July 2020

Challenger Wave

Monthly newsletter of the Challenger Society for Marine Science (CSMS)

NEWS

SAMS World Oceans Day etc.
There are a couple of interesting productions from the communications team at SAMS (Scottish Association for Marine Science). For World Oceans Day, SAMS produced the linked poem and had staff film a line each. The result is hopefully a thought-provoking video about our relationship with the ocean: https://www.youtube.com/watch?v=GAPFkCKS-Z4&feature=youtu.be.

At SAMS we have also produced our first digital-only edition of our Ocean Explorer Magazine, which has features and articles on various marine research and issues. We would love to hear any feedback on this: https://samsmagazine.com/. - ***Euan Paterson, Communications and Media***, euan.paterson@sams.ac.uk.

IMarEST appoints Gwynne Lewis as new chief executive
The Insitute of Marine Engineering, Science & Technology (IMarEST) has appointed a new chief executive, Gwynne Lewis, who will begin the role on the 29th June.

Richard Vie, Chair of the IMarEST Board, said "We are delighted to have found a successor to continue David Loosley's superb work in transforming the Institute. Gwynne has a passion for everything marine and brings a great deal of experience to the role, with knowledge of the shipping and offshore industries, navies, marine science and marine technology. He is well placed to take the Institute forward in becoming a strong and sustainable organisation. I look forward to welcoming Gwynne as he takes up the baton".

Gwynne has a background in marine consultancy and, prior to joining the IMarEST, was the Global Head of Data and Digital at Lloyd's Register until 2018. He has since been the Maritime Product Line Director at Orolia.

Gwynne said, "I'm delighted to have been appointed to this prestigious role and to succeed David as the Institute's chief executive. I'm passionate about our industry, the people who work within it and the sustainability of the maritime economy and ecosystem. There are many challenges we face as individuals, an industry and a society but there has likely never been a more important time for marine engineers, scientists and technologists to make a real a difference in the world. The Institute will have a very important role to play in adapting, as it always has done, to meet the demands of it's present and future members."

David Loosley, the IMarEST's current chief executive, previously announced that he will be stepping down in June of 2020, after leading the organisation for over eight years, to take up the role of Secretary General and CEO of BIMCO.

Careers in Oceanography and Marine Science
The IMarEST Operational Oceanography SIG (Special Interest Group) have produced a skills/employment matrix entitled "Careers in Oceanography & Marine Science" with the educational and experience levels required: www.imarest.org/reports/984-careers-in-oceanography-and-marine-science

This document has been generated by the OOSIG to guide those young undergraduates and post graduates who cannot find posts or a pathway through academia or research such that their enthusiasm is not lost to the sector. It will be expanded online to include case studies from young, mainly scientists who have found employment in the wider field of operational oceanography rather than academia and research, although this is covered as well.

The IMarEST presents 'Ocean Aware', a collaboration with ITN Productions Industry News, launching Autumn 2020

The Institute of Marine Engineering, Science and Technology (IMarEST) and ITN Productions Industry News will be co-producers of an online series exploring ocean health, the stewardship of the seas and the impact the oceans have on society. 'Ocean Aware' will explore the challenging issues in the sector, highlight the importance of preserving the ocean resources and show how marine professionals are addressing the challenges of the modern world; including climate change and renewable energy, scientific advances and the ethical issues surrounding marine exploration, as well as the use of new technology. The programme will combine key sector interviews, news items and sponsored editorial profiles which will be launched throughout 2020. The series will form part of an extensive communications campaign featuring IMarEST members and professional partners.

Dr Bev MacKenzie, Technical and Policy Director for the IMarEST, said: "We find ourselves at a critical juncture in ocean history and there has never been a more important time to raise awareness and take action on global ocean issues. We're delighted to partner with ITN Productions Industry News again to explore the emerging opportunities and key challenges facing the oceans that will shape the marine industry's outlook for many decades to come."

Elizabeth Fisher-Robins, Head of Industry News, ITN Productions said: "We are really excited by the opportunity to partner again with The Institute of Marine Engineering, Science and Technology to create a series that will educate and inform viewers about the key role marine professionals have in the sustainable use of the ocean's resources and maintaining ocean health."

For more information, or to participate in the programme, please contact Georgia Gerstein, Programming Director, Industry News at ITN Productions, on 07891014840 or Georgia.Gerstein@itnproductions.com. A copy of the series promotional video can also be downloaded here: https://we.tl/t-C9HoGvyHKM.

