation
- Suzy Engwall, CEO at HealthTech Strategies

Conference Dinner, Speaker and Awards, on Tuesday, April 22, 6:30-9:00 pm. Keynote: IEEE Humanitarian Technology Board (HTB) with Adil Usman, Chair for the HTB Outreach Committee. IEEE-USA Harry Diamond Award presentation and SusTech Student Poster Contest awards.

Sustainability Forum

The 2025 IEEE SusTech Sustainability Forum brings together researchers, industry professionals, and legal experts to explore innovative solutions for environmental challenges. Through discussions, presentations, and networking opportunities, participants shared cutting-edge research, industry best practices, and emerging technologies that drive sustainability across various sectors. The forum also included a legal perspective, with an attorney discussing key environmental regulations and policies that impact sustainability efforts.

The 2025 Sustainability Forum is organized in partnership with the Armenian Engineers and Scientists of America (AESA).

Forum speakers addressed the following topics:

- "Green Hydrogen"
- "Decarbonization"
- "Offshore Wind"
- "Administrative Law and the Clean Air Act"
- "Hydrogen: Paving the Way to Net Zero Carbon Emissions"
- "DERConnect – A state-of-the-art Distributed Energy Resources test facility"

Keynote Speakers

- "Designing for Regeneration," Alan Booker
- "Carbon Dioxide Measurement for Climate Restoration," Snyder & Fiekowsky
- "The IEEE Humanitarian Technologies Board (HTB),",Adil Usman, IEEE HTB
- "Advanced Electric Machines for Next Generation Electric Vehicles," Adil Usman, Varroc Engineering
- "Late Breaking Considerations in Sustainability," Maike Luiken
- Video presentation by Tom Coughlin, 2024 IEEE President "Utilizing Technology for a Sustainable Climate" https://ieeetv.ieee.org/ns/ieeetvdl/2025/CA_Presidents/Coughlin/Tom_Coughlin_SusTe ch_2025_x.mp4

Panels

Is Sustainability Socialism? – organized by the IEEE SSIT

The IEEE Society on the Social Implications of Technology sponsored a panel titled "Is Sustainability Socialism?" This panel featured speakers about technology solutions for climate sustainability and discussing the social impact of these solutions and the role of government, not-for-profit and for-profit enterprises.

Moderator: Prasanta Ghosh, SSIT

Panelists:

- Brett Sanders UC Irvine Civil Engineering professor, flood control and climate change, UCI Blum Center for Poverty Alleviation
- Richard Matthew UC Irvine Social Ecology professor, climate change and social crises
- Alan Booker (LEED AP BD+C, WELL AP, LFA, GRP), founder and executive director of the Institute of Integrated Regenerative Design
- Julija Saveljeva, PhD candidate and research assistant at the BA School of Business and Finance, Latvia.

Sustainability Standards – organized by IEEE SA

Standards are a key enabler and accelerator in addressing sustainability issues, helping solutions to scale at the pace required to meet global targets, such as UN Sustainable Development Goals (SDGs). IEEE SA has been at the forefront of driving sustainability focused standards and related work to help achieve these goals. This panel provided an overview of IEEE SA initiatives in standards, along with a deeper dive into issues such as maritime electrification, the energy-water nexus, socio-technical standards, standards related to IEEE Planet Positive 2030 Initiative, and standards related to policy engagement with governments, NGOs, and the UN.

Moderator: Maike Luiken

Panelist topics:

- Standards Initiatives in Support of Sustainability – Maike Luiken
- Sustainable Maritime – Sustainable ships/ports – Rudi Schubert
- The Energy/Water Nexus – Mark Siira
- Standards and the UN Sustainable Development Goals (SDGs) – Karen Mulberry

Technical Program

SusTech 2025 featured over 120 paper presentations in these thematic sessions:

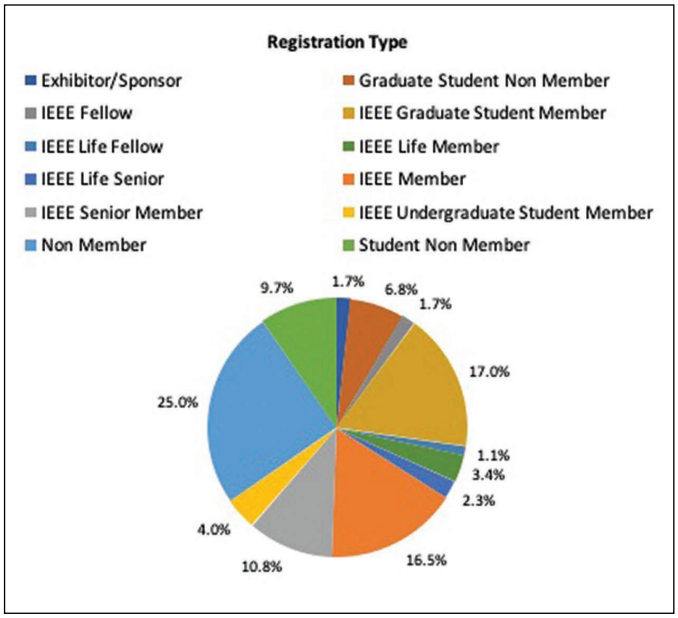
- Agriculture
- Alternate Energy
- Carbon
- Ecology
- Electronics
- Energy Efficiency
- eWaste
- Machine Learning
- Management
- Smart Grid
- Society Implications/Quality of Life
- Software
- Transportation
- Water

Online Student Poster Contest was held on April 20.

A total of nine posters were presented online, including from Uganda, Korea and Uzbekistan.

- **First Place Winner:** "A Novel CSP–sCO? Waste Heat Recovery System for Gas Turbine Power Plants: A Techno-Economic Investigation"; Kashif Liaqat, Rice University, Houston, Texas, USA
- **Second Place Winner:** "Not Trashed — Self Sorting Trashcan"; Hsu-Wei Chen, University of California, San Diego, La Jolla, California, USA
- **Third Place Winner:** "Evaluating Solar Deployment Locations Using Locational Marginal Prices"; Hossein Ashrafpour, University of California Merced, Merced, California, USA
- **Third Place Winner: "**Identifying Contextual Dependencies Between United Nations Sustainable Development Goals Targets"**;** Alekhya Velagapudi, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

Attendees by Type



Registrations

Total registrations 180

- 119 New attendees, 44 returnees
- 103 members (38 students); 62 nonmembers (29 students); 2 sponsors
- In person authors - 65
- Remote authors - 49
- In person attendees - 51
- Remote attendees - 5
- Exhibitors - 1
- Gold Sponsors - 2
- Forum one-day - 2
- Student Poster ONLY - 5

Committee

Position	Name	Organization
Chair	Sevada Isayan	Glendale Community College
Treasurer	Albert Lin	Consultant
Past Chair	Ed Perkins	Consultant
Technical Program Chair	Ed Perkins	Consultant
V. Chair	Adil Usman	Varroc Engineering Limited
Student Poster Chair	Sean Monemi	Cal. State Poly. Univ. Pomona
YP Program	Alberto Tam Yong	Applied Medical
Sustainability Forum Committee		
Forum Coordinator/Chair	Linda Megerdichian	Armenian Engineers and Scientis America (AESA)
	Aslanian Ani	AESA
	Chakryan Edgar	AESA
	Shahnazarian Angineh	AESA
	Sheerak Megerdichian	AESA
SusTech Talks Coordinator	Susan Dickey	none
Publication Chair	Ed Perkins	Consultant
Publication V Chair	Naga Korivi	Oregon Institute of Technology
EDAS Chair	Ed Perkins	
Marketing & Publicity Chair	Kishan Joshi	IEEE Santa Clara Valley Section
Marketing & Publicity	Gora Datta	CAL 2 CAL
Marketing & Publicity	Farhad Mafie	Savant Company
Europe Liaison	Nuno Domingues	ISEL
Local Arrangements	Albert Lin	
Exhibits & Patrons Chair	Albert Lin	
	Rick Smith	
Registration Chair	Don Mayer	The Aerospace Corporation (Reti
Webmaster	Ed Perkins	Consultant

Sponsors

Sponsors for SusTech 2025 include the IEEE Oregon, San Fernando Valley, Foothill, and Orange County Sections, IEEE Region 6, IEEE-USA, IEEE SSIT; and co-sponsored by the IEEE Standards Association, and the IEEE IAS, OES, PES, and TEMS Societies and supported by the IEEE SusTech Initiative.

Sustainability Forum organizing partner Armenian Engineers and Scientists of America, Inc. (AESA) Marketing Partners IEEE-USA and IEEE SusTech Initiative

Diamond Patron, IEEE Humanitarian Technologies Board; Gold Patrons, Profitable Biodiversity and UC San Diego Division of Extended Studies; Exhibitor, Hitachi

Diamond Patron

The IEEE Humanitarian Technologies Board (HTB) inspires and empowers IEEE volunteers around the world carrying out and supporting impactful humanitarian technology activities at the local level.

The IEEE HTB mission is to support impactful and ethically informed volunteer-led initiatives, programs and projects, and mutually beneficial partnerships, as well as to inform policy formulation that harness technology and innovation to address societal challenges (including disaster recovery) in a responsive, effective, and sustainable way.

Gold Patrons

A biodiversity offering is a profitable product or service that supports a species-sustaining biodiversity project. This is a business approach to halting the current extinction crisis. **Profitable Biodiversity** helps firms to identify biodiversity offerings; identify biodiversity projects; design marketing campaigns; and develop technologies to give customers feedback on project successes.

UC San Diego Division of Extended Studies serves the critical lifelong knowledge and skill development needs of individuals, organizations and community through continuing education and degree-related programs; community initiatives that support economic and social development; and through a wide array of public service lectures, forums and special events.

Marketing Patrons

The **IEEE SusTech Initiative** seeks to contribute technical expertise and solutions to address sustainability challenges, including climate change. This initiative is growing rapidly and new volunteers are always welcome.

IEEE-USA's mission is to recommend policies and implement programs specifically intended to serve and benefit the members, the profession, and the public in the United States in areas of economic, ethical, legislative, social and technology policy concern.

Our vision is to serve the IEEE U.S. member by being the technical professional's best resource for achieving lifelong career vitality and by providing an effective voice on policies that promote U.S. prosperity.

Sustainability Forum Partner

The Armenian Engineers and Scientists of America, Inc. (AESA) is a non-profit (501 c-3) non-partisan, and non-sectarian

philanthropic organization headquartered in Glendale, California.

AESA is primarily focused on promoting science and technology among the Armenian nation, including Armenia and the Diaspora communities.

AESA's mission is to address the professional, technical and scientific needs of fellow Armenians throughout the world. AESA consists of several committees, operating under the auspices and guidance of the AESA Board.

Exhibitor

HITACHI

How does your company balance environmental measures and profits? Hitachi America provides manufacturing companies with innovative solutions to this problem.

Paper Statistics

Submissions

Accepted with minor revisions	Pending (no manuscript)	Accepted with major_revision	Abstract accepted	Accepted	Rejected	Withdrawn	Total under review, accepted and rejected	Total reviewed (not withdrawn)	Total accepted, rejected, withdrawn (but reviewed)	Acceptance ratio (%, including revisions)
84	1	35	1	12	21	48	154	146	158	85.7

Record number of submissions.

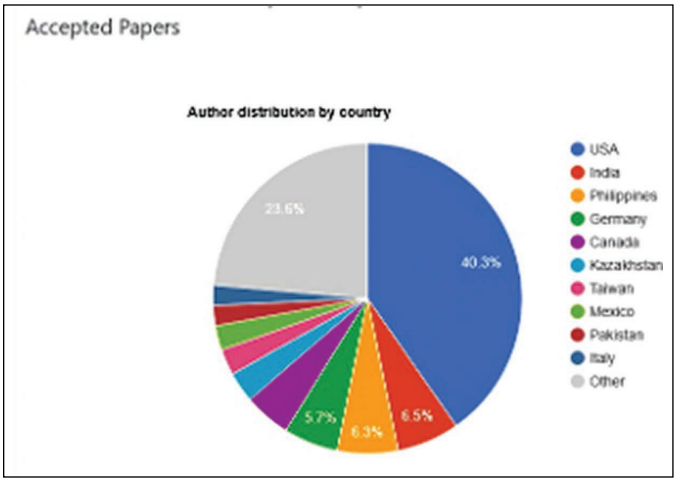
Track Statistics

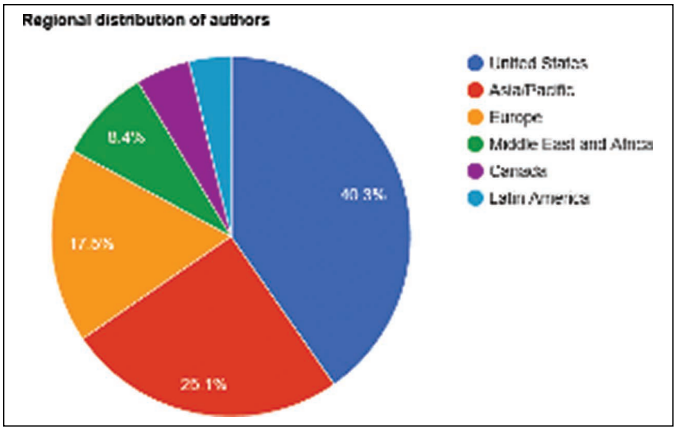
Track	Accepted with minor revisions	Pending (no manuscript)	Accepted with major_revisi	Abstract accepted	Accepted	Rejected	Withdrawn	Total under review, accepted	Total reviewed (incl.	Acceptance ratio (%)
Extended Abstract for presentation	5	0	4	0	0	2	9	11	11	81.8
Invited Papers	0	0	0	0	0	0	1	0	0	0.0
Later Papers/Sessions	29	0	11	1	7	8	22	56	57	85.7
Regular papers	50	1	20	0	5	11	16	87	90	87.2

Authors

- Authors from 46 countries
- Author counts for Europe, Middle East, Africa are shown both combined and separated into Europe and MEA

Submitted Papers			Accepted Papers		
Region	Authors	%	Region	Authors	%
United States	201	37.7	United States	191	40.3
Europe, Middle East, Africa	146	27.4	Europe, Middle East, Africa	123	25.9
Asia/Pacific	142	26.6	Asia/Pacific	119	25.1
Europe	91	17.1	Europe	83	17.5
Middle East and Africa	55	10.3	Middle East and Africa	40	8.4
Canada	24	4.5	Canada	23	4.9
Latin America	20	3.8	Latin America	18	3.8





Reviewers

- Total of 105 reviewers (new record)
- 96 active reviewers (completed one or more reviews).

Report on IGARSS 2025 Brisbane

Melanie Olsen, Chair Australia Chapter; Giulia De Masi, AdCom Member, Mal Heron, ExecVP

OES at IGARSS 2025 in Brisbane

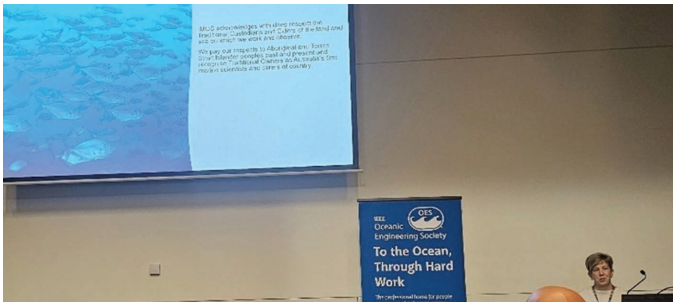
The International Geoscience and Remote Sensing Symposium (IGARSS) was held in Brisbane, Australia, from the 3rd–8th of August, 2025, and OES contributed in several ways under a Sister Society MOU Agreement. On the first day participants dived into the future of ocean exploration with the tutorial *"Sensing the Seas: AI and Data-Driven Enhanced Marine Sensing and Exploration in the Science-Policy Interface."* Presentations were given by Prof. Maurizio Migliaccio, Dr. Andrea Buono, Dr. Giulia De Masi and Dr. Christopher Whitt. The session offered not just tools and workflows, but also a vision of how AI-powered sensing can help reveal the ocean's pollutants (like oil slicks) and hidden patterns, and guide us toward more sustainable stewardship of the seas.

The tutorial was followed in the afternoon by the OES Australia Chapter hosting a Networking Session at the River Quay Green where OES members and some invited guests experienced the south bank of the Brisbane River.

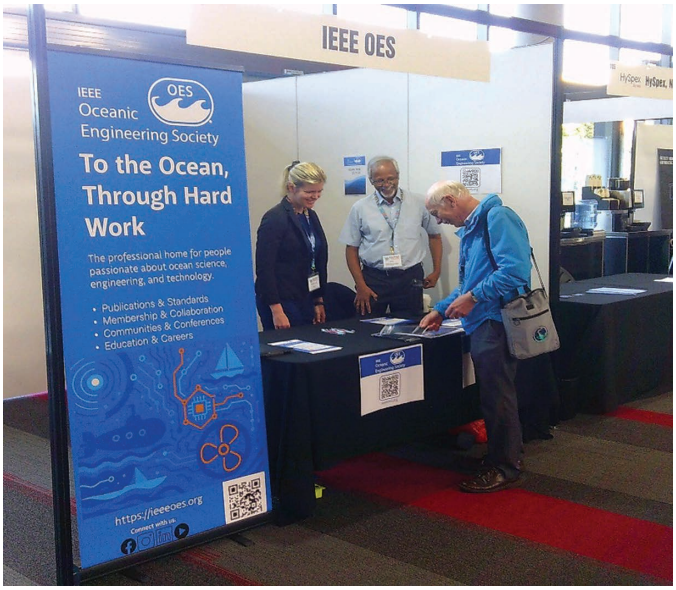
IEEE OES Chapter Coordinator Maurizio Migliaccio also hosted an OES Chapter Chairs meeting at the conference with representatives from several Chapters attending.

The OES Australia Chapter's special session on "*Challenges for Ocean Remote Sensing in the UN Decade of Ocean Science for Sustainable Development*" commenced with keynote speaker Dr. Michelle Heupel, Executive Director of Australia's Integrated Marine Observing System. This was followed by technical talks from HF Radar (Prof. Mal Heron), to marine autonomous systems (Melanie Olsen), Xband radars (Jochen Horstmann) and early insights into new tools for live marine tracking and tide prediction dashboards (Dr. Robbi Bishop-Taylor).

The OES tutorial in session (top), and the OES Networking Event at the River Quay Green (bottom).



OES Special Session keynote speaker Dr. Michelle Heupel.



IEEE OES Booth at the IGARSS Exhibit Hall with Melanie Olsen and Venugopalan Pallayil talking with Prof. Eric Gill.

As part of OES' Memorandum of Understanding with the Geoscience and Remote Sensing Society (GRSS), OES hosted a booth at the Exhibition Hall. The booth attracted many prospective new members from across the world, to the extent that we ran out of brochures; twice! It is fantastic to see so many parallels with GRSS members working in the oceanic domain, and the subsequent interest in ocean science and technology.

The MOU between GRSS and OES includes participating in flagship conferences of the sister Society. It is anticipated that this agreement will be renewed for another two years to the end of 2027. At IGARSS 2025 Brisbane, it was our turn to participate and all reports indicate that the inter-Society collaboration is providing benefits to both Societies.

OCEANS – Call for Expressions of Interest, 2029 through 2030

Deadline for Submission of EOI: 30 Nov., 2025

OCEANS is a flagship conference of IEEE Oceanic Engineering Society. It has a history dated back to 1970. Currently, two editions of OCEANS are being held each year, one in North America and the other either in Asia (even years) or Europe (odd years). Over years this has been serving our scientific community adequately. Some of the upcoming conferences and their dates are listed below

OCEANS 2026 Sanya, Hainan, China – May 25-28, 2026
OCEANS 2026 Monterey, CA, USA – September 21-24, 2026
OCEANS 2027 Aberdeen, Scotland, UK – June 20-24, 2027
OCEANS 2027 Anchorage, Alaska, USA – September 20-23, 2027
OCEANS 2028 Adelaide, Australia – April 03-06, 2028
OCEANS 2028 San Diego, CA, USA – September 17-21, 2028

IEEE Oceanic Engineering Society (IEEE OES) is now inviting Expressions of Interest (EOI) from potential Local Organising Committees (LOC) towards organizing OCEANS conference for the years 2029 (Europe & North America) and 2030 (Asia & North America).
The EOI should be limited to no more than two pages (A4 or American Letter) and contain the following information:

- Proposed Conference City Location. The significance/importance of this geographical location in relation to an OCEANS conference. What is the local infrastructure with regards to marine/ocean science and engineering and industry; include local marine/oceanic facilities and attractions that might be visited or used.
- Proposed year of event (include preferred dates, with alternatives, if you know them at this stage).
- The core of the Local Organizing Committee (LOC) with names, affiliations, email addresses of the main conference chairs (i.e. General, Finance and Technical Chairs), whether or not they are IEEE-OES members, and their experience in conference organization. Other chairs will be designated at full proposal stage.
- Potential Patrons and local support (community, industry, academia, etc.). Letters of support (or other indication of support) from potential patrons, local organisations, community leaders, local industry, academia and so on while not mandatory at this stage may be included as an appendix.
- Proposed Conference Venue (with alternatives) and availability of hotel accommodation. Points of relevance are size of venue, ease of travel.
- If known, the proposed Conference Theme, which defines the nature of your OCEANS. This theme should encompass topical or local strengths (see the OCOP manual link for past conference themes).

Other information, such as a budget, brochure, venue layouts, full LOC, *etc*., is not necessary at this stage. Applicants are strongly recommended to refer to the OCEANS Conference Operation Policy (OCOP) manual available online here: https://oceansconference.org/planning/hosting-the-oceans-conference-operations-manual/. However, please do note that this document is undergoing revision as Marine Technology Society, who has been a partner to the conference, will not be sponsoring the conference from 2026 onwards.

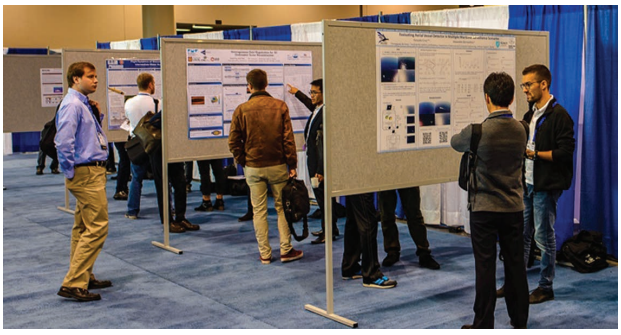
The EOI may be sent to vp-oceans@ieeeoes.org. The EOIs will be evaluated by the OCEANS Central Coordination Committee (OCCC) and successful applicants will be informed and requested to submit the full proposal.
The deadline for submission of EOI is 30 Nov 2025.

A Blast From the Past! . . . Aberdeen, Anchorage, Here We Come . . . Again!

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

OCEANS 2017 was successfully held in Aberdeen, Scotland, and Anchorage, Alaska. And…it has just been approved to return to Aberdeen, and also Anchorage, in 2027. Here's a Blast from the Past with some photos of these excellent OCEANS conferences.

OCEANS 2017 Anchorage Reception.



Anchorage Student Poster Competition.

OCEANS 2017 Anchorage Exhibits.

Alaska Native Heritage Center.

OCEANS 2017 Aberdeen Gala Cake.

Kilts at the Gala Dinner.

Reception Bagpipers.

Aberdeen Reception.

OCEANS 2025 BREST: A Huge Success

Prof. René Garello, IEEE Life Fellow, General Chair

The OCEANS conference in Brest, France, extended on 4 days from June 16 to June 19. It was a worldwide event with 950 attendees, 60 countries represented and 450 papers, 46 exhibitors.

And thank you to our sponsors, IEEE OES and MTS, along with our supports, Naval Group, IEEE France Section, IMT Atlantique, ENSTA, ISEN, UBO, INP Grenoble, Campus Mondial de La Mer, Brest Metropole, Lab-STICC, and I hope I don't forget anyone. And, also endorsed by the UN Decade for Oceans sustainability. And many many thanks to Brest en Vue and Le Quartz fantastic teams.

Day 1

This is usually a day with less activities but, in Brest, we were able to secure two large workshops, "Ship/Whale Collisions" and "Second Federation and Digital Twins of the Ocean Interoperability Workshops."

They were extremely well attended along with the 3 Tutorials. All together more than 200 participants. Thanks to Greenov for organizing the first workshop and the EU projects Blue-Cloud 2026 and ILIAD for the second one. Thanks to the Tutorial instructors, too.

And to end the day we had a particularly well attended Welcome Reception at Oceanopolis, 450+ people (much more than expected).

A view of the ILIAD / Blue-Cloud 26 workshop morning session.

A view of the Whale/ship collision workshop session.

A glimpse of one of the displays at OCEANOPOLIS.

Day 2 – Plenary-Part1

Day 2 started with a plenary session introduced by Michel Gourtay, from Brest Métopole, and Director of the Brest Technopole, followed by René Garello, General Chair, who in this time of denial, reflected on the fate of Marine Science and Technology. Quote from Kathleen Kramer, IEEE President: "At a time when political forces in some parts of the world are increasingly challenging scientific research independence, the global scientific community recognizes the urgent need for a unified, proactive approach."

Quote from René Garello:

"United we stand!

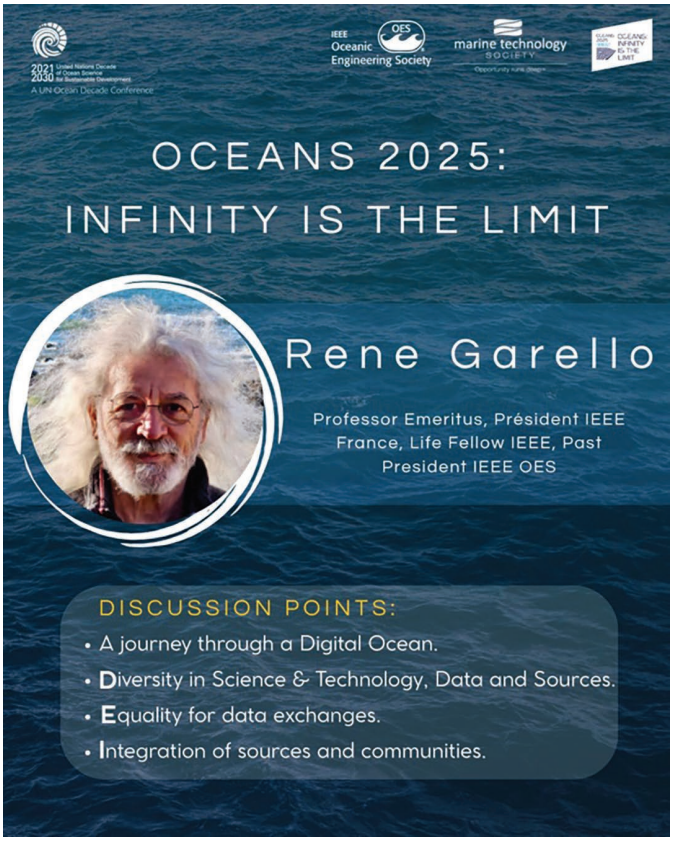
Science & Technology, together, are providing the trusted facts.

Ignorance & misuse of Technology are highlighting the fake."

A few pictures below for illustrating the first part (out of three) of the Plenary

Michel Gourtay, Brest Métopole, and Director of the Brest Technopole, introducing the Plenary session.

René Garello, General Chair OCEANS 2025 Brest, welcoming the delegates at the plenary session.



Summary of the Plenary session introduction speech by René Garello.

Day 2 – Part 2

After a week of political marine science in Nice, at the UNOC conference, IEEE OES, MTS and UN Ocean Decade sponsored and endorsed the OCEANS 2025 Conference (supported by IEEE France Section). Marine Science and Technologies were predominant in Brest, as already said, with 450 papers (out of 750 abstracts sent and reviewed) and 46 company booths.

In the Greek mythology, there were the Three Graces. And they were back, alive and well, to Brest for delivering 3 passionate and heartful keynote speeches during the plenary session at Le Quartz.

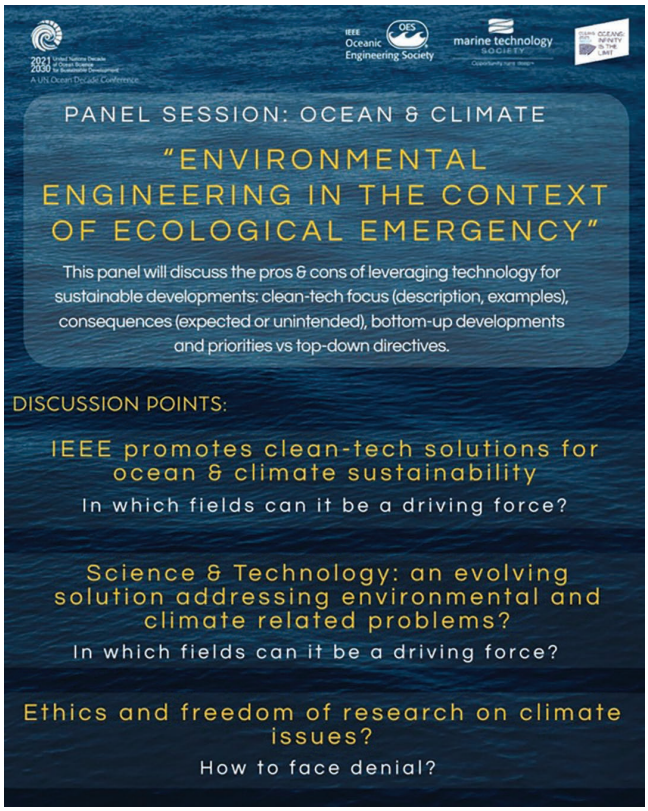
Zoi Konstantinou, Bente Bye and Lucie Cocquempot addressed the European Ocean Pact, Gender and Diversity and Sustainable Innovation in a transitioning world in the context of an ecological crisis situation.

Kudo to them all.

First Keynote speech summary.

Second Keynote speech summary.

Third Keynote speech summary.



Highlight of the discussion points during the Plenary Panel session.

Day 2 – Plenary Part 3

PANEL SESSION: OCEAN & CLIMATE
"ENVIRONMENTAL ENGINEERING IN THE CONTEXT OF ECOLOGICAL EMERGENCY".

With a perfect blend between Ocean Policy from a European and UNESCO viewpoint, with emphasis on the United Nations Decade of Ocean Science for Sustainable Development (2021-2030) and an IEEE proposition for Clean-tech solutions for Ocean & Climate sustainability, the stage was set for very fruitful discussions.

Plenary Panel session discussion topic and participants.

Thanks to our panelists:

- Zoi Konstantinou – The European Commission policy officer in DG MARE, she is responsible for the European Marine Observation and Data network (EMODnet) and the EU Digital Twin of the Ocean (EU DTO).
- Venugopalan Pallayil – Deputy Head & Principal Research Fellow, National University of Singapore, Vice-President OCEANS, IEEE OES.
- Adam Leadbetter – Lead Manager, Decade Coordination Office for Ocean Data Sharing for UNESCO/IOC.
- Rakesh Kumar – IEEE Chair – IEEE Future Directions and DataPort

Day 2 – When Science Meets Technology: The Exhibit Space was Really Crowded

Day 2 of the conference was the busiest of the OCEANS 2025 four days. After a very well attended Plenary session, all delegates moved to the Exhibit hall where the lunches and coffee breaks were located.

And, on top of the many sessions, we also had an intense panel session on the very acute problem of Plastic Pollution: Tackling Ocean Plastics and Other Forms of Pollution Through Science, Technology, and Policy.

A view of the Exhibit space. 46 booths and more than 500 delegates visiting the opening.

Many thanks to (left to right): Francesco Maurelli, Atmanand, Gwenaëlle Coat, René Garello, Jay Pearlman, Malcolm Heron and Zoe Konstantinou for their inner view of the problem at hand.

Day 3 – Part 1

A busy day: more than 150 papers presented, a Women in Engineering panel and more to come in the next post.

The session rooms were fully attended and the Exhibit was still the place to see all the marine devices, projects and services.

An example of one of the many sessions.

A view of the Women in Engineering panel.

Thanks to the Technical Program team: Christophe Laot, Isabelle Quidu and Jerôme Mars. And the Exhibit one: Céline Liret and Morgane Gélébart.

Day 3 – Part 2

This was the day of the gala dinner at "Les Ateliers des Capucins." 600+ participants, welcomed by the local bagad. And the Student Poster Competition (SPC) Award Ceremony, along with the OES Challenge results. And the results for the SPC: 3rd Prize to Dongwook Lee, from Korea Advanced Institute of Science and Technology (KAIST) - Presented by René Garello on behalf of Lab-STICC. 2nd Prize to Xin Qiao from Memorial University of Newfoundland, Canada - Presented by Michel Gourtay on behalf of Brest Métropole. 1st Prize from University of Waterloo, Canada - Presented by Aymeric Bonnaud on behalf of Naval Group, platinum sponsor of the conference.

Many thanks to the SPC jury:

Weimin Huang; Beatrice Tomasi; M. A. Atmanand; Venugopalan (Venu) Pallayil and our two "Student & SPC" chairs: Frédéric Maussang and Pierre-Jean-Bouvet. And our warmest thanks to ONRG for providing the SPC grants to the students.

Again, thanks to our sponsors, Brest Metropole (Michel Gourtay) and Naval Group (Aymeric Bonnaud).

Third prize presented to Dongwook Lee by René Garello on behalf of the CNRS research group Lab-STICC.

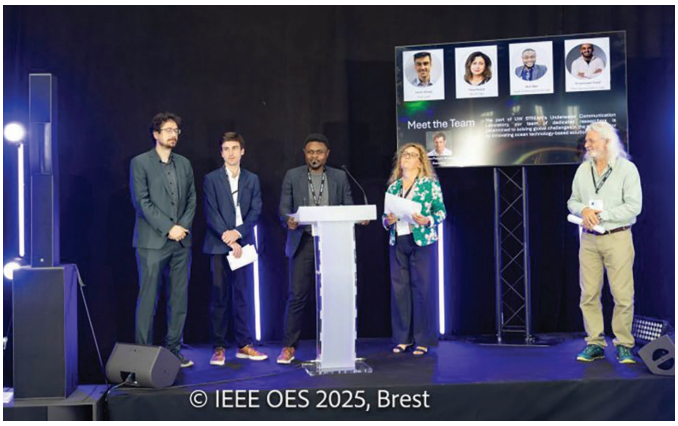
Second Prize presented to Xin Qiao by Michel Gourtay on behalf of Brest Metropole.

Introductory speech by Aymeric Bonnaud from Naval Group before handing the first prize.

First Prize presented to Jayden Hsiao by Aymeric Bonnaud on behalf of Naval Group.

Day 3 – Part 3

And still at the Gala Dinner, we had the presentation of the winner(s) of the OES challenge. This challenge is dedicated to teams of students and young professionals to take on new innovative ideas and technical solutions to address at least one of the ten OD challenges (**oceandecade.org**). Congratulation to the winning team from Dalhousie University.



The OES Ocean Challenge winning team rep from Dalhousie University.

The certificate that was remitted to the Challenge winner.

Meeting of the ties …

Many thanks to Giulia De Masi and Francesco Maurelli for their dedicated supervision of the challenge.

And finally, without them no conference:

- Christophe Laot (IMT Atlantique); Jérôme Mars (Grenoble-Alpes University) and Isabelle Quidu (ENSTA), the Technical Program team.
- Olivia Lahens (TBI/Campus Mondial de la Mer), our local rep and Master of Ceremony of the Plenary keynote speeches.
- Frédéric Maussang (IMT Atlantique) & Pierre-Jean Bouvet (on the right of the picture, ISEN Brest) already mentioned.

The OCEANS 2025 Brest organizing committee (from left to right): Christophe Laot, Jérôme Mars, Isabelle Quidu, Olivia Lahens, Frédéric Maussang, René Garello, Vianney Pichereau, Pierre-Jean Bouvet. Missing: Céline Liret, Diane Di Massa, Matthew Gelis.

- Pascal Lorenz, Conference and IEEE France treasurer.
- Well, myself.
- Vianney Pichereau (VP University of Brest), European contact
- Missing on the pictures: Céline Liret (Oceanopolis), Exhibit Chair; Diane Di Massa (former Mass Maritime Professor), Tutorial chair and Matthew Gelis (Webmaster).

Day 4 – Last But Not Least

The last day had again a very high level of participation to the Scientific and technical sessions, and the Exhibit was quite busy as well. 8 parallel sessions were still running, with the addition of day long "Poster Track."

Through all the presentations, displays and panels, we can certify that we had, indeed, Diversity, Equality/Equity and Integration/Inclusion. And quite a fair number of topics related to the main concern of "Climate & Ocean" in the context of ecological emergency. And the ways to address these "problems" by proposing sustainable clean-tech solutions.

In Brest we are in Land's end county - Pen Ar Bed, in Breton, meaning the end of the world. But here the saying is that it's the beginning of the world. And Infinity being the limit, we'll try to go beyond.

A last tour at the Exhibit before packing.

Another view of a fully attended technical session.

The OES, MTS, future conferences and Brest partners corner.

Career Networking Exhibition Tour (CNET) at OCEANS 2025 Brest

Giulia De Masi, OES AdCom Member

The Career Networking Exhibition Tour (CNET) at OCEANS 2025 Brest offered a unique opportunity for students and young professionals of the IEEE Oceanic Engineering Society (OES) to explore career opportunities in oceanic engineering, guided by experienced OES volunteer mentors.

Continuing the tradition from previous OCEANS editions, this year I had the chance to visit around 40 exhibitors during the first two days of the conference, preselecting 10 booths—all of which expressed interest in participating in CNET by offering internships or job opportunities. Several students and young professionals joined the event.

During the guided tour, participants explored the exhibition hall, met leading companies and organizations, and discovered key players shaping the future of marine technology. More than just a tour, CNET proved to be a valuable networking experience, an opportunity to ask questions, make connections, and start building the professional relationships that can shape a career.

Feedback from participants was very positive, with several noting that the initiative is especially useful for recent graduates and should be promoted more widely. A lesson learned for the next editions!

Two moments of the CNET tour at the Exhibition of OCEANS 2025 Brest.

The Student Poster Competition at OCEANS 2025 Brest

Dr. Shyam Madhusudhana, OES Student Poster Competition Chair
Photo credits: Manu Ignatius

The Student Poster Competition (SPC) has been a cherished tradition at OCEANS conferences ever since its introduction by Col. Norman Miller at the 1989 Seattle meeting. Over the decades, it has evolved into a highly anticipated feature of MTS/IEEE-OES OCEANS events, drawing talented undergraduate and graduate students from universities and research institutions worldwide. The SPC offers these emerging scientists a unique platform to share their research, network with peers and professionals, and gain visibility within the global ocean science and engineering community.

For each conference, prospective participants submit abstracts that undergo a rigorous two-stage review process. From this pool, around top 20 highly-competitive submissions are shortlisted, and the candidates invited to take part in the final program. These finalists benefit from waived registration fees and receive financial assistance to help cover travel and lodging expenses—support made possible through the continued generosity of the Office of Naval Research Global (ONR-G), whose support helps us celebrate the next generation of ocean professionals. Prize money funding for this edition was

Student participants along with sponsoring societies' representatives Shyam Madhusudhana (IEEE-OES) and Justin Manley (MTS).

(L-to-R) Judges Weimin Huang, Beatrice Tomasi, M. A. Atmanand, Venugopalan Pallayil, and LOC SPC co-Chairs Pierre-Jean Bouvet (also a judge) and Frederic Maussang.

Top three winners: (L-to-R) Dongwook Lee (3rd), Jayden Hsiao (1st), and Xin Qiao (2nd).

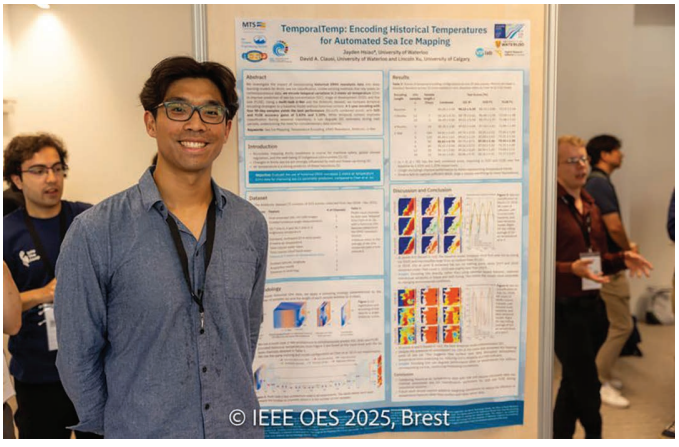
provided by local organizations and were arranged for by the conference General Chair Rene Garello.

The SPC at OCEANS 2025 Brest was handled by local organizing committee (LOC) SPC co-Chairs Frederic Maussang and Pierre-Jean Bouvet. This edition drew over a hundred abstract submissions. From these, 22 were shortlisted for presentation during the conference. Unfortunately, one candidate could not travel to France due to prevailing geopolitical hurdles. The poster sessions attracted steady interest throughout the event, with judges engaging the finalists in detailed discussions about their work. The panel of judges—all volunteering their time—played an essential role in providing feedback and selecting the winners.

The competition concluded with the awards ceremony during the gala evening. Certificates of participation were presented by the OES SPC Chair, Shyam Madhusudhana, and the MTS President, Justin Manley. Top three awards were presented by the respective sponsors, closing another successful chapter in the SPC's long-running history.

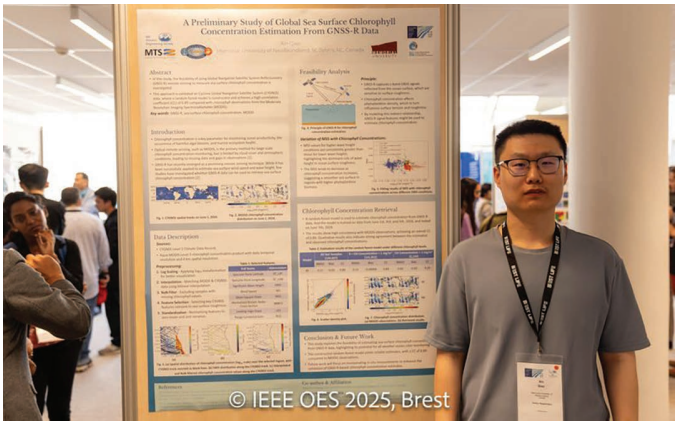
The list of participants (including the prize winners) together with their affiliation, poster title and an abstract of their poster are given below. Apologies to the participants whose photos aren't included.

First prize (Norman Miller Award) (Certificate and $3,000)
Jayden Hsiao, University of Waterloo, Canada
TemporalTemp: Encoding Historical Temperatures for Automated Sea Ice Mapping



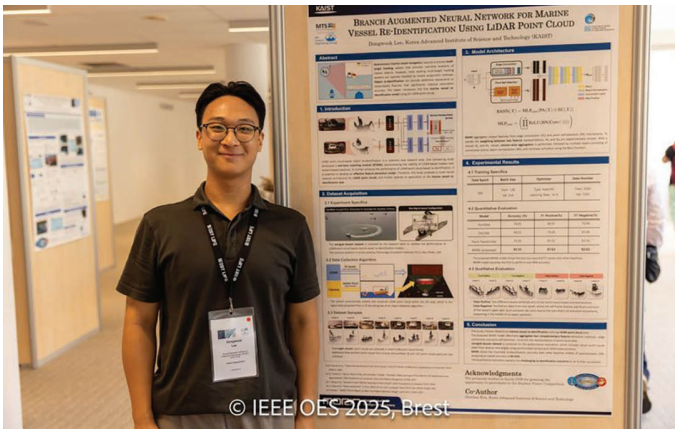
Abstract—This paper investigates the impact of incorporating historical ERA5 reanalysis data into deep learning models for Arctic sea ice parameter prediction. While existing approaches primarily rely on contemporaneous observations, we explore whether encoding temporal variations in ERA5 2-meter air temperature (t2m) can improve classification of sea ice concentration (SIC), stage of development (SOD), and floe size (FLOE). Using a multi-task U-Net architecture, we evaluate different temporal encoding strategies on the AI4Arctic dataset, comparing performance against a baseline model without historical context. Our results show that a 1-year encoding with 4 samples of 90 days each achieves the best overall performance (85.62% combined score), improving SOD and FLOE classification by 1.43% and 1.20% respectively. Qualitative analysis reveals that temperature encoding helps distinguish ice types during transitional seasons but can degrade SIC estimation during melt conditions when air temperatures become misleading indicators. These findings demonstrate that carefully designed temporal encodings can enhance sea ice classification while highlighting the need for complementary data sources to address limitations during melt periods.