National Marine Facilities (NMF) Technology Roadmap 2020-21

In June the National Oceanography Centre published the National Marine Facilities (NMF) Technology Roadmap 2020-21, https://bit.ly/NMF_TRM, which outlines current capabilities, and looks to the future of oceanographic science and the technology that will take us there. The NMF Technology Road Map acts as a focus for the interactions between science and technology ('*science pull* and *technology push*') in developing the National Marine Equipment Pool (NMEP) and associated supporting infrastructure. The Road Map highlights how these capabilities feed into the broader goals of an integrated observing system and how the data gathered can support the Global Ocean Observing Systems (GOOS) and its constituent parts.

For the full press release, noc.ac.uk/news/national-marine-facilities-technology-road-map-published. Feedback and comments are welcome, please contact Jackie Pearson, Secretary to the Marine Facilities Advisory Board, National Oceanography Centre: jfpea@noc.ac.uk

NEW DATES for a VIRTUAL Ocean Best Practices Workshop IV are September 18-25 2020 and a final plenary on September 30.

Our world is certainly changing and it is hard to

predict what October, November and December will be like. Recognizing and adapting to the challenges we are facing and will be facing in the months ahead, we have moved the annual Oceans Best Practices workshop to a virtual event on the web and changed it to a series of shorter meetings that can accommodate global participation. The workshop will host Plenaries on September 18th and 25th with a final mini-plenary on September 30th. Working groups will meet at selected times during the period of September 21st to 24th. The format of the meeting has also evolved to focus more on conversations and smaller working groups. We will be having two instances of the second and third plenary to support the challenges of time zones.

The Intergovernmental Oceanographic Commission is very pleased to share their open call for Early Career Ocean Professional Co-leads at the Ocean Best Practice Workshop IV. This call seeks early-career professionals to help shape how the ocean community, across disciplines, regions, and generations, develops, shares, and advances its methods. This will be an opportunity for intergenerational exchange on current practices, while gaining experience as a co-lead in an international, multi-stakeholder consultation process: applications are due by the 20th July.

A draft agenda is available at www.oceanbestpractices.org/events/evolving-and-sustaining-ocean-best-practices-iv/. We encourage you to mark your calendars for the plenaries during the times indicated on the agenda (pick what is most convenient for you). Registration will open shortly. If you have any questions, send us a note at https://www.oceanbestpractices.org/contact/. - ***Jay Pearlman, Director, Four Bridges*** jay.pearlman@ieee.org

VIEWS

Sonardyne's BlueComm underwater communications selected by Australian Defence Science and Technology Group

Australia's Defence Science and Technology Group (DST) has acquired a BlueComm undersea communications system from Sonardyne International Ltd. as part of its ongoing program in maritime autonomous systems (MAS). BlueComm is the only commercial-off-the-shelf (COTS) technology that enables wireless transmission of high bandwidth tactical data, including video, over ranges of a few tens or even hundreds of metres, at rates of up to 10 megabits per second. With it, forces can vastly increase the communications capability of their underwater systems to drive faster, safer and better-informed decision making in theatres of operation.

Because they use light to transmit and receive data instead of the acoustics traditionally used for communications underwater, BlueComm modems can deliver higher data rates with lower latency. They're also undetectable by sonar listening devices, making them highly suitable for covert, secure communications. Configurations are available for all operating environments, including shallow waters with high levels of ambient light, and installation on underwater vehicles equipped with powerful lighting.

Sonardyne's BlueComm undersea communications system; the only commercial- off-the-shelf (COTS) technology that enables wireless transmission of high bandwidth tactical data, including video, underwater.

For DST, the objective of the acquisition is to understand the operational implications of optical data transmission and its dependence on water clarity, geometry and ambient illumination. DST is the Australian government's lead agency responsible for applying science and technology to safeguard Australia and its national interests, delivering expert, impartial advice and innovative solutions for defence and national security. It has been instrumental in driving the adoption of unmanned/uninhabited systems in the Pacific region through exercises such as Australia's Autonomous Warrior, which saw the co-ordinated

use of unmanned/uninhabited air, land, sea surface and underwater systems.