Second Prize (Certificate and $2,000)
Xin Qiao, Memorial University of Newfoundland, Canada
A Preliminary Study of Global Sea Surface Chlorophyll Concentration Estimation From GNSS-R Data



Abstract—Chlorophyll concentration serves as a key indicator of marine primary productivity, and accurate measurement of chlorophyll is essential for monitoring ocean ecosystems and understanding the impact of climate change on oceans. While optical sensors, such as Moderate Resolution Imaging Spectroradiometer (MODIS), provide valuable chlorophyll concentration information by calculating reflectance values at different bands, they are limited by cloud cover and other environmental factors. In contrast, Global Navigation Satellite System Reflectometry (GNSS-R) is not affected by cloud cover but the use of GNSS-R data for global sea surface chlorophyll concentration retrieval remains unexplored. This study addresses this gap by analyzing the feasibility of using GNSS-R data and conducting experiments with CYGNSS data. The results demonstrate the potential of the random forest model in estimating chlorophyll concentrations from GNSS-R data, achieving a root mean square difference (RMSD) of 0.17 and a correlation coefficient (CC) of 0.89.

Third Prize (Certificate and $1,000)
Dongwook Lee, Korea Advanced Institute of Science & Technology, Korea
Branch Augmented Neural Network for Marine Vessel Re-Identification Using LiDAR Point Cloud

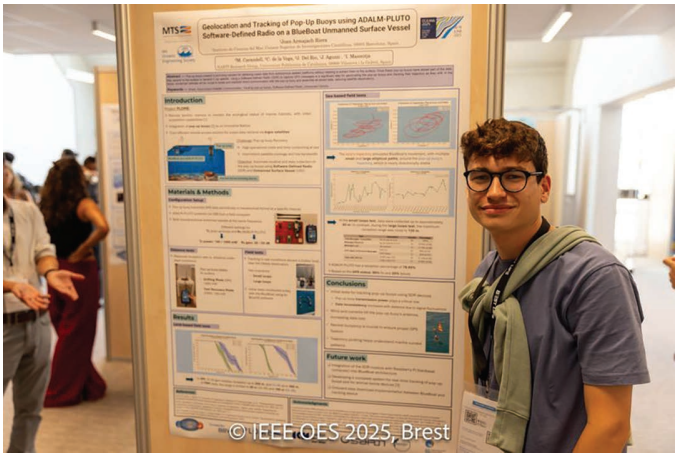


Abstract—This paper introduces the first marine vessel re-identification model using 3D LiDAR point clouds. Although various models for processing 3D LiDAR data have been developed, their application to marine vessel re-identification remains underexplored. In this work, we evaluate the performance of multiple existing point cloud processing models specifically for vessel re-identification tasks and propose a novel model, the Branch-Augmented Neural Network (BANN), designed to effectively aggregate multiple feature representations and capture diverse aspects of vessel geometry and appearance. For evaluation purposes, we introduce the Jeongok-Vessels dataset, comprising 360-degree point cloud views of eight distinct vessels. This dataset was collected at Jeongok Port, Republic of Korea, using a camera-to-LiDAR back-projection technique. Experimental results validate the feasibility of 3D LiDAR point cloud-based marine vessel re-identification, demonstrating that BANN's multi-branch feature aggregation significantly enhances re-identification accuracy compared to baseline methods.

Chafaa Lyes Abbassen, ISEN Yncréa OUEST, France
Exhaustive Testing of Subspace Modal Estimation for Pekeris waveguide

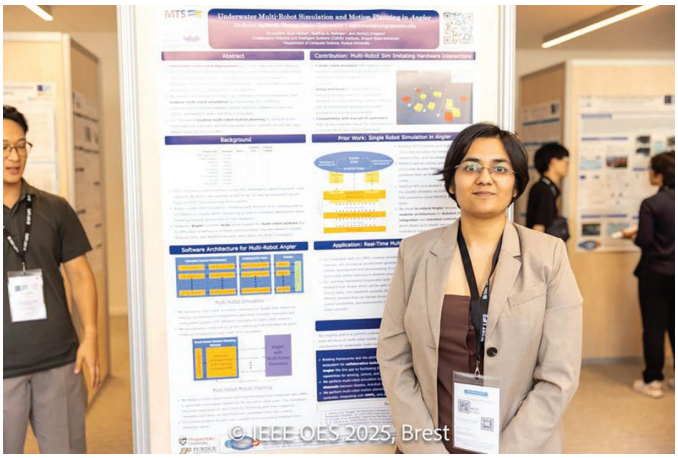
Abstract—In this paper, we consider a shallow water environment modeled as an acoustic waveguide. Our study investigates the effect of varying the physical parameters (sound speed and density) of a Pekeris waveguide on the performance of a recently developed modal functions estimation algorithm. Conducted numerical experiments show that the bottom's density affects neither the number of modes nor the estimation error. Instead, they increase as the seabed sound speed rises. Moreover, results suggest that the apparition of additional modes causes a loss in the modal reconstruction accuracy. Finally, we deduced that waveguides with higher bottom velocity require a lower noise level in order to estimate correctly the modal functions.

Joan Armajach, Institut de Ciències del Mar, Spain
Geolocation and Tracking of Pop-Up Buoys using ADALM-PLUTO Software-Defined Radio on a BlueBoat Unmanned Surface Vessel



Abstract—Pop-up buoys present a promising solution for obtaining diverse ocean data from stand-alone, seafloor oceanographic platforms without needing to extract them to the surface. Once these pop-up buoys have stored part of the data, they ascend to the surface with the purpose of sending fragments of data via satellite. Using a Software-Defined Radio (SDR) receiver installed on a surface vehicle to capture the GPS messages is a significant step towards the automatization of geolocating the popup buoys and tracking their trajectory as they drift. Here we have demonstrated their feasibility and performance in laboratory condition tests and field campaigns. In the future, the implementation of an unmanned vehicle will be crucial to locate and establish direct communication with the pop-up buoy and assemble all stored data without relying on the passage of satellites. Additionally, it could be used as an aid to localise and recover these devices, reducing the time spent in the sea by the researchers and therefore their cost.

Akshaya Agrawal, Oregon State University, USA
Underwater Multi-Robot Simulation and Motion Planning in Angler



Abstract—Deploying multi-robot systems in underwater environments is expensive and lengthy; testing algorithms and software in simulation improves development by decoupling software and hardware. However, this requires a simulation framework that closely resembles the real-world. *Angler* is an open-source framework that simulates low-level communication protocols for an onboard autopilot, such as *ArduSub*, providing a framework that is close to reality, but unfortunately lacking support for simulating multiple robots. We present an extension to *Angler* that supports multi-robot simulation and motion planning. Our extension has a modular architecture that creates non-conflicting communication channels between Gazebo, ArduSub Software-in-the-Loop (SITL), and MAVROS to operate multiple robots simultaneously in the same environment. Our multi-robot motion planning module interfaces with cascaded controllers via a Joint-Trajectory controller in ROS 2. We also provide an integration with the Open Motion Planning Library (OMPL), a collision avoidance module, and tools for procedural environment generation. Our work enables the development and benchmarking of underwater multi-robot motion planning in dynamic environments.

Youssef Attia, University of Genoa, Italy
Dynamic Goal-Based Adaptive Line of Sight: An X300 AUV Case-study

Abstract—Path-following control is a well-known problem in autonomous vehicle guidance, especially in aerial and marine contexts. The popular Line-of-Sight guidance algorithm specifies heading changes according to a constant lookahead distance, which efficiently reduces cross-track errors. Yet, its performance deteriorates in dynamic contexts with sharp turns, high vehicle speeds, or external disturbances such as ocean currents. To alleviate these limitations, Adaptive Line-of-Sight (ALOS) methods have been formulated to compensate for unknown disturbances, yet they still rely on a fixed lookahead distance, jeopardizing their effectiveness in complex three-dimensional navigation scenarios.

This paper presents a Dynamic Goal-Based ALOS method enhancing the standard solution through a real-time adaptive lookahead distance mechanism. In contrast to current approaches, our method adaptively tunes the lookahead distance according to cross-track and vertical-track errors and the path curvature for better tracking performance in high-curvature 3D settings. Numerical tests were carried out in a ROS2-based simulation with the X300 Autonomous Underwater Vehicle. The results show that the new method minimizes both cross-track and vertical track errors over fixed lookahead approaches, especially for difficult serpentine trajectories.

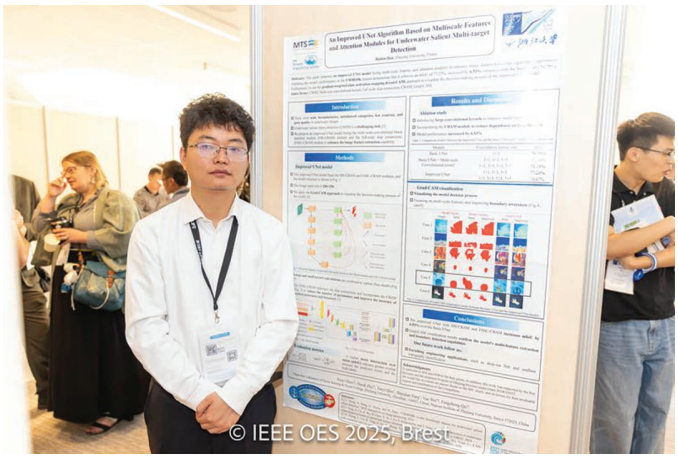
Javier Busquets-Mataix, Universitat Politècnica de Valencia, Spain
Advances in the Alba Series of Hybrid Underwater Gliders for Long-Term Ocean Operations

Abstract— Autonomous underwater gliders have become a key technology in long-term ocean monitoring due to their low

power consumption and high endurance. These vehicles, typically propelled by buoyancy variations, can cover thousands of miles over weeks or months at sea. However, their main limitation lies in their low cruising speed—usually around 0.2–0.3 m/s—which restricts their ability to respond quickly to dynamic environmental conditions. Navigation in strong currents, rapid vertical profiling, and precise maneuvering in complex underwater terrain are often beyond the capabilities of conventional buoyancy-driven gliders.

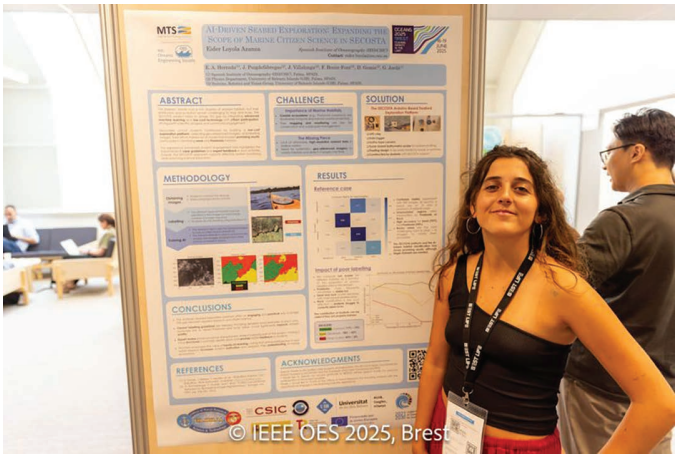
To address these challenges, this work presents the advances from the first operative version of the Alba series, a hybrid underwater glider with three independent propulsion systems. These systems are based on an oil-based buoyancy engine complemented with a compressed gas module for rapid depth changes, and a pair of electric propellers for active thrust. This configuration allows the vehicle to switch between passive gliding and active propulsion depending on mission needs and environmental conditions. The oil-buoyancy pump system enables long-range energy-efficient navigation. The compressed gas-based system adds vertical mobility during fast transitions by increasing the total buoyancy force in case of the presence of water column high energetic condition. Meanwhile, the electric propellers offer enhanced yaw control, extra thrust in the previous conditions, fine maneuverability, and the ability to navigate confined or turbulent areas. By combining these three systems, the Alba22 glider improves overall responsiveness, flexibility, and adaptability, offering a promising platform for a new generation of smart, autonomous oceanographic vehicles. This hybrid architecture imposes significant design changes over conventional gliders, which are also addressed in this work to inform future development of multi-modal underwater propulsion systems.

Haibin Han, Zhejiang University, China
An Improved UNet Algorithm Based on Multiscale Features and Attention Modules for Underwater Salient Multi-target Detection



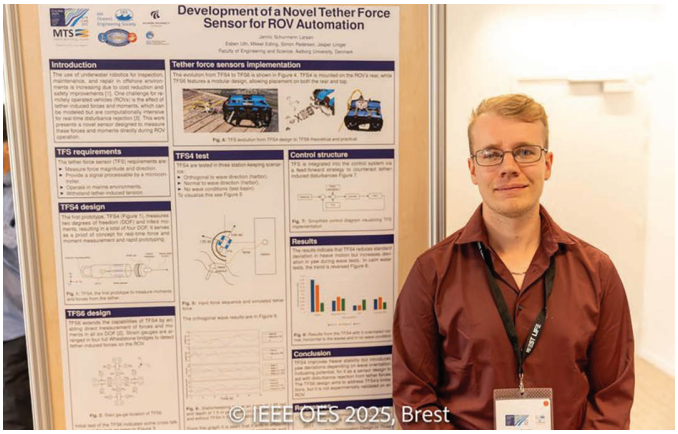
Abstract—Underwater salient object detection (USOD) has attracted increasing research attention in underwater exploration for its applications in various underwater vision tasks. However, factors such as low contrast, poor quality, and significant changes in the object scale of underwater images often degrade the performance of USOD, making it challenging to meet practical demands. Therefore, this paper proposes an improved UNet model incorporating multi-scale features and attention modules to enhance its feature extraction capability. To validate our model, we selected the USOD10K dataset, known for its high diversity, complexity, and scalability. The results show that the improved UNet model achieved a mIoU of 77.23%, representing a 6.53% increase over the standard UNet's 70.70% . It is expected that the application of this model helps to enhance detection accuracy. The Gradient-weighted Class Activation Mapping (Grad-CAM) approach enhances the understanding of the decision-making process of the improved UNet model, which focuses on more information at different scales than the base UNet model.

Eider Loyola Azanza, Spanish Institute of Oceanography, Spain
AI-Driven Seabed Exploration: Expanding the Scope of Marine Citizen Science in SECOSTA



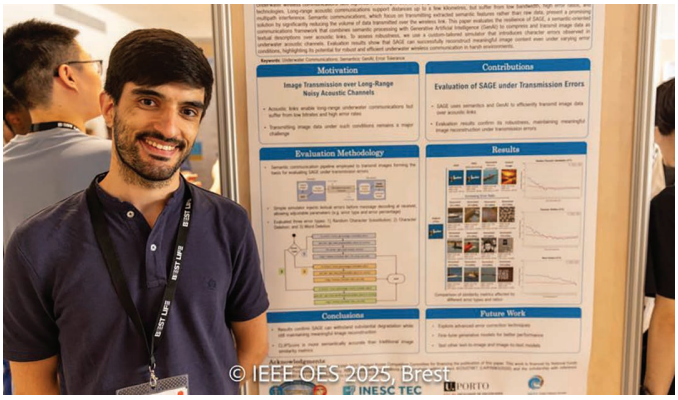
Abstract—The Balearic Islands are home to a rich diversity of seabed, yet their distribution and evolution remain challenging to map and study, which has become a priority in the EU-marine strategy directive. The SECOSTA project contributes to bridge this gap by integrating advanced machine learning and low-cost technology with citizen participation, driving both scientific progress and community engagement. In this paper, we present an AI-Driven Seabed Exploration platform, an innovative tool built by secondary school students that integrates a submersible camera with GPS and a bathymetric probe to collect high-resolution seabed images alongside geo-referenced bathymetric data. The collected images are labelled by the students, so they can be used to train a convolutional neural network inspired by U-Net to identify seabed habitats. In terms of citizen science goals, the results obtained with this platform are promising, as the model can predict seabed habitat with skills comparable to expert-based identification. Also, the procedure ensures social engagement connecting with a population (secondary school students) which are often difficult to mobilize. The limitations and future improvements of the initiative are also discussed.

Jannic S. Larsen, Aalborg University, Denmark
Development of A Novel Tether Force Sensor for ROV Automation



Abstract—An issue that ROVs experience during operations is disturbances from the tether, making navigation and control more difficult as real-time measurements are not currently available. This paper proposes the development of an innovative sensor that can measure tether forces in multiple degrees of freedom. These tether forces apply an external disturbance during operation, which is difficult to model and predict. The sensor provides real-time input on the effect the tether has on the ROV, which can be utilized in feed-forward in the control system in combination with a feedback loop. There are 2 proposed designs: a 4 DOF sensor design using a plastic bottle and a 6 DOF version utilizing an aluminum cross with hollowed sections. Both designs use strain gauges to measure and determine the direction and magnitude of the force from the tether. The sensors are implemented to a modified BlueROV2 using ROS. Station-keeping tests in a harbour and test basin are done for the 4 DOF version to evaluate performance. The sensor shows potential, improving response in heave but worsening it in yaw. It removes and adds oscillations both in frequency and amplitude depending on the orientation of the waves relative to the sensor. Indicating alternative control strategies might be more suitable. The 6 DOF version is not tested on the BlueROV2. In future work, additional development is required to ensure the viability of the tether force sensor as a commercial product.

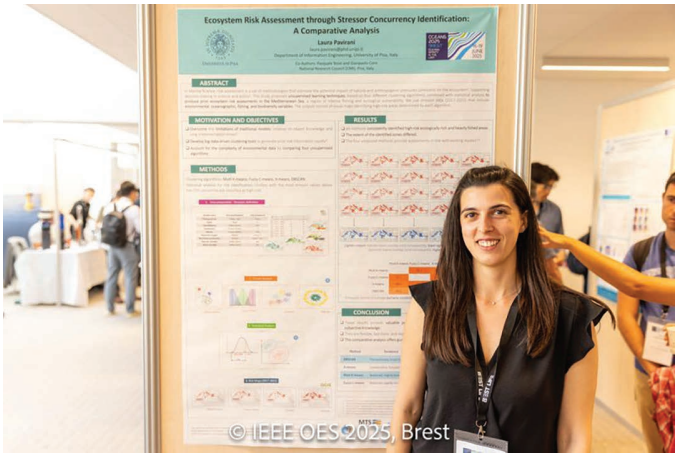
João Pedro Loureiro, Universidade do Porto, Portugal
On the Resilience of Underwater Semantic Wireless Communications



Abstract—Underwater wireless communications face significant challenges due to propagation constraints, limiting the effectiveness of traditional radio and optical technologies. Long-range acoustic communications support distances up to a few kilometers, but suffer from low bandwidth, high error ratios, and multipath interference. Semantic communications, which focus on transmitting extracted semantic features rather than raw data, present a promising solution by significantly reducing the volume of data transmitted over the wireless link.

This paper evaluates the resilience of SAGE, a semantic-oriented communications framework that combines semantic processing with Generative Artificial Intelligence (GenAI) to compress and transmit image data as textual descriptions over acoustic links. To assess robustness, we use a custom-tailored simulator that introduces character errors observed in underwater acoustic channels. Evaluation results show that SAGE can successfully reconstruct meaningful image content even under varying error conditions, highlighting its potential for robust and efficient underwater wireless communication in harsh environments.

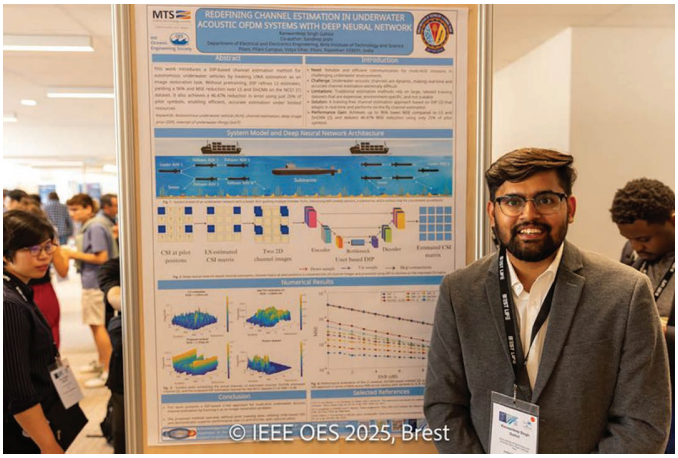
Laura Pavirani, Università di Pisa, Italy
Ecosystem Risk Assessment through Stressor Concurrency Identification: A Comparative Analysis



Abstract—In Marine Science, ecosystem risk assessment is a process that integrates data to estimate the potential impact of harmful and fragile forces (*stressors*) on the ecosystem. Nowadays, the management of marine ecosystems is increasingly complex due to multiple stressors, including human activities and climate change, and requires robust tools to address challenges effectively. We present big data-driven methods that enable a rapid, simultaneous analysis of multiple stressors using unsupervised learning techniques and statistical analysis to produce *prior* ecosystem risk assessments. We apply four cluster analysis methods based on Multi K-means, Fuzzy C-means, X-means, and DBSCAN, to identify stressor concurrency areas in Mediterranean Sea data from 2017 to 2021. These data include stressor variables related to environmental, oceanographic, fishing, and biodiversity factors. The methods assess ecosystem risk by detecting high stressor concurrency conditions. Finally, they produce maps that highlight potential high-risk regions. We compare the results of the four methods to

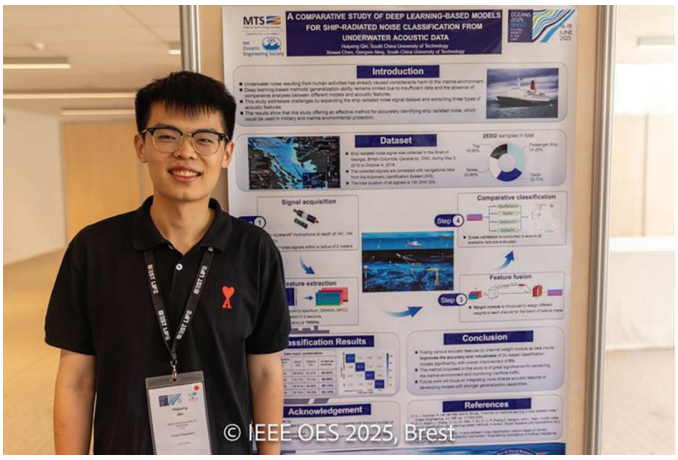
examine the similarities and differences in their abilities to detect high-risk areas. From the Mediterranean data, all methods jointly indicate known high-risk areas but differ in the extent of the identified areas. Our comparative analysis highlights the importance of selecting the most appropriate clustering technique based on the balance between *precautionary* (highlighting broader areas) and *conservative* (highlighting smaller areas) perspectives. The results provide information that should be used in ecosystem models and marine spatial planning to improve the accuracy and objectivity of ecosystem risk assessment and management strategies.

Kanwardeep Singh Gahlot, Birla Institute of Technology and Science, India
Redefining Channel Estimation in Underwater Acoustic OFDM Systems with Deep Neural Network



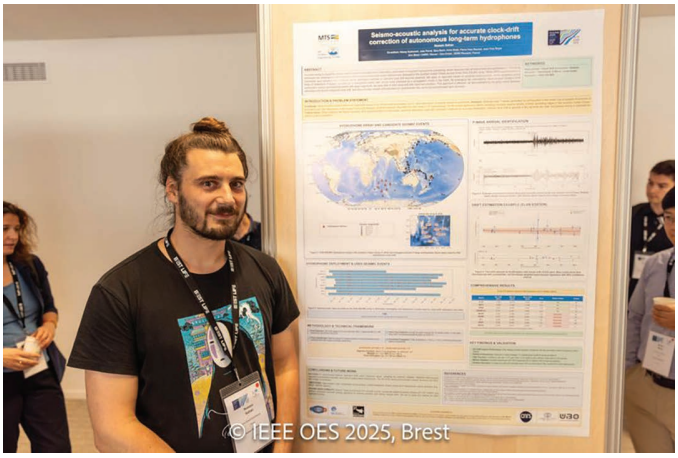
Abstract—This paper introduces a novel method for channel estimation in underwater acoustic communication in an autonomous underwater vehicular network. The proposed method employs a denoising technique to refine least squares (LS) channel estimates using deep image prior (DIP). By establishing an equivalence between underwater acoustic (UWA) channel estimation and image denoising, we leverage DIP to enhance estimation accuracy. The proposed approach is validated on the Norway continental shelf (NCS1) watermark dataset, demonstrating superior performance with average mean square error reductions of 96.64% and 96.09% compared to LS and the deep denoising convolutional neural network (DnCNN), respectively. Furthermore, the proposed analysis of pilot symbol utilization in the DIP-based estimator shows a 46.47% error reduction, even when using only 25% of the pilot symbols. By efficiently utilizing available resources, the proposed method enhances spectral efficiency and enables accurate estimation, even with limited pilot signals.

Haipeng Qin, South China University of Technology, China
A comparative study of deep learning-based models for ship-radiated noise classification from underwater acoustic data



Abstract—Underwater noise resulting from human activities has already caused considerable harm to the marine environment. Ship radiated noise, as the primary source of human-induced underwater noise, plays a crucial role in accurately and efficiently classifying such noise to safeguard the marine ecosystem. Although deep learning (DL)-based methods have been shown to enhance classification accuracy and efficiency, their generalization ability remains limited due to insufficient data and the absence of comparative analyses between different models and acoustic features. This study addresses these challenges by expanding the ship radiated noise signal dataset and extracting three types of acoustic features. The classification accuracy of different models with various feature combinations is evaluated, and the results show that feature fusion improves the model's classification accuracy by an average of over 8%, offering an effective method for accurately identifying ship radiated noise.

Romain Safran, Univ Brest/CNRS/Ifremer, France
Seismo-acoustic analysis for accurate clock-drift correction of autonomous long-term hydrophones



Abstract—Accurate timing is crucial for precise seismic event localization from trilateration, particularly in long-term hydrophone monitoring, which assumes that all instruments are synchronized. This study addresses the challenge of estimating clock drift in autonomous underwater hydrophones deployed in the southern Indian Ocean as part of the OHA-SIS-BIO array. When GPS synchronization is impossible upon recovery due to battery failure, alternative methods to estimate clock drift become essential. We apply an

approach based on weighted least-squares, which compares arrival-times of teleseismic P-waves recorded on a hydrophone station with arrival-times predicted by a propagation model in the Earth. By leveraging the International Seismological Center's EHB earthquake catalog and selecting events with large magnitude, we were able to infer clock drift with improved precision. This approach is effective, as demonstrated by the good match between calculated and directly measured clock drift, and thus provides reliable drift estimates for hydrophones that cannot be synchronised upon recovery.

Tyméa Perret, Ifremer, France
Target tracking in multibeam water-column images based on acoustic simulation of beam forming artifacts

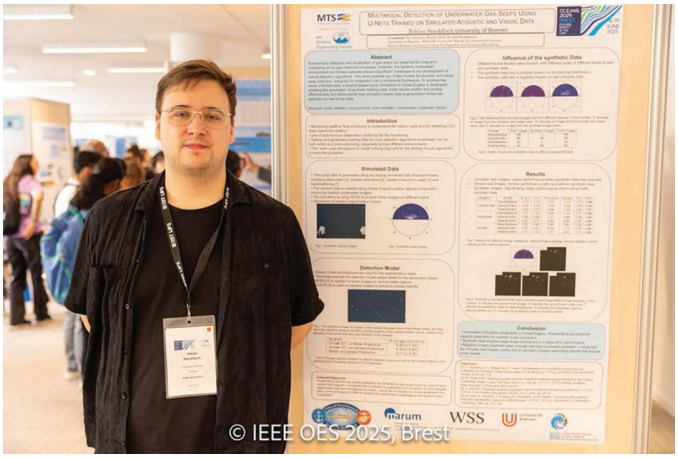
Abstract—Multibeam echosounders have revolutionized underwater exploration, enabling the study of biological and geophysical phenomena such as fish distribution and gas venting. We employed automated deep-learning methods to analyze the large volume of water-column data, thus obtaining a big database of water-column echoes of different types. The subsequent objective is to ascertain the relationships between these echoes. Consequently, it is imperative to reintegrate physical principles into our analytical framework.

Due to antenna sidelobes, multibeam water-column images are known for artifacts known as ghost echoes. Modeling these ghost echoes is notoriously difficult due to the complexity of the antenna directivity function. Discriminating them from primary echoes is challenging, and multibeam manufacturers still need to solve both tasks.

Our research addresses this gap with a novel approach to tracking water-column echoes combining multibeam simulation, to account for the geometry of beam directivity and sidelobe effects, with graph representation to model relationships between echoes. This method allows to track and cluster water-column echoes by bridging simulation, graph representation, and acoustic physics. This method identifies whether an echo is a ghost or other echo by (i) approximating the mean sidelobe levels under a simplified hypothesis (ii) simulating the along/across-track positions and levels from an echo detected with an automatic detector and a multibeam survey toolbox and (iii) analyzing geometric and level relationships between echoes from simulated acoustic point clouds. The method then (iv) represents these relationships in the form of a graph that respects multibeam sounder directivity. Importantly, this approach bypasses the need to accurately reproduce sidelobe positions in the directivity pattern, focusing instead on relative acoustic levels and geometric relationships between echoes.

We tested this approach on different multibeam surveys to ensure the generalizability of this method. Results demonstrate that our method works effectively in a range of contexts, including echoes of a single target from successive water-column images, ghost echoes in the across and along axes, and multiple distinct target echoes within the same water-column image.

Niklas Stockfisch, University of Bremen, Germany
Multimodal Detection of Underwater Gas Seeps Using U-Nets Trained on Simulated Acoustic and Visual Data



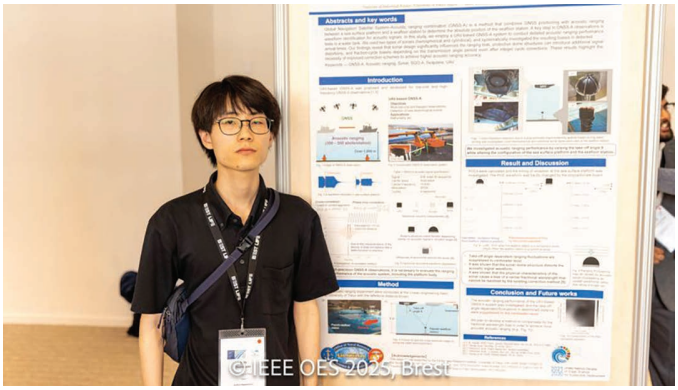
Abstract—Autonomous detection, quantification, and sampling of natural or anthropogenic gas seeps from the seafloor are crucial for sustainable and efficient long-term monitoring of bio-geochemical processes and environmental changes. The unstructured and dynamic underwater environment requires robust multimodal approaches for object detection, but the lack of large datasets complicates algorithm development and training. This paper addresses these challenges by developing two U-net models for acoustic and vision-based seep detection, which can be integrated into a multimodal detection framework. The Unreal Engine is used for realistic high-resolution imaging, and a first-principle physics-based sonar simulation is integrated for efficient and accurate training of the acoustic U-net. Preliminary results demonstrate the efficacy of the trained detection models and show that data augmentation based on sonar simulation improves detection performance on real-world sonar datasets.

Craig Stewart, Robert Gordon University, UK
Effects of Suspended Material on the Bit Error Ratio of Underwater Wireless Optical Links

Abstract—Visible light communication (VLC) in the underwater environment has the potential to significantly enhance the performance of underwater networks by improving energy efficiency and channel capacities. This study investigates how suspended particulates affect the Bit Error Ratio (BER) in VLC links. A Literature review, series of simulations and practical experiments were conducted using a test tank and an optical communication system to evaluate received power characteristics and BER performance over short-range links through water with varying levels of particulate matter. The study also explored the impact of forward error correction (FEC) techniques, including Reed-Solomon and Hamming codes, to assess their effectiveness in improving link reliability. The results showed that, as expected, the red wavelength laser diode outperformed the green wavelength laser diode over discrete link distances in the scattering medium. Regarding BER and FEC, the cloudy water environment exacerbated BER issues. However, the Reed-Solomon code solved the errors to successfully recover the original data

across the link in both clear and cloudy water, whereas the Hamming code reduced errors, but not sufficiently to eliminate all error propagation. Thus, the Reed-Solomon code proved to be the most effective in both clear and cloudy waters. Despite this, the experiment highlighted the inherent challenges of maintaining a reliable VLC link, as significant BER remained even in clear water with short-range communication.

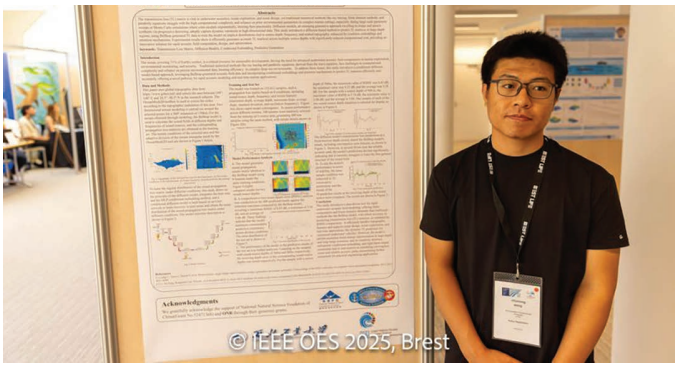
Yuto Yoshizumi, University of Tokyo, Japan
Evaluation of acoustic ranging performance of UAV-based GNSS-A observation system by water tank experiment



Abstract—Global Navigation Satellite System–Acoustic ranging combination (GNSS-A) is a technique that combines GNSS positioning with acoustic ranging between a sea surface platform and a seafloor station to determine the absolute position of the seafloor station. A key step in GNSS-A observations is waveform identification for acoustic signals. In this study, we employ a UAV-based GNSS-A system to conduct detailed acoustic ranging performance tests in a water tank. We used two types of sonars (hemispherical and cylindrical), and systematically investigated the resulting biases in detected arrival times. Our findings reveal that sonar design significantly influences the ranging bias, protective dome structures can introduce additional signal distortions, and fraction-cycle biases depending on the transmission angle persist even after integer-cycle corrections. These results highlight the necessity of improved correction schemes to achieve higher acoustic ranging accuracy.

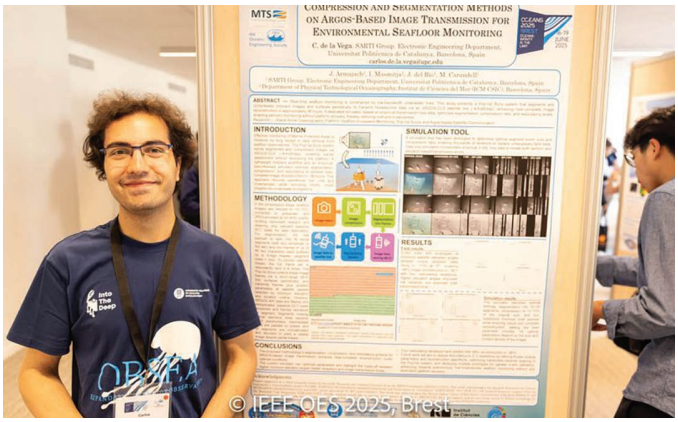
ChuXiong Wang, Northwestern Polytechnical University, China
Prediction of Large-Depth Transmission Loss Matrices Using Conditional Diffusion Models

Abstract—The transmission loss (TL) matrix is vital in underwater acoustics, ocean exploration, and sonar design, yet traditional numerical methods like ray tracing, finite element methods, and parabolic equations struggle with the high computational complexity and reliance on prior environmental parameters in complex marine settings, especially during large-escale parameter sweeps or Monte Carlo simulations where costs escalate exponentially, limiting their practicality. Diffusion models, an emerging generative approach excelling in image and speech synthesis via progressive denoising, adeptly capture dynamic variations in high-dimensional data. This



study introduces a diffusion-based method to predict TL matrices in large-depth regions, using Bellhop-generated TL data to train the model on implicit distributions tied to source depth, frequency, and seabed topography, enhanced by condition embeddings and attention mechanisms. Experimental results show it efficiently generates accurate TL matrices across multiple source depths with significantly reduced computational cost, providing an innovative solution for rapid acoustic field computation, design, and optimization.

Carlos de la Vega, Universitat Politècnica de Catalunya, Spain
Compression and Segmentation Methods on Argos-Based Image Transmission for Environmental Seafloor Monitoring



Abstract—Real-time seafloor monitoring through a network of stand-alone benthic platforms is challenging due to the limitations of underwater communications. In this context, an image transmission methodology has been developed for the Pop-Up buoy technology, which has proven effective in ensuring the transfer of environmental information from the seafloor to the land. Images taken by a stand-alone seafloor observatory camera are segmented and compressed, and sent to the surface in a Pop-Up buoy periodically, which will then transmit the compressed image's hexadecimal data through an ARGOS-CLS satellite link. The methods have proven useful, as in the best of cases, given a satellite transmission rate of 4.6 kB/day, a compressed image was sent through this satellite link in approximately 96 hours for its nearly complete image reconstruction. A simulation tool has been developed to ensure that optimal parameters are used during the process. This novel approach would ensure periodic monitoring of underwater areas of interest without the cost of having to recover benthic platforms and with the least possible invasiveness.

Mapping Sea Ice, Building Bridges: Reflections from a Student Poster Experience in Brest

Jayden Hsiao, University of Waterloo — OCEANS 2025 Brest SPC First Prize Winner

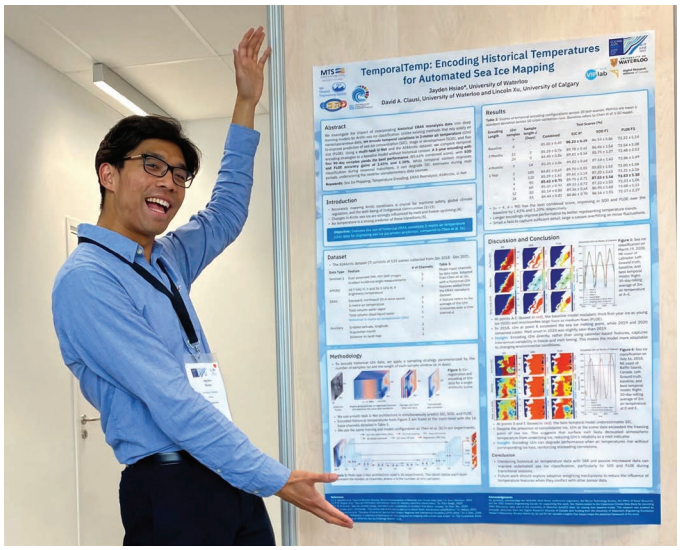
My recent experience at the OCEANS conference in Brest, France, culminating in winning the Student Poster Competition, was nothing short of transformative. Supported by the Office of Naval Research (ONR) and IEEE OES, this opportunity provided an unparalleled platform to share my research, engage with the global ocean engineering community, and forge lasting connections.

My research focuses on automated sea ice mapping using remote sensing, specifically leveraging space-borne Synthetic Aperture Radar (SAR) and passive microwave imagery. Presenting this work at the poster competition was initially daunting – the first night was admittedly sleepless! However, any nerves were quickly dispelled by the encouraging atmosphere fostered by fellow competitors, judges, and attendees. The insightful questions and engaging discussions validated the relevance of my work and opened doors to valuable academic connections.

The poster competition location proved excellent, positioned right next to the food and drinks during coffee breaks and lunches. This spot ensured consistently high traffic, leading to rich discussions with experts both within and far beyond my specific niche. While deeply immersed in remote sensing, the conference exposed me to a thrilling array of cutting-edge ocean technologies: the intricate world of autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROVs), the innovation behind biomimetic sensors, advanced LIDAR reconstructions of sea beds, the endurance of ocean gliders, and the practicalities of edge computing in marine environments. This broad exposure highlighted the incredible cross-functional collaboration potential where electronics, mechanical design, and computing converge to explore and understand our oceans.

Beyond the technical program, the social and cultural aspects were equally enriching. As my first time in France, it was a joy to practice the French learned within the Canadian educational system. The organized events – the Welcome Reception at the stunning Oceanopolis aquarium, the Student Mixer, the main conference at Le Quartz Congress Center, and the unforgettable Gala Dinner at Ateliers des Capucins – provided fantastic venues to connect. Most rewarding were the spontaneous evening dinners and drinks shared with newfound friends from around the world and members of the organizing committee. A special note of gratitude goes to the delegation from MIT Sea Grant for their companionship and knowledge-sharing throughout the event. And, of course, Brest served up the best seafood I've ever had!

This journey – from initial apprehension to the thrill of winning and the wealth of experiences gained – was made possible by the generous support of ONR and IEEE OES. The conference was not just a competition; it was a vibrant educational experience that solidified my passion for ocean engineering, expanded my horizons, and connected me with an inspiring network of ambitious and intelligent peers and mentors from across the globe. I am deeply grateful for this incredible opportunity and the supportive community that defines IEEE OES.



Me showcasing the poster I presented. My graphic design skills from high school and internships came in handy!

The small but mighty delegation from Kitchener-Waterloo, Ontario, Canada in front of Château de Brest.

SPC Experience at OCEANS 2025 Brest

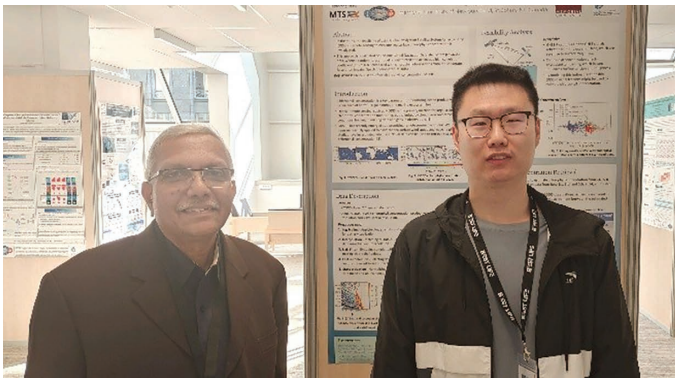
Xin Qiao, OCEANS 2025 Brest SPC Second Prize winner

It was a truly special experience to attend the OCEANS conference for the third time, and the Student Poster Competition (SPC) for the second one. Having previously participated in OCEANS 2024 Singapore and Halifax, I thought I knew what to expect, but this year's conference in Brest, France, brought me a whole new level of challenge, excitement, and gratitude.