Ioseba Tena, Global Business Manager, Defence, at Sonardyne, says, "BlueComm is a game changer for underwater operations, enabling autonomous and unmanned underwater vehicles (AUV/UUVs) and unmanned and manned vessels to communicate, without compromising their position. As we envision new concepts of operation which require interaction between different off-board assets subsea, the ability to share data covertly and securely cannot be underestimated."

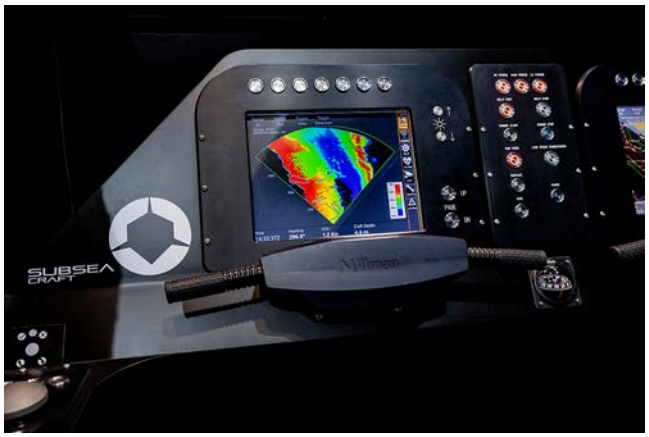
Sonardyne's Vigilant sonar to provide critical hazard avoidance for new diver delivery system

Underwater obstacle avoidance technology from maritime defence and security specialist Sonardyne International Ltd. has been chosen for a new design Diver Delivery Unit (DDU) being built by SubSea Craft.

Sonardyne's Vigilant Forward Looking Sonar (FLS) will provide a critical hazard avoidance capability for the crew and embarked divers of the VICTA Class DDU when navigating on or below the surface. Using a compact and sophisticated bow-mounted transducer arrangement, Vigilant FLS displays water depth, sub-surface obstacles and features by creating an accurate 3D model of the underwater environment. The model is displayed relative to the underwater vehicle or surface vessel it's fitted to, overlaid on standard charts in real-time, providing operators with a detailed topographical image of their route ahead. Vigilant FLS provides an easy to interpret 3D bathymetry out to 600 m over a 90° field of view, as well as automated warnings of unseen collision hazards out to 1.5 km, supporting safe navigation for mariners, underwater vehicle pilots and unmanned surface and subsea systems.

SubSea Craft's VICTA Class DDU offers the speed and endurance of a long-range insertion craft with the stealth and capacity of a swimmer delivery vehicle. It can travel up to 250 nautical miles (nm) at speeds of up to 40 knots on the surface, whilst submerged it cruises at 6 knots, with a 'sprint' capability of 8 knots, for up to 25 nm to deploy and recover up to eight operatives (two crew and six divers) to their objective area mission-ready.

"Being able to detect, at range, navigation hazards, before they become a real threat, is mission-critical to the sort of operations likely to feature in VICTA's playbook" says Tim Chicken, SubSea Craft's Chief Commercial Officer. "Vigilant is the solution. With Vigilant integrated into VICTA, complete with its easy to use, intuitive graphic user interface, pilots can visualise the environment ahead to navigate safely and avoid obstacles ensuring safe insertion and recovery of operators, regardless of the mission. As VICTA is designed around the operator, Vigilant was the ideal solution."



Sonardyne's Vigilant FLS shown integrated into SubSea Craft's VICTA DDU.

"Vigilant FLS offers naval forces with unprecedented subsurface situational awareness with unrivalled range," says Ioseba Tena, Global Business Manager for Marine Robotics and Defence at Sonardyne. "With Vigilant integrated into VICTA, complete with its easy to use, intuitive graphic user interface, pilots can visualise the environment ahead to navigate safely and avoid obstacles ensuring safe insertion and recovery of operators, regardless of the mission. Quite simply, it provides a tactical advantage for their operations."

From blooms to ocean deserts: understanding primary productivity in the ocean

Sunlight is, directly or indirectly, the ultimate energy source for almost all life on Earth. Phytoplankton harvest it to convert inorganic carbon to an organic form and as a result, are responsible for approximately half of the photosynthesis that occurs on our planet. Phytoplankton primary production therefore fuels marine food webs and is a fundamental property of the ocean ecosystem.