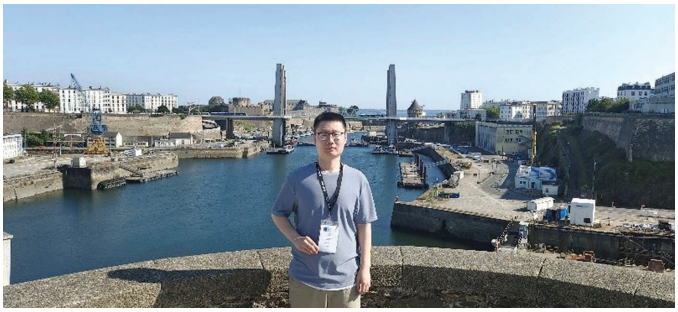
When I first received the SPC acceptance email, I was thrilled. However, that excitement was soon tempered by a significant hurdle—my visa was delayed, and I was unable to attend the kickoff meeting organized by the SPC chairs. It was unfortunate not to be able to engage with the SPC cohort from the start. Nonetheless, I remained hopeful and focused on preparing my poster, refining my presentation, and ensuring that every detail was covered when I arrived. Despite the visa problem, I made it to Brest just in time to attend the welcome reception. It was held in Oceanopolis, a beautiful aquarium overlooking the harbor. As I entered, I was immediately impressed by the diversity and energy in the room—students, professors, engineers, and industry professionals from all over the world were mingling over local food and wine, exchanging stories about their research and travels.

Presenting my poster in front of experts from academia and industry was both nerve-wracking and exhilarating. I rehearsed key points in mind, prepared different versions of my presentation depending on the audience, and anticipated questions they might ask. What inspired me most was the quality of interactions I had—not only did I receive valuable technical feedback on my research in GNSS-R-based ocean remote sensing, but I also had the chance to explore potential directions I hadn't previously considered. Each conversation became a spark for new ideas and future research.

Winning second place among more than one hundred poster submissions was an incredible honor. The recognition served as an affirmation of the hard work I've engaged in my Ph.D. journey and reinforced my motivation to keep pushing the boundaries of what's possible through satellite data and deep learning for ocean monitoring. I am sincerely grateful to the IEEE Oceanic Engineering Society (OES) and the SPC organizers and sponsors for making this experience possible. Special thanks to the Office of Naval Research (ONR) for their generous support, which allowed me to enjoy OCEANS in person. I also want to thank my supervisor, Prof. Weimin Huang, for encouraging me to participate in SPC and for his continuous guidance throughout this conference and my entire Ph.D. journey.



With Dr. Atmanand from Indian Institute of Technology Madras.



In Brest.

Beyond the academic and technical insights, Brest itself is a warm and vibrant city. I particularly enjoyed walking along the harbor after a full day at the conference, catching glimpses of local fishing boats gently swaying in the water and feeling the crisp Atlantic breeze on my face.

A Milestone at OCEANS 2025 Brest: My First International Conference

Dongwook Lee, Korea Advanced Institute of Science and Technology (KAIST) — OCEANS 2025 Brest SPC Third Prize Winner

When I received the news that my paper had been selected as one of the Student Poster Competition (SPC) papers, I was thrilled. I couldn't wait to be on-site in Brest, France, to present my work in front of a large audience. This was my very first international conference, and also the first time I would be presenting a poster to such a wide and diverse group of people.

As someone who has been studying marine robotics, I've always hoped to connect with researchers from other areas of marine science and engineering—hoping to step out of my narrow research zone and into a broader community. OCEANS 2025 Brest offered exactly that. It was a truly exciting and eye-opening experience. I had the chance to meet people from both academia and industry working in diverse areas such as marine environmental monitoring, underwater sensing and communication, naval defense systems, and more. Walking through the conference hall, visiting various exhibition booths, attending poster sessions, and listening to oral presentations—all of it was incredibly dense, inspiring, and memorable.

The SPC poster session was especially meaningful. I presented my work on designing a neural network structure for re-identifying marine vessels using LiDAR point clouds. Many people stopped by my poster, engaging in thoughtful discussions, asking insightful questions, and offering helpful comments. Those conversations gave me new ideas for extending my research and even ways my work might support others. The exchange of ideas was genuinely motivating.

Another highlight of the conference was the social networking. Beyond the formal talks, I was able to connect with many people in ways that I believe will lead to future collaborations. Some shared research interests with me, while others had valuable datasets that could support my work. I'm especially grateful to the conference organizers for hosting networking events like the student mixer, the welcome reception at Océanopolis, and the gala dinner—each of which made it easier to form lasting connections. I also had a few nostalgic reunions: I ran into a student I had met during the MBZIRC 2024 competition as part of a rival team, my former undergraduate advisor, and a senior from my current lab who graduated years ago.

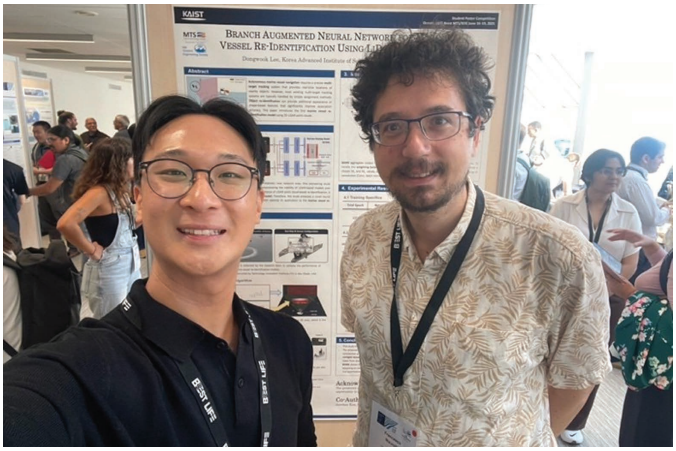


Figure 1. With Francesco Maurelli, my former undergraduate supervisor and an OES member, in front of my Student Poster Competition (SPC) poster.

Figure 2. Group photo taken during the Gala Dinner.

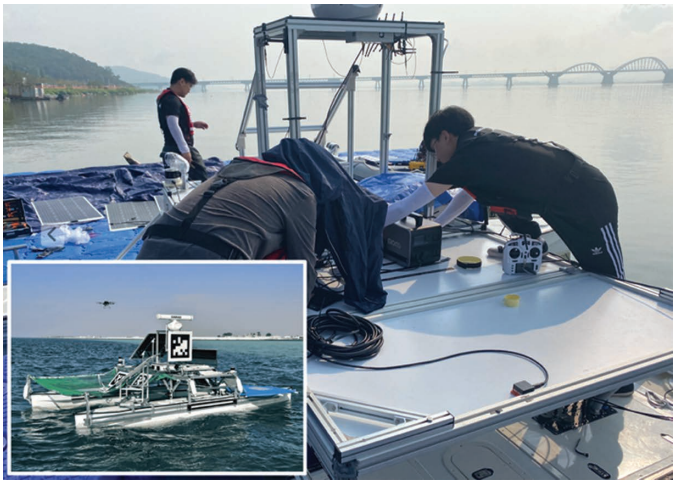


Figure 3. Testbed USV used for dataset acquisition in the SPC-presented paper, modified and operated by the Mobile Robotics & Intelligence (MORIN) Lab at the Korea Advanced Institute of Science and Technology (KAIST).

In the end, receiving third place in the SPC was the most rewarding gift of OCEANS 2025 Brest. The other SPC presentations were truly impressive, which made me even more honored to receive the award. It has become both an encouragement and a catalyst, pushing me to continue my research with renewed enthusiasm. OCEANS 2025 Brest will remain an unforgettable milestone in my academic journey, and I sincerely hope more students and researchers take the opportunity to participate in future OCEANS conferences—to broaden their perspectives, find new collaborators, and gain fresh insights through meaningful conversations with peers and experts alike.

Winning Poster Paper

TemporalTemp: Encoding Historical Temperatures for Automated Sea Ice Mapping

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***Abstract*—This paper investigates the impact of incorporating historical ERA5 reanalysis data into deep learning models for Arctic sea ice parameter prediction. While existing approaches primarily rely on contemporaneous observations, we explore whether encoding temporal variations in ERA5 2-meter air temperature (t2m) can improve classification of sea ice concentration (SIC), stage of development (SOD), and floe size (FLOE). Using a multi-task U-Net architecture, we evaluate different temporal encoding strategies on the AI4Arctic dataset, comparing performance against a baseline model without historical context. Our results show that a 1-year encoding with 4 samples of 90 days each achieves the best overall performance (85.62% combined score), improving SOD and FLOE classification by 1.43% and 1.20% respectively. Qualitative analysis reveals that temperature encoding helps distinguish ice types during transitional seasons but can degrade SIC estimation during melt conditions when air temperatures become misleading indicators. These findings demonstrate that carefully designed temporal encodings can enhance sea ice classification while highlighting the need for complementary data sources to address limitations during melt periods.**

I. Introduction

Sea ice plays a crucial role in global climate regulation, maritime safety, and the livelihoods of indigenous communities that rely on stable ice conditions for travel and hunting [1]–[3]. However, Arctic ice conditions are becoming increasingly variable, with trends such as delayed freeze-up, increased fragmentation, and reduced summer ice extent [4]. These changes pose challenges for navigation, ecosystem stability, and traditional ways of life, emphasizing the need for continuous monitoring.

Traditionally, sea ice conditions are assessed through manually produced ice charts, which rely on expert interpretation of remote sensing data within geographic information system software. While these charts provide invaluable insights, their production is labor-intensive and limited in both spatial and temporal coverage, underscoring the need for automated approaches [5].

Key indicators such as sea ice concentration (SIC), stage of development (SOD), and floe size (FLOE) are widely used to characterize Arctic ice dynamics. SIC measures the fraction of ice-covered water, informing climate models and navigation. SOD provides insight into ice age and thickness, aiding in route planning for ice-capable vessels. FLOE describes ice fragmentation, influencing drift patterns and melt processes [5]. Recent advances in machine learning, particularly deep learning architectures such as U-Nets, have shown promise in automating the estimation of these indicators using synthetic aperture radar (SAR) and passive microwave data [6]–[8]. However, these models primarily rely on contemporaneous observations, limiting their ability to capture longer-term temporal trends in ice evolution.

Arctic change is not only spatial but also strongly influenced by temporal factors, such as melt onset and freeze-up timing. The persistence of specific temperature conditions over time is a key driver of ice formation and decay [9]. While some studies have integrated spatiotemporal encodings to improve model predictions [10], interannual variability remains a challenge. Historical air temperature records have proven effective in capturing key seasonal transitions, such as melt duration and freeze-up timing, making them a promising addition to existing models [11].

This study investigates whether incorporating temporal variations in 2-meter air temperature can improve machine learning models for sea ice parameter prediction. The remainder of this paper is structured as follows: Section II reviews relevant work in sea ice forecasting and deep learning approaches. Section III details our model architecture and temporal encoding strategy. Section IV describes the experimental design and evaluation metrics. Section V presents our findings and analyzes model performance. Finally, Section VI summarizes key insights and discusses directions for future work.

II. Background

A. Use of Temporal Data for Sea Ice Forecasting

Several studies have demonstrated the value of incorporating temporal data, particularly ERA5 reanalysis, for sea ice forecasting. Asadi et al. [12] used ERA5 data to develop a sequence-to-sequence deep learning model for probabilistic sea ice forecasts, achieving skillful predictions up to 90 days in advance. Similarly, Kim et al. [13] leveraged ERA5 variables such as temperature, wind speed, and solar radiation to train a U-Net model for long-term SIC forecasting, outperforming traditional statistical and deep learning baselines. Liu et al. [14] employed convolutional long short-term memory (ConvLSTM) networks to predict short-term Arctic sea ice dynamics, highlighting the role of reanalysis climate variables in improving forecast accuracy. These studies underscore the importance

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of historical temperature, wind, and radiation trends for sea ice prediction.

B. AutoICE Challenge

The AutoICE Challenge [5] explored the development of deep learning models for multi-parameter sea ice mapping using SAR imagery. As part of this challenge, models were trained and evaluated using the standardized AI4Arctic dataset [15]. The challenge introduced a paradigm shift from single-variable estimation to multi-task learning, evaluating models on their ability to predict SIC, SOD, and FLOE. The winning model, based on a multi-task U-Net architecture [10], achieved state-of-the-art performance, attaining an overall score of 86.39% and an SIC R^2 score of 92.02%. This model demonstrated the effectiveness of integrating multiple data sources, including SAR, passive microwave, and reanalysis data, for automated sea ice characterization.

C. Datasets

This study enhances sea ice mapping by extending the AI4Arctic dataset with historical reanalysis data. While AI4Arctic includes ERA5 climate variables at the time of each scene, we incorporate preceding reanalysis data to provide additional temporal context for sea ice classification.

1) AI4Arctic Dataset: The AI4Arctic dataset [15] consists of 533 georeferenced scenes collected between January 2018 and December 2021, covering regions in the Canadian and Greenlandic Arctic. Each scene includes:

- **Sea Ice Charts:** Manually annotated by the Canadian Ice Service (CIS) and Greenland Ice Service (DMI), following the SIGRID-3 standard. These charts are provided as three discrete maps representing SIC, SOD, and FLOE. SIC is reported as the total polygon sea ice concentration, while SOD and FLOE are reported as the ice type associated with the dominant partial concentration. SOD and FLOE polygons are masked where there is no dominant partial concentration (defined as $\geq$65%).
- **Synthetic Aperture Radar (SAR) Imagery:** Sentinel-1 C-band SAR images (HH and HV polarizations) acquired in extra-wide swath mode, preprocessed with noise correction and incidence angle adjustment.
- **Passive Microwave Radiometry:** Brightness temperature (TB) measurements from AMSR2, covering multiple frequency bands, resampled to align with Sentinel-1 imagery.
- **Reanalysis Climate Data:** ERA5 climate variables interpolated to match the Sentinel-1 resolution, capturing atmospheric conditions at the time of image acquisition.

The dataset also includes a *ready-to-train* (RTT) version, where SAR images are downsampled to 80m pixel spacing, and normalization is applied across all variables to facilitate deep learning model training.

2) Historical ERA5 Dataset: ERA5 is a state-of-the-art climate reanalysis dataset produced by the European Centre for Medium-Range Weather Forecasting (ECMWF) [16]. It provides global estimates of atmospheric, land, and oceanic climate variables with a spatial resolution of approximately 31km and an hourly temporal frequency, covering the period from 1979 to the present. Observational data are assimilated using a four-dimensional variational (4D-Var) data assimilation scheme, ensuring consistency across time and space.

D. U-Net Architectures for Sea Ice Mapping

U-Net architectures [17] are widely used for segmentation tasks. The model follows an encoder-decoder structure built on convolutional neural networks (CNNs), where downsampling layers extract hierarchical features and upsampling layers restore spatial resolution. Skip connections bridge corresponding encoder and decoder layers, preserving fine-grained details that would otherwise be lost in deeper layers. Each convolutional layer applies a set of filters to learn spatial patterns, expanding the model's receptive field while maintaining local feature representation. In sea ice mapping, U-Nets have demonstrated strong performance in both SIC estimation and classification tasks [6], [7]. Their effectiveness is further highlighted by the AutoICE Challenge, where two of the top five teams employed U-Net-based models [5] to process high-resolution remote sensing data.

III. Methodology

This study builds upon the architecture and input choice developed in the winning solution of the AI4EO AutoICE Challenge by Chen et al. [10], where the input channels were selected based on their best performance in the AI4Arctic dataset. We extend the model by incorporating historical reanalysis data to enrich the temporal context for sea ice mapping and classification.

TABLE I
Model input channels adapted from Chen et al. [10], with historical ERA5 temperature features (n temporal samples) added. See Section IV-A for sampling details.

Data Type	Feature	Number of Channels
Sentinel-1	Dual-polarized (HH, HV) SAR images	2
	Gridded incidence angle measurements	1
	Distance-to-land map	1
AMSR2	18.7 GHz H, V and 36.5 GHz H, V brightness temperature	4
ERA5	Eastward, northward 10 m wind speed	2
	2 m air temperature	1
	Total column water vapor	1
	Total column cloud liquid water	1
	Historical 2 m air temperature	n
Auxiliary	Gridded latitude, longitude	2
	Acquisition month	1

A. Data Preprocessing and Co-registration

To enhance the temporal context for sea ice mapping, ERA5 2-metre air temperature (*t2m*) data was acquired from

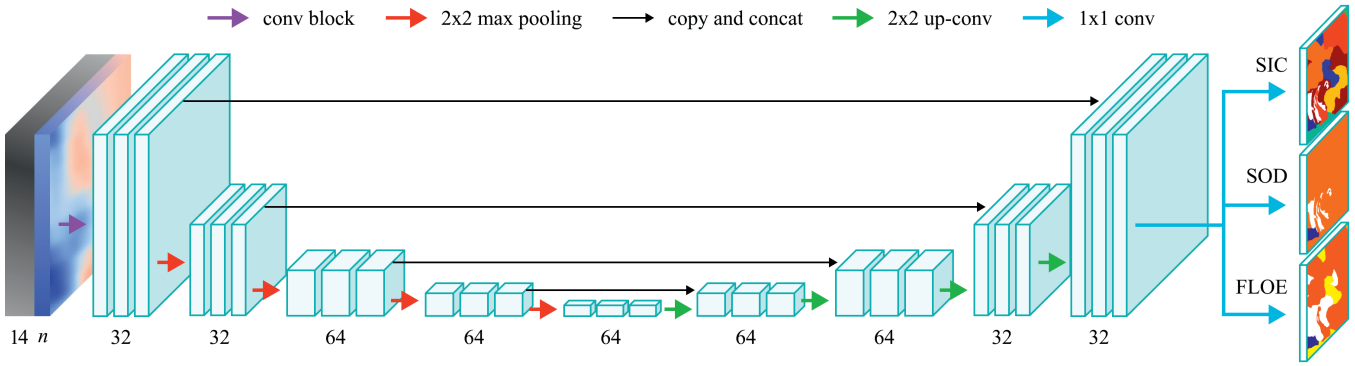

Fig. 1. Diagram of the multi-task U-Net architecture used in all experiments. The labels below each layer represent the number of channels, where n is the number of *t2m* samples. Encoded historical temperatures are fused at the input-level with the 14 base channels detailed in Table I.

the Copernicus Climate Data Store [18]. The *t2m* variable represents the air temperature 2 metres above the Earth's surface, calculated by interpolating between the lowest model level and the Earth's surface [18].

For this study, historical *t2m* data from January 2017 to December 2021 were incorporated to complement the AI4Arctic dataset. The chosen range covers the dataset period, as well as an additional year for historical context. The historical *t2m* data were aligned with the 21×21 latitude and longitude range of the scene, ensuring spatial correspondence. The data were then normalized using the AI4Arctic dataset's provided mean and standard deviation for *t2m*, ensuring consistent scaling across all time periods. After normalization, the data were resized to match the resolution of the scene using nearest neighbour interpolation, a method chosen for its computational efficiency.

To encode the historical *t2m* data, we applied a sampling strategy based on time windows parameterized by the number of samples (n) and the duration of each sample window (d, in days). For example, with $n = 12$ and $d = 7$, the encoding captures the past twelve weeks, where each sample represents a contiguous and non-overlapping 7-day period, starting from the scene date and moving backward in time. These encoded time windows were concatenated with the 14 input channels used in the winning AutoICE solution [10], creating a final input to the U-Net model as summarized in Table I.

B. Architecture

The model utilizes a multi-task U-Net architecture designed to simultaneously predict three sea ice parameters: SIC, SOD, and FLOE. As shown in Figure 1, the network consists of four encoder-decoder blocks. The encoder progressively reduces spatial dimensions while capturing high-level features, and the decoder reconstructs these features back to the original input size.

For SOD and FLOE, pixel-wise classification is performed using separate 1x1 convolutional layers at the decoder's output. Each of these layers corresponds to the number of classes, and the cross-entropy (CE) loss function is applied for classification. On the other hand, SIC is treated as a regression task, where a dedicated regression head is appended to the final decoder output. This regression layer is optimized using the Mean Squared Error (MSE) loss function.

The architecture is trained end-to-end, with multi-task optimization allowing for joint learning of the three sea ice parameters. This configuration ensures that shared representations across the tasks are learned effectively, while still maintaining task-specific outputs for classification and regression.

IV. Experimental Setup

A. Temporal Encodings

In this study, we explore various temporal encoding configurations to balance temporal coverage, detail, and data efficiency for the ERA5 2m air temperature (*t2m*) data. As detailed in Section III-A, temporal encodings are defined by two parameters: n, the number of samples, and d, the length of each sample in days.

The temporal coverage of the encodings ranges from a minimum of three months to a maximum of one year. Different combinations of n and d are used to capture various temporal dependencies within these spans. For instance, one year can be represented by $n = 2$ and $d = 180$, which corresponds to two samples of 180 days each. To achieve a finer temporal resolution, $n = 24$ and $d = 15$ also covers one year, but with 24 samples of 15 days each.

These selected time spans align with established work using ERA5 reanalysis data, such as the 90-day forecasting [12] and the 12-month forecasting [13], which have demonstrated the utility of similar temporal resolutions in climate and environmental predictions.

B. Hyperparameters and Training Setup

The hyperparameters for training were adapted from the approach outlined in the AutoICE winning solution [10].

The dual-polarized SAR images, distance maps, and corresponding ice-chart-derived label maps were downsampled by a factor of 10. During training, patches of size 256×256 were randomly extracted from these downsampled images. The AMSR2 and ERA5 variables were resampled to match this size, with their values interpolated within the geographic

TABLE II

SUMMARY OF SCORES FOR DIFFERENT TEMPORAL SAMPLE CONFIGURATIONS ACROSS 20 TEST SCENES. METRICS ARE REPORTED AS THE MEAN SCORE ± THE STANDARD DEVIATION ACROSS 10 INDEPENDENT CROSS-VALIDATION RUNS. THE BEST PERFORMANCE IN EACH SCORE COLUMN IS HIGHLIGHTED IN **BOLD**.

Encoding Length	t2m Samples n	Sample Window d [Days]	Test Scores [%]			
			Combined	SIC r2	SOD f1	FLOE f1
Baseline (Chen et al. [10])	0	0	85.00 ± 0.49	**90.23 ± 0.35**	86.10 ± 0.86	72.33 ± 1.14
3 Months	12	7	85.20 ± 0.76	89.78 ± 0.42	86.46 ± 1.54	73.54 ± 1.08
	24	3	84.40 ± 0.86	89.01 ± 0.54	85.75 ± 1.37	72.48 ± 2.53
4 Months	9	14	85.35 ± 1.06	89.82 ± 0.64	87.14 ± 1.62	72.86 ± 1.49
1 Year	2	180	84.81 ± 0.69	89.70 ± 0.55	85.83 ± 1.52	73.00 ± 1.08
	3	120	85.39 ± 1.62	89.61 ± 1.14	87.20 ± 2.63	73.31 ± 2.16
	4	90	**85.62 ± 0.75**	89.75 ± 0.71	**87.53 ± 1.16**	**73.53 ± 1.10**
	6	60	85.32 ± 0.94	89.32 ± 0.73	87.32 ± 1.52	73.33 ± 1.06
	12	30	85.14 ± 0.80	89.36 ± 0.64	86.95 ± 1.60	73.08 ± 1.11
	24	15	84.44 ± 0.82	88.86 ± 0.70	86.16 ± 1.51	72.17 ± 2.27

areas corresponding to the patches. For validation and testing, entire SAR scenes and distance maps were downscaled, combined with upsampled variables, and input into the trained model, with outputs interpolated back to their original size for evaluation.

The model was trained using Stochastic Gradient Descent (SGD) with momentum, a learning rate of 0.001, and a weight decay coefficient of 0.01. A cosine annealing scheduler [19] was used to adjust the learning rate dynamically, gradually decreasing it until a minimum value before resetting every 20 epochs. This strategy helps the model explore different regions of the loss landscape and avoid suboptimal local minima.

To increase training diversity and improve generalization, data augmentation techniques such as random rotation, flipping, random scaling, and CutMix were applied to SAR images and their corresponding label maps. Training was conducted with a batch size of 64, 128 iterations per epoch, and a total of 100 epochs, selected based on training time constraints and convergence behavior. Since the Mean Squared Error (MSE) loss for SIC is considerably higher than the Cross-Entropy (CE) loss for SOD and FLOE, a loss weighting strategy was applied to balance their contributions, setting the loss weights as SIC × 1, SOD × 3, and FLOE × 3.

All experiments are conducted on the Narval cluster of Compute Canada [20] using an NVIDIA A100-SXM4-40GB GPU and 128 GB of memory with the PyTorch 1.12 library.

C. Evaluation Metrics

Model accuracy was assessed using four key metrics from the AutoICE challenge: the coefficient of determination (R^2) for SIC, the F1 score for SOD and FLOE, and a combined score that weighted these metrics as 2/5 for SIC, 2/5 for SOD, and 1/5 for FLOE [5].

The R^2 score was selected for SIC because it quantifies the variance explained by the model, effectively capturing how closely predictions align with ground truth values. Since SIC is represented as 11 discrete classes corresponding to ice concentration levels in tenths from 0 to 100%, using R^2 ensures that predictions account for the relative proximity between these classes.

For SOD and FLOE classification, we employed the F1 score since these categorical classifications lack consistent quantitative intervals needed for regression metrics. SOD classification spans ice development from new ice (<10 cm) to multi-year ice (survived >2 melt seasons), while FLOE sizes range from small floes (<100 m) to ice fields (>2 km).

D. Data Splitting and Cross-Validation

To ensure comparability with prior work, the same 20 test scenes from the AutoICE competition were used. For each of the 10 independent runs, we randomly selected 20 validation scenes from the 513 available training scenes for model tuning.

After each epoch, a combined performance score was calculated on the validation set. If the score exceeded the best recorded value from previous epochs, the model parameters were updated and saved. The final model, selected based on peak validation performance, was then used to generate predictions for the test set.

V. RESULTS AND DISCUSSION

Nine configurations of historical temperature encodings were evaluated. Table II summarizes model performance on the 20-scene test set across 10 independent cross-validation runs, where the $(n = 4, d = 90)$ encoding achieves the highest combined score of 85.62%. While the Chen et al. [10] baseline achieved superior SIC estimation (90.23%), our temperature-enhanced model demonstrated consistent improvements in both SOD (87.53%, an increase of +1.43% over the baseline) and FLOE classification (73.53%, +1.20% improvement).

Experiments on temporal encoding parameterization reveal two key insights. First, longer encoding windows generally improve model performance by providing a more comprehensive representation of temperature trends over time. However, the way these longer windows are encoded plays a crucial role in determining effectiveness. Encoding with too few samples over long periods (e.g., $n = 2, d = 180$) fails to capture sufficient detail in temperature variations, limiting its usefulness for

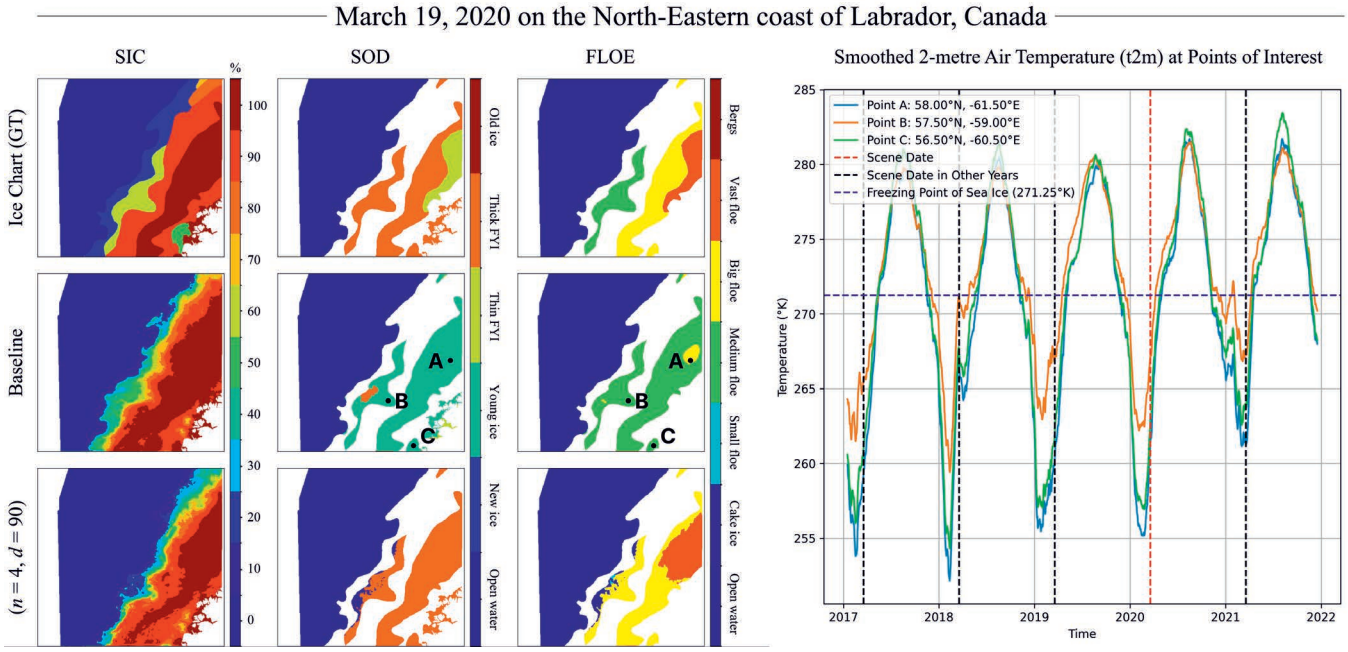

Fig. 2. Qualitative comparison of sea ice classification on March 19, 2020, along the north-eastern coast of Labrador, Canada. The left panel shows sea ice maps across ground truth, baseline, and the best-performing temporal encoding model ($n = 4, d = 90$), highlighting misclassifications by the baseline model at points A, B, and C. The right panel presents 2-metre air temperature trends at these points, averaged over a 30-day rolling window.

prediction. Conversely, excessively high temporal resolutions (e.g., $n = 24, d = 3$ and $n = 24, d = 15$) introduce redundancy, leading to overfitting. In these cases, the model may focus too much on minor fluctuations in temperature rather than prioritizing more informative input channels, such as SAR data.

To better understand the effects of historical temperature encoding on model performance, we analyze two representative test scenes: one where the $(n = 4, d = 90)$ model outperforms the baseline, and another where it underperforms. These case studies highlight the strengths and limitations of incorporating historical air temperature trends into sea ice classification.

A. March 19, 2020 – North-Eastern Coast of Labrador, Canada

As illustrated in Figure 2, our model demonstrated improved performance over the baseline in both SOD and FLOE classification for this scene. The left panel of the figure highlights several key misclassifications by the baseline model, where thick first-year ice (FYI) was mistakenly labeled as young ice (SOD), and large floes were misclassified as medium floes at points A, B, and C.

The right panel presents 2-metre air temperature ($t2m$) trends on March 19 across different years, revealing notable differences in temperature patterns. To highlight these patterns, this temperature is smoothed using a 30-day rolling window. In 2018, temperatures at point B exceeded the freezing point of sea ice ($271.25K$), whereas in both 2019 and 2020, temperatures remained lower. However, despite similar air temperatures in 2019 and 2020, the melt season in 2020 started slightly later. These variations likely contributed to our model's improved ability to classify older and thicker ice types, as it effectively leveraged temperature trends to distinguish ice conditions.

This result underscores the importance of directly encoding temperature rather than relying solely on calendar-based indicators. Since interannual variability affects melt onset and freeze-up timing [11], encoding only the month fails to capture these variations adequately. The same period in different years may exhibit significantly different temperature trends, affecting ice formation and decay. By incorporating historical air temperature records, the model gains a more accurate representation of seasonal transitions. This approach addresses a key challenge in sea ice modeling by allowing the model to adapt to shifting environmental conditions rather than assuming fixed seasonal patterns.

B. July 16, 2018 – North-Eastern Coast of Baffin Island, Canada

Figure 3 presents the results for SIC classification in this scene, where the $(n = 4, d = 90)$ temporal encoding model underperformed compared to the baseline. The left panel highlights notable misclassifications made by the temporal encoding model at points D and E. At point D, the model failed to correctly identify consolidated ice regions (100% SIC), misclassifying them as lower SIC categories. Similarly, at point E, areas with 50% SIC were incorrectly labeled as open water, leading to an underestimation of SIC.

The right panel of Figure 3 provides insight into the potential cause of these errors by showing smoothed $t2m$ trends. Despite the presence of consolidated ice, air temperatures at the scene date exceeded the freezing point of sea

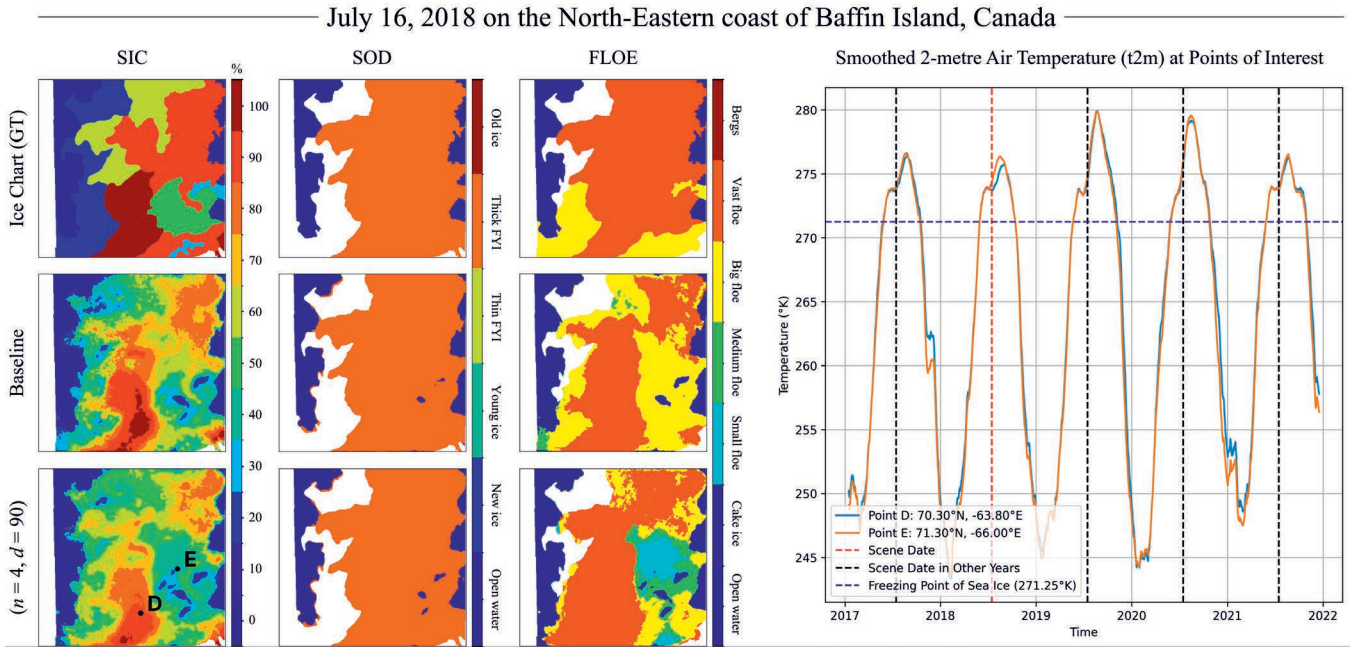

Fig. 3. Qualitative comparison of SIC classification on July 16, 2018, along the north-eastern coast of Baffin Island, Canada. The left panel shows sea ice maps across ground truth, baseline, and the best-performing temporal encoding model ($n = 4, d = 90$), highlighting misclassifications by the temporal encoding model at points D and E. The right panel presents 2-metre air temperature trends at these points, averaged over a 30-day rolling window.

ice, suggesting that surface melt may have decoupled the atmosphere from underlying ice. This effect likely weakened the predictive power of temperature trends, as the temporal encoding model overestimated melting, misinterpreting the warmer temperatures as indicators of more extensive ice loss.

This result highlights a key limitation of temporal encoding when air temperature trends become misleading. Since melt conditions influence $t2m$, the presence of surface melt can elevate air temperatures without necessarily indicating significant ice deterioration. In such cases, directly encoding $t2m$ may degrade performance by reinforcing spurious correlations.

VI. Conclusion

This study demonstrates that incorporating historical air temperature data can improve automated sea ice classification, particularly for stage of development and floe size estimation. Our experiments show that a 1-year temporal encoding with four 90-day samples provides optimal performance, achieving an 85.62% combined score. The temperature-enhanced model shows particular strength in transitional seasons where temperature trends help distinguish between ice types, as evidenced by 1.43% and 1.20% gains in SOD and FLOE classification respectively over the baseline.

However, the benefits of temporal encoding are context-dependent. During melt conditions, air temperature trends can become misleading indicators of ice state, sometimes degrading SIC estimation performance. This suggests that while historical temperature data provides valuable supplementary information, it should not replace direct ice observations from SAR and passive microwave sensors.

Future work should explore several promising directions: (1) incorporating VIIRS ice surface temperature (IST) data to complement air temperature measurements, as IST has shown promise for SIC estimation [21]; (2) developing adaptive weighting mechanisms to reduce the influence of temperature features when they conflict with other sensor data; and (3) investigating hybrid approaches that combine learned temporal encodings with physics-based models of ice-temperature relationships. These advances could further improve the robustness of automated sea ice monitoring systems in our changing Arctic.

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References

[1] S. Sandven, G. Spreen, G. Heygster, F. Girard-Ardhuin, S. L. Farrell, W. Dierking, and R. A. Allard, "Sea Ice Remote Sensing—Recent Developments in Methods and Climate Data Sets," *Surveys in Geophysics*, vol. 44, no. 5, pp. 1653–1689, Oct. 2023. [Online]. Available: https://doi.org/10.1007/s10712-023-09781-0

[2] P. M. Wagner, N. Hughes, P. Bourbonnais, J. Stroeve, L. Rabenstein, U. Bhatt, J. Little, H. Wiggins, and A. Fleming, "Sea-ice information and forecast needs for industry maritime stakeholders," *Polar Geography*, vol. 43, no. 2-3, pp. 160–187, Jul. 2020, publisher: Taylor & Francis _eprint: https://doi.org/10.1080/1088937X.2020.1766592. [Online]. Available: https://doi.org/10.1080/1088937X.2020.1766592

[3] J. D. Ford, W. A. Gough, G. J. Laidler, J. MacDonald, C. Irngaut, and K. Qrunnut, "Sea ice, climate change, and community vulnerability in northern Foxe Basin, Canada," *Climate Research*, vol. 38, no. 2, pp. 137–154, Feb. 2009. [Online]. Available: https://www.int-res.com/abstracts/cr/v38/n2/p137-154/

[4] G. Boutin, T. Williams, P. Rampal, E. Olason, and C. Lique, "Impact of wave-induced sea ice fragmentation on sea ice dynamics in the MIZ," Copernicus Meetings, Tech. Rep. EGU2020-8657, Mar. 2020, conference Name: EGU2020. [Online]. Available: https://meetingorganizer.copernicus.org/EGU2020/EGU2020-8657.html

[5] A. Stokholm, J. Buus-Hinkler, T. Wulf, A. Korosov, R. Saldo, L. T. Pedersen, D. Arthurs, I. Dragan, I. Modica, J. Pedro, A. Debien, X. Chen, M. Patel, F. J. P. Cantu, J. N. Turnes, J. Park, L. Xu, K. A. Scott, D. A. Clausi, Y. Fang, M. Jiang, S. Taleghanidoozdoozan, N. C. Brubacher, A. Soleymani, Z. Gousseau, M. Smaczny, P. Kowalski, J. Komorowski, D. Rijlaarsdam, J. N. van Rijn, J. Jakobsen, M. S. J. Rogers, N. Hughes, T. Zagon, R. Solberg, N. Longépé, and M. B. Kreiner, "The AutoICE Challenge," *The Cryosphere*, vol. 18, no. 8, pp. 3471–3494, Aug. 2024, publisher: Copernicus GmbH. [Online]. Available: https://tc.copernicus.org/articles/18/3471/2024/

[6] K. Radhakrishnan, K. A. Scott, and D. A. Clausi, "Sea Ice Concentration Estimation: Using Passive Microwave and SAR Data With a U-Net and Curriculum Learning," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 14, pp. 5339–5351, 2021, conference Name: IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. [Online]. Available: https://ieeexplore.ieee.org/document/9416884

[7] Y.-R. Wang and X.-M. Li, "Arctic sea ice cover data from spaceborne synthetic aperture radar by deep learning," *Earth System Science Data*, vol. 13, no. 6, pp. 2723–2742, Jun. 2021, publisher: Copernicus GmbH. [Online]. Available: https://essd.copernicus.org/articles/13/2723/2021/

[8] A. Stokholm, T. Wulf, A. Kucik, R. Saldo, J. Buus-Hinkler, and S. M. Hvidegaard, "AI4SeaIce: Toward Solving Ambiguous SAR Textures in Convolutional Neural Networks for Automatic Sea Ice Concentration Charting," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 60, pp. 1–13, 2022, conference Name: IEEE Transactions on Geoscience and Remote Sensing. [Online]. Available: https://ieeexplore.ieee.org/document/9705586

[9] J. A. Screen and I. Simmonds, "The central role of diminishing sea ice in recent Arctic temperature amplification," *Nature*, vol. 464, no. 7293, pp. 1334–1337, Apr. 2010, publisher: Nature Publishing Group. [Online]. Available: https://www.nature.com/articles/nature09051

[10] X. Chen, M. Patel, F. J. Pena Cantu, J. Park, J. Noa Turnes, L. Xu, K. A. Scott, and D. A. Clausi, "MMSeaIce: a collection of techniques for improving sea ice mapping with a multi-task model," *The Cryosphere*, vol. 18, no. 4, pp. 1621–1632, Apr. 2024, publisher: Copernicus GmbH. [Online]. Available: https://tc.copernicus.org/articles/18/1621/2024/

[11] G. I. Belchansky, D. C. Douglas, and N. G. Platonov, "Duration of the Arctic Sea Ice Melt Season: Regional and Interannual Variability, 1979–2001," Jan. 2004, section: Journal of Climate. [Online]. Available: https://journals.ametsoc.org/view/journals/clim/17/1/1520-0442_2004_017_0067_dotasi_2.0.co_2.xml

[12] N. Asadi, P. Lamontagne, M. King, M. Richard, and K. A. Scott, "Probabilistic spatiotemporal seasonal sea ice presence forecasting using sequence-to-sequence learning and ERA5 data in the Hudson Bay region," *The Cryosphere*, vol. 16, no. 9, pp. 3753–3773, Sep. 2022, publisher: Copernicus GmbH. [Online]. Available: https://tc.copernicus.org/articles/16/3753/2022/

[13] Y. J. Kim, H.-c. Kim, D. Han, J. Stroeve, and J. Im, "Long-term prediction of Arctic sea ice concentrations using deep learning: Effects of surface temperature, radiation, and wind conditions," *Remote Sensing of Environment*, vol. 318, p. 114568, Mar. 2025. [Online]. Available: https://www.sciencedirect.com/science/article/pii/S0034425724005947

[14] Y. Liu, L. Bogaardt, J. Attema, and W. Hazeleger, "Extended-range arctic sea ice forecast with convolutional long short-Term memory networks," *Monthly Weather Review*, vol. 149, no. 6, pp. 1673–1693, 2021.

[15] J. Buus-Hinkler, T. Wulf, A. R. Stokholm, A. Korosov, R. Saldo, L. T. Pedersen, D. Arthurs, R. Solberg, N. Longépé, and M. B. Kreiner, "AI4Arctic Sea Ice Challenge Dataset," 2022. [Online]. Available: https://data.dtu.dk/collections/AI4Arctic_Sea_Ice_Challenge_Dataset/6244065/2

[16] H. Hersbach, B. Bell, P. Berrisford, G. Biavati, A. Horányi, J. Muñoz Sabater, J. Nicolas, C. Peubey, R. Radu, I. Rozum, and others, "ERA5 hourly data on single levels from 1979 to present," *Copernicus climate change service (c3s) climate data store (cds)*, vol. 10, no. 10.24381, 2018.