A combination of both light and nutrients are essential for phytoplankton to sustain their growth. Without the supply of nutrients from the lower layers of the ocean, phytoplankton cannot photosynthesise and maintain their biomass in the sun-lit upper layers of the ocean. The variable nature of the ocean's conditions therefore corresponds to a hugely variable distribution of phytoplankton, from enormous blooms of algae to vast ocean deserts almost free of biogenic activity. Ocean deserts, known as oligotrophic zones, may account for over 30% of total marine primary production and cover more than 60% of the ocean's surface area, making them the largest ecosystem in the surface ocean.

These regions often occur as a result of the warming of surface waters, causing them to become more buoyant. This creates a pressure and temperature gradient with the cooler, denser deep ocean waters below. When phytoplankton die, they are exported as organic matter to depth, causing nutrients to accumulate in deep waters. However, the gradient between the surface and the deep prevents the reintroduction of dissolved nutrients into the surface of the oceans. The surface therefore becomes depleted of nutrients and primary production becomes limited. With global warming predicted to expand the ocean's oligotrophic regions, we must ensure that we understand the fundamental processes occurring within them, including primary productivity.

It is therefore vital that we measure primary productivity in these vast ocean deserts as well as in areas rich with productivity and nutrients. Until now, it has been difficult to find a single instrument capable of accurately measuring primary production at both high and extremely low concentrations of phytoplankton. Chelsea Technologies' new portable active fluorometry system, LabSTAF chelsea.co.uk/products/labstaf/, monitors phytoplankton using the latest in STAF (Single Turnover Active Fluorometry) technology and combines an unparalleled sensitivity with a wide dynamic range. This allows for measurements in extreme oligotrophic waters, open oceans, coastal waters and lakes with much greater precision. It provides a highly automated platform for running continuous Fluorescence Light Curves (FLCs) and incorporates new features to greatly improve the accuracy of STAF-based primary production assessment, including the correction of spectral errors, baseline fluorescence and the package effect.

For more information on LabSTAF and the use of active fluorescence in primary productivity monitoring, please contact Ben Goymer at bgoymer@chelsea.co.uk.

SALTS

No news from sea this month I'm afraid
I know that this is a favourite section for many readers, where we get the inside information about life at sea, its thrills and spills. So please the next time you are at sea or carrying out any fieldwork, please remember that a simple paragraph or two will get you published here. **–** ***Ed***

CALENDAR

7th - 9th October 2020: Marine Alliance for Science and Technology for Scotland 10th Annual Science Meeting (ASM)
Glasgow, Scotland
Join us at the Technology and Innovation Centre, Glagow. We will look back at the signiificant progress made by our partners and collaborators, and look forward to 2021, which sees the start of the decade of ocean science for sustainable development. We will examine the modern challenges that face our marine waters, and identify ways and means to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

This cross-disciplinary meeting brings together members of the marine science community, with the aim of promoting and communicating research excellence and forging new scientific collaborations. The cross-disciplinary nature of the event as well as the high calibre of the selected talks means that scientists can broaden their knowledge in marine science as well as benefit from expertise and ideas gained in a range of fields other than their own. Science presentations and e-poster sessions will take place on the first two days, together with Plenary Speakers and opportunities to network.

We are delighted that IMarEST is sponsoring the student prizes for the 2020 ASM. Best

Presentation - £200 first prize and a £100 second prize and Best Poster - £130 first prize and a £70 second prize. Winners of the Best Presentation and Poster will be invited to attend the IMarEST Scottish Branch evening lecture to obtain their certificate and prize (travel cost to be reimbursed by IMarEST). You must be a student member of IMarESt to be eligible for these prizes, www.imarest.org/membership/membership-registration/upgrade-your-membership/student-member-simarest. The E-poster submission deadline is 16.00 on Monday **28th September 2020**.

On the third day the venue will host a number of meetings and workshops: If you are interested in hosting one of these, or if you are interested in **exhibiting** at the 2020 event, or anyone wishing to showcase or demonstrate a piece of kit/equipment please email Dr Emma Defew, ecd2@st-andrews.ac.uk. For further general information, please visit, www.masts.ac.uk/annual-science-meeting/.

8th – 11th October 2020: Eighth Arctic Circle Assembly

Reykjavík, Iceland

The Arctic Circle has received over 200 Session Proposals for the eighth Arctic Circle Assembly. In addition to the record number of Proposals, hundreds of speakers have already been confirmed. The Session Proposals come from a great number of institutions from different parts of the world, focusing on a wide variety of Arctic issues.