[17] O. Ronneberger, P. Fischer, and T. Brox, "U-Net: Convolutional Networks for Biomedical Image Segmentation," May 2015, arXiv:1505.04597 [cs]. [Online]. Available: http://arxiv.org/abs/1505.04597

[18] H. Hersbach, B. Bell, P. Berrisford, S. Hirahara, A. Horányi, J. Muñoz-Sabater, J. Nicolas, C. Peubey, R. Radu, D. Schepers, A. Simmons, C. Soci, S. Abdalla, X. Abellan, G. Balsamo, P. Bechtold, G. Biavati, J. Bidlot, M. Bonavita, G. De Chiara, P. Dahlgren, D. Dee, M. Diamantakis, R. Dragani, J. Flemming, R. Forbes, M. Fuentes, A. Geer, L. Haimberger, S. Healy, R. J. Hogan, E. Hólm, M. Janisková, S. Keeley, P. Laloyaux, P. Lopez, C. Lupu, G. Radnoti, P. de Rosnay, I. Rozum, F. Vamborg, S. Villaume, and J.-N. Thépaut, "The ERA5 global reanalysis," *Quarterly Journal of the Royal Meteorological Society*, vol. 146, no. 730, pp. 1999–2049, 2020, _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/qj.3803. [Online]. Available: https://onlinelibrary.wiley.com/doi/abs/10.1002/qj.3803

[19] I. Loshchilov and F. Hutter, "SGDR: Stochastic Gradient Descent with Warm Restarts," May 2017, arXiv:1608.03983 [cs]. [Online]. Available: http://arxiv.org/abs/1608.03983

[20] S. Baldwin, "Compute Canada: Advancing Computational Research," *Journal of Physics: Conference Series*, vol. 341, no. 1, p. 012001, Feb. 2012. [Online]. Available: https://dx.doi.org/10.1088/1742-6596/341/1/012001

[21] L. de Loë, L. Xu, and K. A. Scott, "Fusing Ice Surface Temperature with the AI4Arctic Dataset for Enhanced Sea Ice Concentration Estimation: A Preliminary Assessment," in *OCEANS 2024 - Halifax*, Sep. 2024, pp. 1–9, iSSN: 2996-1882. [Online]. Available: https://ieeexplore.ieee.org/document/10754523

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Born in the heart of Pahang, Malaysia, my early life journey took root in the serene landscapes of Terengganu, where I was raised in a close-knit family of nine. As the third of seven siblings, I grew up in a lively household shaped by love, discipline, and resilience. My father, a dedicated technician with Tenaga Nasional Berhad (TNB), instilled in me a strong work ethic and a sense of responsibility, while my mother, a devoted housewife, nurtured the values of patience, care, and perseverance.

My academic journey began at Universiti Sains Malaysia (USM), where I pursued both my bachelor's and master's degrees in Electrical and Electronic Engineering, specializing in Control System Engineering. I was fortunate to be mentored by the esteemed Professor Mohd Yusoff Mashor, whose guidance profoundly shaped my foundational research skills. At the time when I questioned my path, he believed in my potential. For that, I remain deeply grateful.

Preparing to join academia under the Academic Staff Training Scheme (ASTS), I continued my studies at RMIT University in Australia, where I earned my PhD. I was supervised by Professor Liuping Wang, a leading figure in control theory and industrial applications. Her unwavering support, especially during a challenging time in my life – completing my PhD while pregnant, was invaluable. That period taught me resilience, and I am proud to have succeeded in both roles: as a researcher and a mother.

Interestingly, I once aspired to pursue graduate studies at the University of Sheffield in the UK, drawn by its reputation in control systems. Although that path did not unfold, I later discovered that both of my supervisors, Prof. Yusoff and Prof. Wang, earned their PhDs from the University of Sheffield. It was a beautiful reminder that life often aligns things in ways we do not expect, and for that, I am thankful.

My engagement with IEEE began at RMIT in 2003 as a graduate student member, joining their IEEE Student Branch. Now, in 2025, I celebrate 22 years with IEEE, continuing to contribute actively through USM and on national and global platforms. I have been part of several technical chapters, including the IEEE Oceanic Engineering Society, the IEEE Control Systems Society, and the IEEE Women in Engineering. These affiliations have allowed me to connect, learn, and contribute meaningfully.

Throughout my IEEE journey, I have been honored to hold leadership roles such as Secretary for IEEE OES (2025-2026), Vice Chair for IEEE OES Malaysia (2025), Secretary for IEEE Malaysia Section (2019-2020), Chair for IEEE Women in Engineering Malaysia (2019-2020), and Executive Committee member for IEEE Control Systems Society Malaysia Chapter (2023-2025). I am deeply humbled to have received recognitions, including the IEEE Outstanding Student Branch Counsellor Award (2014), the IEEE Region 10 Educational Activities Outstanding Volunteer Award (2017), and the IEEE Malaysia Section Women in Engineering Outstanding Award (2020).

In October 2008, I joined the School of Electrical and Electronic Engineering at USM as a lecturer under the Mechatronic Engineering Programme. My journey into Ocean Engineering began when Professor Mohd Rizal Arshad introduced me to the Underwater Robotic Research Group (URRG). I deeply appreciate his trust and mentorship. Our first research project focused on modelling the underwater glider, combining his expertise in underwater robotics with mine in system modelling and control.

Being part of URRG led to numerous rewarding experiences, including collaborative research, organizing technical seminars, and the International Conference on Underwater System Technology. Through this group, I also became involved with the National Underwater Robotic Network (NURN) and served as a pro-tem committee member in establishing the IEEE OES Malaysia Chapter.

As an academician, I balance teaching responsibilities with research in system modelling, control, and optimization, with applications in robotics, mechatronics, and underwater systems. My first journal publication, "Nonlinear System Identification Using Fuzzy Approach," was published in 2001 during my master's studies. Since then, I have authored numerous journal articles, conference papers, and book chapters.

Pro-tem committee establishing IEEE OES Malaysia Chapter.

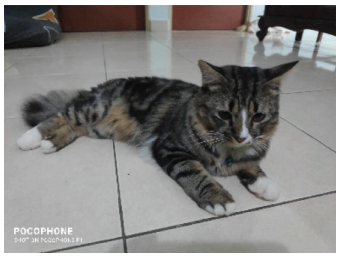
Rosmiwati (She/Her).

My current research involves developing search and rescue tracking systems that utilize GPS and IoT technologies to support fishermen and maritime workers. I am also working on robotic path planning using deep learning approaches. Ocean engineering and technology remain at the heart of my applied research.

Beyond my professional and academic pursuits, I find joy and strength in my role as a wife and mother. My husband, Arham, is a steadfast partner and source of encouragement; together, we are blessed with two wonderful sons, Hakimi and Hamizan. They inspire me every day to live a life of balance, purpose, and love.

From left to right: Hamizan, Hakimi and Arham.

Adding more joy to our home are my two beloved cats: Shah, a charming orange tabby with a bold personality, and Jihan, a graceful mixed Bengal with an adventurous spirit. Whether curled up beside me or playfully exploring, they bring daily comfort and laughter.



Left: Shah, Right: Jihan.

Despite my busy life, I always make time for my ex-secondary school friends, who are like sisters to me. Our reunions are filled with light-hearted conversations, endless laughter, and stress-free moments that keep me grounded. Recently, we celebrated our golden jubilee with a memorable trip to Kenyir Lake, where we cruised on a houseboat and visited the Kelah Sanctuary and Redang Island. These are the memories I treasure deeply.

Beach and snorkelling with my friends from secondary school.

Welcome New and Reinstated Members

From 13 May through 7 August 2025
Total: 143 (incl 69 student: 42 graduate & 27 student)

Australia
Giuseppina DallArmi-Stoks
Andreas Froehlich
Xinyue Yao

Austria
Sadra Karimzadeh

Brazil
Dannylo Cardoso Mauricio

Canada
Marie-Eve C. Clark
Jay Patel
Pavly Saleh

China
Ali Azam
Fangjiong Chen
Xiaopei Chen
Xuan Chen
Yankun Chen
Xinwei Chen
Yiwen Diao
Tianming Gao
Fei Ji
Qiang Li
Yaokun Liang
Yun Liu
Changxin Liu
Feng Lyu
Pengyuan Sun
Yiwei Tao
Xingbin Tu
Dehuan Wan
Qisen Wang
Siyi Wang
Yan Wang
Yiran Wei
Zhiyu Xia
Zhaohui Xue
Hua Yu
Suohang Zhang
Hao Zhao

Ecuador
Maria Jose Salazar Macias

France
Laura Khatib
Barbara Nicolas

Germany
Peter Kampmann
Shixin Sun

India
N. Aishwarya
Rajeev R Ashokan
Pavitra Ashwin
V Gayathri Bijoy
Avik Kumar Das
Riya Joseph
Bhakti Kaushal
Rajitha Vilanthai Krishna Mohan
Sham Kumar S
Unnikrishnan Kuttan Chandrika
Deepak P Lal
Manju M Raj
Rajini Makam
Santhakumar Mohan
P. Murali Krishna
Jayalakshmi V P
Manjula Rani P
Felix M Philip
Daewik Prasheen
Hena Prince
Jayasureya PS
Archana Radhakrishnan
Hemanth S
Brathap S
Sujit Kumar Sahoo
Sumi A Samad
Nandana Sankar
Ananthakrishnan Santhosh
Jyothika Shilu
Poorni Sivaranjan
Santhanakrishnan T
Vengateshan T. S
Arya Thomas
Minakshi Vinod

Ireland
Adam Marc Leadbetter

Israel
Barak Nadav Diker

Japan
Ryoichi Ishijima

Korea, Republic of
Yeonju Choi
Kyung-Ae Park

Malaysia
Muhammad Zulfauzan Fahmi Che Alias
Kee Quen Lee

Mexico
Luis Mario Aparicio

Pakistan
Junaid Imtiaz
Muhammad Yousuf Irfan Zia

Peru
Edgar Luis Salinas Mejia

Poland
Maciej Grzegorz Borowka
Marek Fudalinski
Piotr Gorszczak
Konrad Jablonski
Robert Aron Kita
Patryk Nalepka
Marcin Sosniak
Jakub Zielonka

Portugal
Carlos Goncalves

Singapore
Yu Xiang Tan
Phillip Thomas

Sweden
Miku Brodin-Laakso

Taiwan
Yen-Hsiang Chen
Chen-Fen Huang
Ya-Lun S. Tsai
Chan-Chia Yeh

Turkiye
Nebile Pelin Manti

United Kingdom
Sara Aldhaheri
Adrian Bodenmann
Ashok Nampally

USA
Akshaya Ajay Agrawal
Nolan Allen
Liam Allen
Igor Astrakhovych
Spicer Bak
Rene Bostic
El Colbourn
Diego Alejandro Colon
Nathan Coonrod
Fengying Dang
Massiagbe Fatoumata Diabate
Kerem Enhos
Bruce Hicks
Eric Huynh
Tyler Joseph Inkley
Luke Hamilton Judd
James Lee Kintzele
Zongyao Liu
Leixin Ma
Wyatt Danger Macfarland
Sarah Elizabeth Malone
Sultan Mohammad Manjur
Sarhan M Musa
David Okushemiya
Elizabeth Ann Parker
John E Rominsky
Ronald Ross
Nathan A Sebok
Sakshi Singh
David Smith
David Snyder
Travis Stephen Tartar
May-Win Thein
James Thomson
Joseph Robert Tolone
William Douglas Wilson
Krista Wohlfeil
Yu Zhou

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Although digital versions of the Beacon newsletter are available on the OES website (https://ieeeoes.org/publications/oes-beacon/), only OES members can receive printed copies of each Beacon.

Here is how to get your paper copies of the OES Beacon in the future. Introduction is also on the above OES website.

1) OES members need to contact the IEEE Contact Center at 1-800-678-4333 or 1-732-981-0060- Monday thru Friday- 8:00 AM- 4:30 PM EST.
2) Or . . . send the IEEE Contact Center an email at contact center@ieee.org with your name, IEEE member number and your request to receive your paper copy of the OES Beacon. Please enjoy the BEACON newsletter.

BEACON Newsletter archive website.

Final Year Project 2 Symposium at Malaysia-Japan International Institute of Technology

Nur Irdina Fatina Mohammad Faizal, FYP2 IEEE OES Special Award winner

On 26 June 2025, I had the opportunity to present my undergraduate project entitled "Fabrication of a Normal Mode Helical Antenna for Propagation Attenuation Measurement at 10 MHz for Underwater Communication" at the Final Year Project 2 (FYP2) Symposium organized by the Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM), Kuala Lumpur. It was truly inspiring to witness the energy, innovation, and technical brilliance demonstrated by our future engineers.

The one-day FYP Symposium aimed to foster innovation and research excellence among final-year students through project-based learning and active industry engagement. The event successfully achieved the following:

- Showcased students' capabilities in engineering research through hands-on development, design, testing, and presentation of impactful final year projects, encouraging critical thinking, problem-solving, and creativity.
- Empowered students with real-world technical skills, from simulation and fabrication to experimental validation, while also exposing them to current industry challenges and trends in fields such as underwater communication, embedded systems, automation, and sustainable technology.

The FYP2 Symposium 2025 was a remarkable showcase of innovation, technical expertise, and future-ready talent. As a final-year student, I was honored to participate in this meaningful event that celebrates the culmination of student projects, many of which hold the potential to address real-world engineering challenges. The event began with an opening ceremony officiated by MJIIT's academic leadership, followed by a poster exhibition and project presentations. Students from various engineering disciplines demonstrated their solutions across topics such as embedded systems, antenna design, automation, robotics, sustainable energy, and underwater technologies. It was particularly rewarding to see the integration of both theoretical knowledge and hands-on engineering, reflecting the quality of education at MJIIT, UTM, Kuala Lumpur.

Throughout the morning, I had the opportunity to engage with participants from various departments during the poster

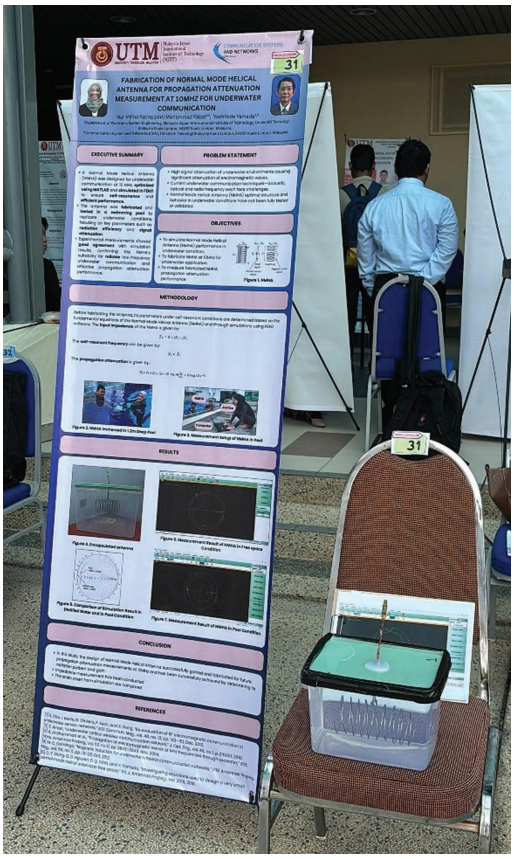


Figure 1. Poster and fabricated normal mode helical antenna showcased by the Special Award IEEE OES recipient.

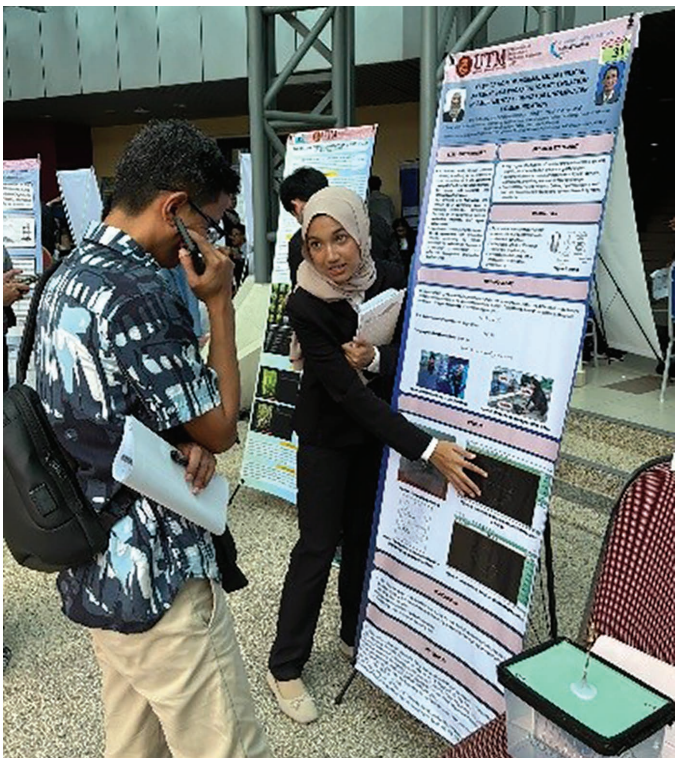


Figure 2. Assoc. Prof. Ir. Dr. Zool Hilmi Ismail, chair of the IEEE OES Malaysia Chapter, attentively evaluating presenter's poster presentation.

Figure 3. Assoc. Prof. Ir. Dr. Zool Hilmi Ismail, chair of the IEEE OES Malaysia Chapter and the recipient of IEEE OES Special Award.

evaluations and technical discussions, where students confidently presented their design processes, simulation methods, and experimental validations. Their work highlighted critical thinking, creativity, and an awareness of global engineering needs.

The symposium concluded with an award ceremony, during which I was honored to receive the IEEE Special Award from the IEEE OES Malaysia Chapter. My project, which involved the Normal Mode Helical Antenna method, was recognized for its exceptional technical merit and its relevance to oceanic and marine communication systems—an area of growing global significance.

In conclusion, the FYP Symposium served not only as a platform to celebrate academic excellence, but also as a stepping-stone for students to engage with industry and research communities. The event's success reflects MJIIT's commitment to nurturing future engineers and is a testament to the importance of academic-industry collaboration. As IEEE OES, we look forward to supporting and engaging with brighter minds who are ready to lead innovation in oceanic engineering and beyond.

IEEE OES Southwest Petroleum University Student Branch Chapter's Launching Event

Qinyuan Pu (SBC Chair), Li Jun (Counselor SBC) and SulemanMazhar (SBC Advisor)

Student members are playing an active part in IEEE Oceanic Engineering Society (OES) activities in China and recent launch of Southwest Petroleum University (SWPU)'s IEEE OES student branch chapter, the third IEEE OES SBC in China, is a clear indication of this growing interest from Chinese student body in IEEE OES.

The approval of the SBC establishment was received in 2024, however, the inauguration ceremony was planned to be held after establishment of elected SBC committee and hence was organized on 29 May 2025.

The event was held in a pleasant afternoon, marked by an extravagant bloom of cherry blossom flowers in the Chengdu campus of Southwest Petroleum University at the academic lecture hall of the central library. The event was attended by Professor Zhang Zhi (Dean School of Petroleum Engineering), professor Zhu Hongjun (Director Faculty Development Center), professor Lu Cong (Vice Dean School of Petroleum Engineering), Mr Qingyuan Pu (president SBC), Professor Li Jun (Counselor IEEE student branch and Director Institute of Marine Oil and Gas Engineering), Prof. Suleman Mazhar (Advisor SBC and IEEE OES

Figure 1. Launching Ceremony of IEEE OES Southwest Petroleum University's IEEE OES Student Branch Chapter (Academic Lecture Hall, Central University Library, Southwest Petroleum University, Chengdu, China).

Figure 2. Mr. Niu Chenwei, representative OES SBC SWPU, presenting about SBC's organizational structure and annual plan for 2025.

Distinguished Lecturer), and more than 100faculty members and students of the university. The meeting was hosted by Mr. Wu Yutong (English translation) and Wu Liansong (Chinese).

The establishment of this branch marks a solid step forward for Southwest Petroleum University in the cultivation of international talents in the field of marine engineering, and builds a new international academic platform for serving the national marine energy strategy.

Professor Suleman Mazhar delivered a speech on behalf of IEEE OES, introducing the IEEE's organization structure and the role and importance of the IEEE OES. He also introduced multiple competitions and opportunities available for students from the platform of IEEE OES. He also informed the audience about upcoming OCEANS 2026 in Sanya, China, and urged an active participation by the SBC members. Later, Mr. Niu Chenwei, the representative of the student branch, reported about the SBC organization as established after internal

Figure 3. Some snapshots from the launching ceremony of IEEE OES Southwest Petroleum University's student branch chapter: Presenting an overview of IEEE OES sponsored technical activities in China (Left) Sharing details about student activities and opportunities available from the platform of IEEE OES (Right)

Figure 4. IEEE OES Distinguished Lecture: Presenting an overview of OFDM basics (Left). Audience consisting of international and Chinese students and faculty members listening to the lecture (Right).

elections and shared details about the annual development plan of the SBC with an aim to "build an international academic platform and serving the marine energy strategy" as the core. Subsequently, Prof. Suleman Mazhar presented the certificate of establishment to the chapter, as a symbolic token of the formal launch of IEEE OES SBC at Southwest Petroleum University. Professor Zhang Zhi, the Dean School of Petroleum Engineering, in his welcoming speech, emphasized the importance of Ocean Engineering as an important direction for the construction of 'double first-class' disciplines in the university and noted that the establishment of the chapter is an important milestone in this regard. The launching ceremony ended successfully in a group photo of all the guests and branch members.

IEEE OES Distinguished Lecture

After the launching ceremony, an IEEE OES distinguished lecture titled "Underwater Acoustics Research: Challenges & Prospects" was delivered by professor Suleman Mazhar. During the lecture, he presented key technologies and advances in the domain of deep learning based underwater communication and presented a brief overview of opportunities and scientific challenges in the underwater imaging and robotics for the blue planet and pollution monitoring in the deep sea. He also provided the participants a brief orientation about international research programs offered by different scientific organization such as Schmidt Oceanographic Institute and Chinese Academy of Sciences.