Session Proposals are currently under review. Session organizers will be notified in the coming days whether their Session has been accepted. Sessions at the Arctic Circle Assembly are held in auditoriums, lecture halls, board rooms, and open spaces throughout Harpa and nearby venues. Sessions are organized by governments, institutions, organizations, universities, think tanks, companies and others. In addition, the Arctic Circle itself organizes Plenary Sessions at the Assemblies.

During these pandemic times Arctic Circle will continue its mission of enhancing and facilitating Arctic and Global dialogue. Arctic Circle social media channels will share updates on Arctic and Global issues and highlight important information from previous Assemblies and Forums. For Information, visit www.arcticcircle.org.

10th – 12th November 2020: Marine Autonomy and Technology Showcase 2020

Southampton, UK

Planning for this year's Marine Autonomy and Technology showcase (MATS 2020) in November is still ongoing despite the uncertain landscape, and so we are still calling for abstracts. Details on this year's themes and how to submit your abstract are available on the NOC's Events pages, noc-events.co.uk/mats-showcase-2020.

We fully understand that the ongoing restrictions are likely to be having an impact upon your planned activities in-year, so we have stepped back from the focus on developments in the last 12 months since the 2019 showcase and will consider any submission that aligns with this year's themes. The deadline for abstract submissions is Tuesday 4 August 2020.

The expert session chairs for the NOC's Marine Autonomy and Technology Showcase 2020 are, Claire Cardy (MD of Nortek UK), Doug Connelly (the NOC's Associate Director for Research and a Director of NOC Innovations Ltd), Peter Collinson (Lead for the Marine Autonomy Group at BP), Dan Hook (Managing Director at Armada) and Dan Ridgwell (Unmanned and Autonomous Systems Capability Lead for BMT).

21st – 23rd November 2020: Arctic Circle Japan Forum
Tokyo, Japan
The Forum will be organized in coordination with the Third Arctic Science Ministerial Meeting, which is co-hosted by the Icelandic Ministry of Education, Science and Culture, and the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). The Arctic Circle is collaborating with the Sasakawa Peace Foundation in organizing the Forum.

Governments, universities, companies, research institutions, organizations, associations and other partners are invited to submit proposals for Sessions to the Arctic Circle Secretariat. Guidelines will be published soon.

1st – 3rd December 2020: Oceanology International
London, UK
Celebrate the world's largest ocean technology exhibition and conference. Oceanology International is turning 50, and you are invited to the celebration. The event brings the industry together, from businesses to government and thought leaders from different sectors, to offer the latest information and technology that are moving our oceans.

Dramatic progress in ocean surveying is unlocking previously unimaginable opportunity across the ocean tech community. The 50th Anniversary Oi expo looks ahead to the next half century of surveying and services, bringing together 500 companies in 17,000 m^2 of exhibition space designed to inspire. Survey and services are key dimensions of the current ocean tech revolution, enabling new kinds of insight into the ocean floor, aquatic life and ongoing change in our oceans.

Progress in automation is unlocking previously unimaginable opportunity across the ocean tech community. It's a unique chance to meet the teams behind the innovations and see the technology in action. From subsea controls to autonomous survey boats, aerial drones to independent sample collectors, unmanned systems will streamline operations and deliver new depth in detail and data.

This is a unique chance to find out what's possible, meet the teams and see the technology in action. Register online now to attend Oi 2020: www.oceanologyinternational. com/.

Visit the show to:

- Have access to a free and interactive educational programme that will inspire and inform you on key industry topics.
- Meet experts and do business – the show offers more than 500 exhibitors, global suppliers of cutting-edge technology.
- Stay up to date with regulations and policies to make more effective decisions for your business and projects.
- Explore features such as the Ocean ICT Zone, focused on marine and ocean IT, communications, satellite and data solutions.

Here are some of the exciting developments for 2020:

- Expanded Dockside Demonstrations - we doubled the number of companies demonstrating technology at the dockside so you have even more options for an immersive experience.
- New tracks at this year's conference - Asset Integrity and Monitoring, Coastal Zone and Shallow Water, Data Interpretation and AI, and much more. Full programme coming soon.
- Expanded Ocean ICT Zone – More exhibitors and technology at the area dedicated to the latest IT and Communication Technologies for the Ocean Space.

To succeed in your future ocean strategies, you need to be where the people shaping them are.

Register now to Oceanology International 2020 and celebrate our 50th anniversary where the industry is.