Waves of Creativity: Inspiring Ocean Awareness through Art & Imagination

Puja Dube, Chairperson, IEEE OES Student Branch Chapter, IIT Delhi

Pre-U STEM Programme

Waves and Wanders: Inspiring the Future Through Ocean-Themed Art

"Art speaks where words are unable to explain – and when it speaks for the ocean, it becomes a voice of nature."

As a passionate advocate for ocean awareness and an active member of the IEEE Ocean Engineering Society Student Branch Chapter at IIT Delhi, I have always believed in the power of creativity to educate, inspire, and bring communities together. This year, I had the profound honour of coordinating and judging the **Waves & Wonders: K-12 Ocean-Themed Art Challenge**—an unforgettable journey filled with emotions, challenges, and most importantly, the joy of watching young minds connect deeply with our oceans.

Planting the Seed: A Dream to Inspire Young Ocean Stewards

Each year, our student chapter organizes unique outreach events aimed at building awareness about oceans and marine ecosystems,—especially for **K–12 students**, who are the torchbearers of the future. This year, our vision was bigger—to host a **grand, physical ocean-themed visual art contest**, inviting school students from Grades 5 to 12 across Delhi and NCR to dive into their imagination and create waves through art. With the generous funding of **$1200 from IEEE Oceanic Engineering Society**, our excitement soared. We launched the registration drive in October 2024, targeting schools nationwide. The response was overwhelming—**over 100 students registered**, many from esteemed institutions. However, just as our sails were up, we hit a financial storm. Due to funding delays, we had to **postpone the event** originally scheduled for December 14, 2024. Despite

Young participants sharing ocean messages through art.

this setback, our spirit remained unshaken. Encouraged by countless student emails asking, "When will the event happen?", we felt a responsibility to deliver on our promise. Our heartfelt thanks go to **Prof. Monika Aggarwal**, our chapter advisor, who **personally sponsored the entire event**. With her support and encouragement, we finally hosted the **Waves & Wonders Art Challenge** on **6 July 2025**, at **IIT Delhi.**

A Celebration of Ocean, Art, and Awareness

Despite the delay, the excitement among the students remained unshaken. On the event day, **around 40 enthusiastic students** arrived with their parents, brushes, and boundless imagination. The drawing contest began at 11:00 AM, and for three magical hours, our venue transformed into an ocean of colors, creativity, and youthful passion. Participants were grouped into three categories: **Grades 5–7**, **Grades 8–10** and **Grades 11–12.** All drawing materials—art sheets, pencils, erasers, brushes, crayons, watercolours, oil pastels—were provided free of cost, and there was **no registration fee**.

We saw an **incredible variety of interpretations—**from vividly painted corals to haunting depictions of pollution, from fantasy creatures beneath the waves to hopeful scenes of marine conservation. The creativity and depth of thought displayed by students left us awestruck. Some remarkable themes explored were: Some students illustrated **"Guardians of the Sea,"** emphasizing the importance of marine life protection. We saw stunning depictions of coral ecosystems under **"Coral Kingdom"** and heartwarming scenes of marine animals like dolphins and turtles in **"Tales from the Tide."** Several entries boldly addressed climate change in **"Waves of Change"—** sending strong environmental messages through visuals.

As I stood among the students, watching them pour their hearts into every brushstroke, I realized: **this wasn't just an art contest—it was a mission**. A mission to **nurture curiosity**, **amplify awareness**, and **plant seeds of ocean stewardship** in the minds of the next generation.

Each piece was a testament to the participant's understanding of the oceans and their significance. Evaluating these heartfelt works was no easy task—it was an emotional experience that reminded us why this cause matters. The judging criteria

Student artwork: Tales from the Tide.

focused on Originality & Creativity, Relevance to the Theme, Message Conveyed, and Visual Impact & Aesthetic Appeal. I extend my **sincere gratitude to our judges**, **Ms. Anjali Verma** and **Mr. Ranesh Saha**, for not only scoring the entries with fairness and insight but also for offering inspiring words that lit a path toward a **sustainable future** for our young artists.

Some winners whose work deeply impressed the panel include: **Aarush Maurya** and **Priti Kumari**, whose artwork boldly addressed **marine pollution**, urging all of us to act now. **Abhishek Kumar** from Class 10 mesmerized us with his artwork *"Depths of Wonder,"* an imaginative portrayal of the mysterious and uncharted ocean floors. **Rachit Kumar** of Class 6 beautifully captured the magic of marine life, showcasing a vibrant world of both known and unseen ocean creatures. **Gargi Shrivastav** and **Ishita Saini**, from the senior category, secured **1st and 2nd positions** with their breathtaking interpretations of **"Ocean Dreams,"** visualizing fantasy realms beneath the sea. **Krishang** and **Ratika** brought **"Tales from the Tide"** to life, capturing the spirit of dolphins and sea turtles with vivid charm.

I want to thank every volunteer who stood by this vision—**Imran Khan**, **Sameer Hansda**, and **Mukesh Aggarwal**—**thank you** for believing in this cause. Your energy, warmth, and encouragement made this event successful and created a

Award-winning student artworks.

Artwork portraying ocean depths and the message to protect marine life.

welcoming space for every child to shine. From organizing logistics to motivating participants, your role was priceless.

Certificates of Achievement were awarded to winners. All participants received **participation certificates and souvenirs**. The winning artworks were displayed on the IIT Delhi department notice boards and will soon grace our official IEEE IITD OES website. All participants received colorful gift packs, keychains, and appreciation goodies. Light refreshments, including **pizza, juices, and chocolates,** added to the joy of the day.

Let the waves of creativity and awareness continue to ripple across generations.

Echoes from the Deep: Coordinating and Judging the Ocean-Themed Creativity Contest for K–12 Students

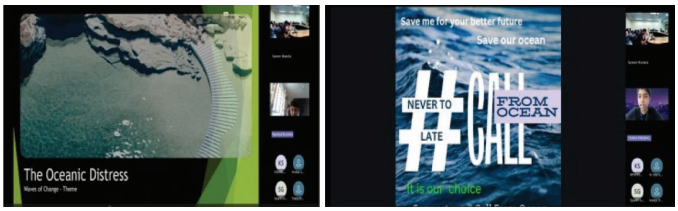
As I sit to reflect on the weeks of planning, hours of preparation, and the unforgettable day of presentations, I am filled with immense gratitude and wonder. Organizing and judging the **Creativity Contest: Poems, Short Stories, and Digital Art – an Ocean & Marine-Themed Contest for K–12 Students** was not just an academic or outreach exercise—it was a journey through imagination, emotion, and the ocean's voice echoed through the creative minds of India's young generation. This nationwide **hybrid** event (online + in-person) was organized by the IEEE Oceanic Engineering Society (OES) Student Branch Chapter at IIT Delhi. We issued our call for registrations in **October 2024**, welcoming participation from across India. There was **no registration fee**—just an open invitation to dive deep into the ocean's mysteries, to create, to feel, and to express. We grouped submissions into three school-grade categories: **Category A:** Classes 5–8, **Category B:** Classes 9–10, **Category C:** Classes 11–12. Coordinating the event came with its fair share of challenges and beautiful moments. From drafting Google Forms to reaching out to schools across the country, from raising sponsorships to handling logistics—it was a test of patience and love for the cause. But every email, reminder call, and spreadsheet entry was worth the effort when we received **45 heartfelt submissions** from diverse regions of India. The contest was conducted in two phases:

Judges and participants during the final round at the seminar room.

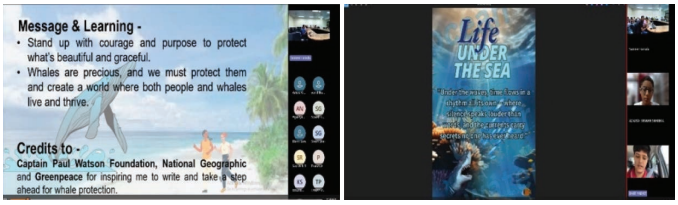
- **Screening Round**: Each submission was evaluated for originality, plagiarism, theme relevance, and overall impact by a panel of experts.
- **Final Round (July 6, 2025)**: Held in hybrid mode at IIT Delhi, where **30 finalists** presented their work, either in person or via MS Teams.

The creativity we witnessed left me in awe. I was astonished to see how deeply these young minds understood marine life and the importance of its protection. Their voices, expressed through poems, stories, and art, carried messages that were both profound and urgent. Some poems spoke of **"The Ocean's Voice,"** an emotional plea from the sea itself, while others like **"Waves of Change: The Impact of Humans on the Ocean"** highlighted the destructive consequences of human actions and their potential to shape the ocean's future. A recurring theme was **"Guardians of the Deep: Protecting Marine Life,"** reminding us that every creature of the ocean deserves care and respect.

In the **Short Stories category**, we were enchanted by pieces like **"Tides of Time: An Ocean Tale"** and **"Coral Kingdom Chronicles,"** which painted rich narratives of



Poster artwork presentation: A call to save our oceans.



Creative digital work highlighting marine biodiversity and conservation.

oceanic worlds and marine adventures. One standout entry, **"A Future in the Ocean: Imagining Marine Life in 2050,"** beautifully envisioned a sustainable future where human actions had restored the ocean's glory. The **digital artwork submissions** were equally mesmerizing. From colourful depictions of **"Ocean's Heroes: Marine Life Protectors"** to vibrant portrayals of **"Life Under the Sea: Exploring Marine Biodiversity"** and **"Coral Reefs: Nature's Underwater Cities,"** the posters conveyed powerful messages of conservation, awareness, and wonder. These K–12 students

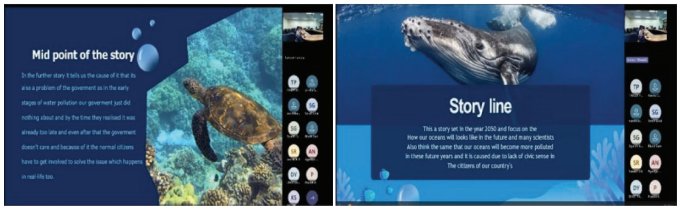
Award-winning poems created by young participants.

not only displayed artistic skill but also a rare depth of environmental consciousness.

- And then, there was young *Zedaan Abdur Rahman* (Class VII), whose short story **"When the Whales Come Home"** brought tears to many eyes. Through his tale of *The Last Whale*, he envisioned a future where ports are moved to "whale-free zones" and conservation triumphs over destruction.

Certain entries stood out for their originality and emotional resonance:

- **"Secrets Unknown"** by *Vanshika Bansal* (Class XI) revealed the hidden beauty and fragility of the ocean, reminding us of our responsibility to protect the unknown depths.
- **"The Beauty Beneath"** by *Kartik Mittal* (Middle Category Winner) told a story of how true beauty often lies beneath the surface—hidden, delicate, and desperately in need of our care.
- **"Dark Beauty"** by *Ananya Pandey* explored the duality of the ocean—the awe it inspires and the fear it conceals, especially in the face of pollution and climate change.
- *Hriyanash Yadav* (Class VI) took us on **"An Ocean Adventure,"** a magical journey beneath the waves that highlighted the diversity of marine life.
- *Sparsh Goel* (Class VIII) in **"Waves of Wonder"** painted a lyrical portrait of marine serenity.
- *Saurav Kumar* moved us with **"The Ocean's Lovely Voice,"** a call to action that demanded attention to ocean conservation.
- And then, there was young *Zedaan Abdur Rahman* (Class VII), whose short story **"When the Whales Come Home"** brought tears to many eyes. Through his tale of *The Last Whale*, he envisioned a future where ports are moved to "whale-free zones" and conservation triumphs over destruction.



Young winner presenting a powerful short story.

Poetic message on Beauty of ocean by young talents.

The final round was a celebration. Ten finalists, along with their teachers and parents, joined us **in person** at IIT Delhi, while the remaining finalists presented **online via MS Teams**. The room was alive with curiosity, pride, and the joy of sharing. Students presented their creations with remarkable articulation—explaining their themes, the tools they used, and the inspirations behind their works. Poets recited with expressive voice, storytellers guided us through plot twists and powerful endings, and digital artists unveiled posters that could stand proudly in any awareness campaign. Judges asked questions about their creative process, and the young minds answered with clarity and conviction. We ensured light refreshments—pizza, chocolates, and juice—because joy, too, is essential in a child's learning journey.

Certificates of Achievement were presented to winners and top-ranked entries in each category. In-person participants also received ocean-themed gifts—keychains, color boxes, pens, and books related to marine science and ocean conservation. All selected finalists received **Certificates of Participation**. Select top entries will be featured internationally through IEEE OES outreach channels, showcased on the **IIT Delhi Departmental Notice Board**, and published on the **IEEE OES IIT Delhi Student Branch Chapter web**. This contest would not have been possible without the unwavering support of our advisor, **Prof. Monika Aggarwal**, whose vision and encouragement made this event a reality. My heartfelt thanks to our dedicated judges—**Ms. Anjali Verma** and **Mr. Ranesh Saha**—and to the volunteers who managed every detail with care and commitment. Special thanks to **Our Volunteers** – Who managed registrations, tech support.

1) **Children are listening—to the ocean, to their teachers, to science, to headlines.**
2) **Creativity is a powerful entry point into environmental literacy.**
3) **When youth speak for the ocean, adults pay attention.**

Let us continue to amplify their voices, support their learning, and build programs where creativity meets conservation. Together, we can turn waves of awareness into tides of action.

Symposium on "Innovations and Technologies in Underwater Communication: Bridging Research and Industry"

Co-Technical Sponsored by IEEE OES

Co-Sponsored by IIT Delhi OES Student Branch Chapter & OES Delhi Chapter

Call for Abstracts: Technical Poster Competition

📍 IIT Delhi | 🗓️ 17–18 November 2025 | 🌐 Hybrid Mode

This two-day global symposium aims to bring together leading researchers, academicians, industry experts, and young professionals to discuss emerging innovations and critical challenges in underwater communication systems. This symposium is a platform to present innovative research, spark collaborations, and bridge academic and industrial applications in underwater technologies.

Event Highlights

- 🎓 Tutorial & Technical Talks by globally renowned experts
- 💬 Panel Discussions on future directions and collaborative research
- 👥 Interactive Sessions for students and early-career researchers
- 🌐 International Insights and Indo-global case studies

Keynote /Tutorial Speaker

- **Prof. Milica Stojanovic** – Northeastern University
- **Prof. Annaya Sen Gupta** – University of IOWA
- Dr. **Costas Pelekanakis** – TNO (Netherlands Organization for Applied Scientific Research)
- **Prof. Roee Diamant** – University of Haifa, Israel
- **Prof. Rosa Zheng** –Lehigh University Bethlehem, USA
- **Dr. Sarang Dhongdi** – BITS Pilani K K Birla Goa Campus
- **Dr. Badri N Subudhi** – IIT Jammu.
- **Dr. Ankur Bansal** – IIT Jammu.
- **Prof. Arun Kumar** – IIT Delhi

Technical Tracks

- Sonar & array signal processing
- Vector sensor and synthetic aperture processing
- Acoustic & optical underwater communication
- Biologically inspired signal processing
- Autonomous/ROVs/Manned underwater vehicles
- Ocean noise, signal coherence, and environmental factors
- AI/ML for Underwater Sensing, Imaging, and Channel Modeling
- Underwater Networks and Telemetry Systems
- Channel Estimation and Equalization in Underwater Environments
- Underwater Localization, Navigation, and Tracking Techniques
- Energy-Efficient and Long-Endurance Communication Techniques
- Cross-Layer Design for UWC and UWSNs
- Hybrid Acoustic-RF-Optical Communication Techniques
- Security and Privacy in Underwater Communication Systems

Technical Poster Competition

Poster sessions offer a unique space for dialogue, feedback, and visibility, particularly for promising ideas that are still in development

We invite poster abstracts from:

- **B.Tech/M.Tech/Ph.D. students**
- **Researchers and faculty members**
- **Industry professionals and engineers**
- **Academicians and startups working in related fields**

Important Dates

Abstract Submission Deadline: 15th September,2025

Notification of Acceptance: 2nd October,2025

Final Poster Submission Deadline: *Will be communicated to accepted authors*

Abstract Submission Guidelines

- Format: **PDF only**
- Word Count: **500–1000 words**, max **2 pages** (including figures and references)
- Include at the top:
  - Poster title
  - Principal author's name
  - Institution or affiliation
- Abstracts must be original and authored by the submitting participants.
- We welcome abstracts that represent Ongoing research work, published work, emerging innovations, early prototypes, or conceptual designs that align with the symposium themes
- **Participant data collected for symposium purposes will be handled confidentially and erased post-event in compliance with data protection guidelines.**

Poster Presentation Guidelines

- Authors (or co-authors) must present in person during the scheduled session in the technical program
- Each presentation will be up to 15 minutes, including time for Q&A
- Authors of selected abstracts will receive detailed poster preparation and submission guidelines

⏳ **Top 3 posters will be awarded with certificates, exciting prizes, and special recognition**

📕 **All accepted participants will receive certificates of participation**

Don't miss this opportunity to share your innovation on an international platform, connect with domain experts, and contribute to shaping the future of underwater technologies.

🔗 ***Abstract Submission Link***:

📩 **For queries, contact:** iitdsocieties@gmail.com

ATTENTION OES STUDENTS

INTERNATIONAL
STUDENT POSTER COMPETITION
FREE TRAVEL TO A CONFERENCE
PRIZE MONEY

WWW.IEEEOES.ORG

IF YOU'RE AN OES STUDENT MEMBER, DON'T MISS OUT ON YOUR CHANCES TO ENTER THE STUDENT POSTER COMPETITION

HAVE YOU COMPLETED SOME EXCELLENT RESEARCH? BE SURE TO ENTER THE OES STUDENT POSTER COMPETITION. UP TO 25 INTERNTIONAL STUDENTS ARE CHOSEN TWICE A YEAR TO TRAVEL, ALL EXPENSES PAID, TO THE NEXT OCEANS CONFERENCE TO PRESENT THEIR RESEARCH IN THE POSTER SESSION. THE THREE TOP POSTERS RECEIVE $3,000, $2,000 AND $1,000 FOR 1ST, 2ND AND 3RD PLACE.

Member Communities

IEEE Oceanic Engineering Society

Connecting Minds Through IEEE Member Communities

Students

The IEEE Student community serves as a launching pad for aspiring engineers and technologists. Catering to undergraduate and graduate students, this community facilitates academic and professional growth through networking events, technical competitions, and access to valuable resources.

By connecting students with seasoned professionals, fostering collaboration among peers, and promoting continuous learning, IEEE Student community prepares the next generation of innovators to make meaningful contributions to the ever-evolving field of technology.

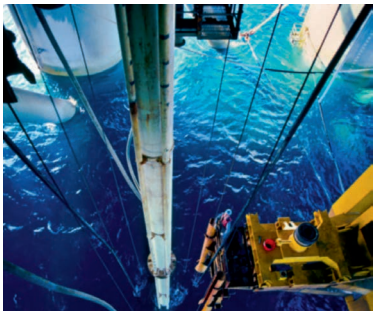
Young Professionals

The Young Professionals community is tailored for early-career individuals navigating the dynamic landscape of technology. IEEE YP offers a vibrant platform for networking, professional development, and knowledge exchange.

Geared towards individuals who have recently graduated or are in the early stages of their careers, YP provides opportunities for skill enhancement, mentorship, and engagement with like-minded peers, empowering young professionals to shape the future of technology.

Women in Engineering (WIE)

Connecting, supporting, and inspiring females worldwide, and facilitating their recruitment and retention in STEM fields. IEEE WIE actively encourages participation from all individuals, regardless of gender or background.



Ocean Decade Initiative

The United Nations Decade of Ocean Science for Sustainable Development 2021-2030 (referred to as 'the Ocean Decade'), brings together ocean actors from across the seas to collaborate for a better ocean. The Ocean Decade Initiative (ODI) aims to boost OES's participation in this global movement, and interface its actions and activities with the Decade.

Membership

IEEE Oceanic Engineering Society

Connecting Minds Through IEEE Member Communities

Become a Member

Are you passionate about ocean science and technology? Are you committed to advancing our understanding of the world's oceans and harnessing their potential for the betterment of society? If so, we invite you to become a member of the IEEE Oceanic Engineering Society (OES).

Senior Membership

Join a distinguished group of oceanic engineers and professionals by becoming a Senior Member of the IEEE Oceanic Engineering Society (OES). Senior Membership is a prestigious designation that recognizes individuals who have made significant contributions to the field of oceanic engineering.

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OCEANS 2026 Sanya
Call for Abstracts

"To the Sea, to the Deep"

IEEE Oceanic Engineering Society

May 25-28, 2026 Sanya China

We seek cutting-edge technical presentations with an emphasis on Deep-sea Technology, Marine Energy, and Ocean AI for our conference in May 2026.

Submissions related to OCEANS 2026 Sanya Special and IEEE OES Standard Topics will be considered. The special topics include:

- Deep sea exploration and archaeology
- Deep sea mining and environmental evaluation
- Artificial intelligence in ocean science and technology
- Mobile underwater sensor networks: Coordinated communication, localization, and observation
- Underwater soundscapes: Methodologies and applications
- Polar and under ice observing systems
- Offshore wind power technology
- Technologies for monitoring extreme weather events
- Biologically inspired technology for marine applications
- Interactive development of marine science and technology
- Ocean remote sensing

IMPORTANT DATES:

- Abstract Submission opens: October 01, 2025
- Deadline for Abstract submission: December 22, 2025
- Call for Tutorials: October 01, 2025
- Tutorials Close: December 15, 2025
- Notification for Authors: February 15, 2026
- Final Paper Submission: March 22, 2026

For further information please contact the OCEANS 2026 Sanya Technical Program Committee at TechnicalChair@sanya26.oceansconference.org .