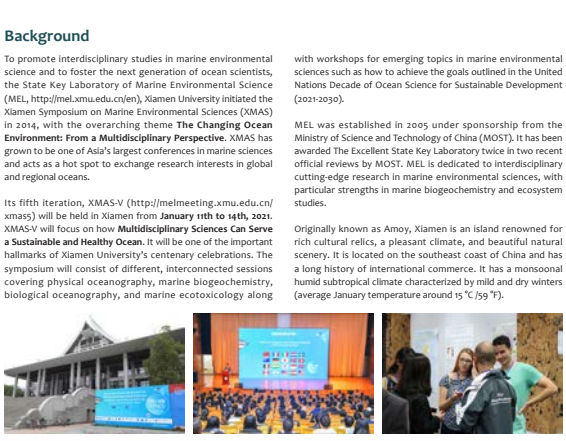
Our technical sessions unpack the latest developments and insights on essential topics, including:

- offshore energy development
- asset monitoring
- navigation and positioning
- hydrography, geophysics and geotechnics
- environmental stressors
- data interpretation and AI

It's shaping up to be a sensational show and an occasion no one in the Ocean tech community can afford to miss.

In its 50 years, Oi has consistently advanced with the community involved in exploring, monitoring, developing or protecting the world's oceans by providing networking across different sectors, knowledge exchange from various disciplines and valuable business opportunities. That reflects on the developments of the show programme year by year and the new benefits for attendees.

11th – 14th January 2021: The Fifth Xiamen Symposium on Marine Environmental Sciences
Xiamen, China



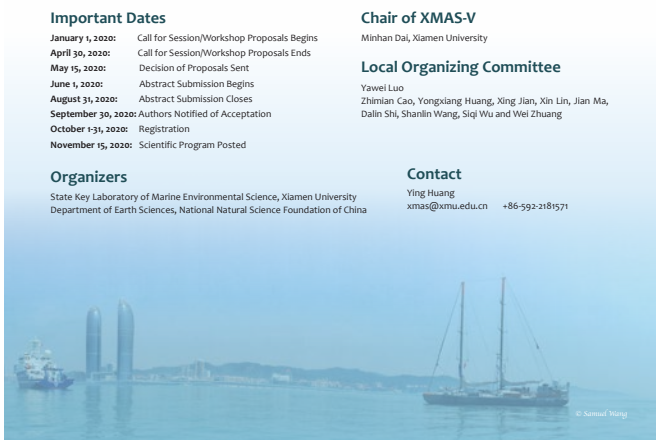
Background

To promote interdisciplinary studies in marine environmental science and to foster the next generation of ocean scientists, the State Key Laboratory of Marine Environmental Science (MEL, http://mel.xmu.edu.cn/en), Xiamen University initiated the Xiamen Symposium on Marine Environmental Sciences (XMAS) in 2014, with the overarching theme **The Changing Ocean Environment: From a Multidisciplinary Perspective**. XMAS has grown to be one of Asia's largest conferences in marine sciences and acts as a hot spot to exchange research interests in global and regional oceans.

Its fifth iteration, XMAS-V (http://melmeeting.xmu.edu.cn/xmas5) will be held in Xiamen from **January 11th to 14th, 2021**. XMAS-V will focus on how **Multidisciplinary Sciences Can Serve a Sustainable and Healthy Ocean**. It will be one of the important hallmarks of Xiamen University's centenary celebrations. The symposium will consist of different, interconnected sessions covering physical oceanography, marine biogeochemistry, biological oceanography, and marine ecotoxicology along with workshops for emerging topics in marine environmental sciences such as how to achieve the goals outlined in the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

MEL was established in 2005 under sponsorship from the Ministry of Science and Technology of China (MOST). It has been awarded The Excellent State Key Laboratory twice in two recent official reviews by MOST. MEL is dedicated to interdisciplinary cutting-edge research in marine environmental sciences, with particular strengths in marine biogeochemistry and ecosystem studies.

Originally known as Amoy, Xiamen is an island renowned for rich cultural relics, a pleasant climate, and beautiful natural scenery. It is located on the southeast coast of China and has a long history of international commerce. It has a monsoonal humid subtropical climate characterized by mild and dry winters (average January temperature around 15 °C /59 °F).

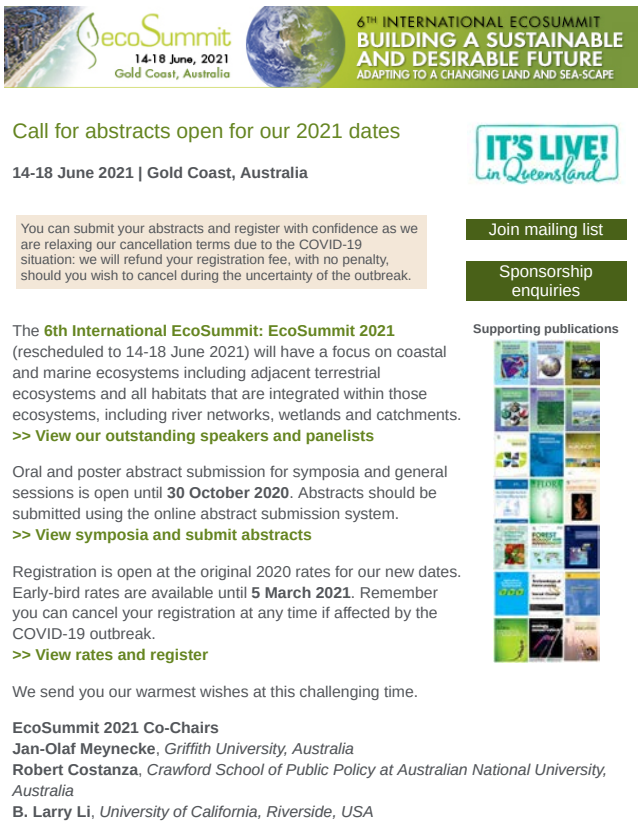


The State Key Lab of Marine Environmental Science (MEL), Xiamen University and the Earth Science Division of the National Natural Science Foundation of China (NSFC) are going to hold the fifth bi-annual meeting XMAS-V. The theme of XMAS-V is **Multidisciplinary Sciences Serving a Sustainable and Healthy Ocean.** More information about the meeting can be found at http://melmeeting.xmu.edu.cn/xmas5/.

14th-18th June 2021: EMODnet Open Conference and Jamboree
Ostend, Belgium
Due to the outbreak of the COVID-19 virus, the second EMODnet Open Conference and Jamboree which was initially scheduled to take place in September 2020 has been postponed. Save the date for this event, which will bring together the extended EMODnet family in Ostend (Belgium) to set goals for the next phase of EMODnet to 2030. More information will follow, www.emodnet.eu/conference2021.

14th-18th June 2021: the postponed EcoSummit 2020
Gold Coast, Australia
As a result of the spread of COVID-19, Elsevier and the EcoSummit 2020 Chairs took the decision to postpone the 6th International EcoSummit Congress to 2021,to be held in the same venue at The Gold Coast Convention Centre, Australia.

Due to this rescheduling, oral and poster abstract submission for symposia and general sessions is open until 30 October 2020. Abstracts should be submitted using the online abstract submission system, ecosummitcongress.com/submit-abstract.asp. We continue to look forward to welcoming our speakers and plenary panelists to the Gold Coast in June 2021.



Registration is open for the new dates, ecosummitcongress.com/conference-register.asp, and we look forward to seeing you at EcoSummit 2021. So that you can submit your abstract and register with confidence we are relaxing our cancellation terms due to the Coronavirus COVID-19 situation. Rest assured that we will refund your registration fee, with no penalty, should you wish to cancel during the uncertainty of the outbreak.

EcoSummit 2021 Co-Chairs:
Jan-Olaf Meynecke, Griffith University, Australia
Robert Costanza, Crawford School of Public Policy at Australian National University, Australia
B. Larry Li, University of California, Riverside, USA

16th - 18th June 2021: 9th International Workshop on Marine Technology - MARTECH 2020
Vigo, Spain

The organising Campus de Excelencia Campus do Mar (University of Vigo, Spain) and the Universitat Politècnica de Catalunya (UPC, Spain) will call for papers for MARTECH 2021, www.martech-workshop.org.

The main objective of the MARTECH Workshop is to show latest investigations and exchange of information and points of view on current research in MARine TECHnology. The Program Committee cordially invites you to participate and submit your contribution in one of the proposed topics:

- Operational Oceanography
- Instrumentation, Metrology, Signal processing
- Seafloor observatories and sensor networks
- Observatories, remote sensing
- Marine Robotics: ROVs, AUVs, ASVs, Gliders
- Underwater imaging and communication
- Seafloor and Water Column characterization
- Technology for Marine Biologyand Aquaculture
- Renewable energies
- Coastal, regional, and offshore research vessels and platforms
- Marine Geophysics technology and solutions
- Marine Data Interoperability and data flow
- Technologies for a sustainable dredging
- 2021 as a point between the past and the future

Yours sincerely, Dr. Ana Bernabeu, General Chair and Dr. Joaquin del Rio, Steering Committee Chair

9th – 13th August 2021: IMBeR ClimEco7 summer school
Vancouver, Canada

6th - 10th September 2021: Postponed Challenger Society Biennial Meeting
Oban, Scotland
The biennial Challenger conference attracts around 300 leading UK marine scientists, science managers and early career scientists. As well as showcasing cutting edge marine science and technology, the conference is noted for its training of young scientists and networking events, including a public lecture by an eminent authority on relevant societal marine issues.

Once again the call is out for sponsors and exhibitors wishing to participate in next year's conference. The conference is a great place to be if you are recruiting marine science graduates.

For the only the third time, the conference will be held at SAMS (Scottish Association for Marine Science in beautiful OBAN. SAMS hosted the first post war conference back in 1946 and since then only once more since in 2006.

20th – 22nd September 2021: Oceanology International Middle East
Abu Dhabi, UAE
Whilst it is hugely disappointing to postpone the launch, and not a decision we have taken lightly, we believe it is the best course of action for all involved. In the last couple of months, we have been speaking to customers, partners and supporters to understand their views and to ensure we make the best decision - in such challenging circumstances - for the ocean communities we serve.

We trust that postponing Oceanology International Middle East will enable us to deliver the true value of this world-leading brand next year. Amid these challenging times, we would like to reiterate our commitment in creating new opportunities and connections for our industry. Over the next several months, we will offer our support to the global community by hosting various digital activities that will connect our exhibitors with their targeted clients. In advance, we thank you for your understanding and support. If you require any further clarification or information regarding this situation, please feel free to email us at info@oceanologyinternationalmiddleeast.com.

5th - 9th September 2022: Challenger Society Biennial Meeting – celebrating the 150th anniversary of the Challenger Expedition
London, UK
To be hosted by the National History Museum, just a 'date for the diary', stayed tuned.

The CSMS email address is info@challenger-society.org.uk. Contributions for next month's edition of Challenger Wave should be sent to: john@vectisenvironmental.com by the 31st July.

We continue to send printed copies of Challenger Wave to members of the CSMS without email addresses. However it is in everybody's interest to send your email address to Jennifer Jones, jxj@noc.ac.uk, as soon as possible

---

JOBS

There are jobs on the IMBER web site

http://www.imber.info

IMBeR

Integrated Marine Biosphere Research

Jobs and opportunities

- Project Assistant: Ocean Acidification. OA-ICC, Monaco. Apply **15 July** if you live locally (France or Monaco)
- Call for Applications for an Early Career Researcher to Join the SCOR Executive Committee. Apply by **17 July**
- Data scientist: FACE-IT project, Laboratoire d'Océanographie de Villefranche, France. Apply by **31 July**
- Postdoc: Environmental and social dimensions of the bio-economy. UCT, Cape Town, South Africa. Apply by **31 July**
- Researcher: Marine Plastics, JAMSTEC, Yokosuka City, Japan. Apply by **31 July**
- Seven taxa-specific Conservation Coordinator positions. This is a combined venture of the IUCN Species Survival Commission and the Indianapolis Zoo. Apply by **1 Aug**.
- Postdoc: Earth observation and climate. European Space Agency Initiative. Submit proposals by by **8 August**
- Call for applications for 2021 Institute of Advanced Sustainability Studies (IASS) Fellow Programme, Potsdam, Germany. Apply by **23 August**
- Postdoc: Ecological modelling. Yantai Institute of Coastal Zone Research, Yantai, China. Apply by **30 August**
- Scientist: Next generation Earth system models, Max Planck Institute, Hamburg, Germany. Apply by **30 August**
- PhD: Earth System Modelling, Max Planck Institute, Hamburg, Germany. Apply by **15 September**
- Fisheries Specialists Pool, University of Santa Cruz CA, USA. Apply by **1 November**
- Research engineer: Marine ecosystem modelling, CLS, Toulouse, France. No deadline – open until filled

Visit the IMBeR Website

imber@imr.no