

Challenger Wave



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

NEWS

Scientists uncover 'hidden' water of the Arctic ocean

Scientists working with marine robots have measured previously hidden patches of water between the Arctic and Atlantic oceans that could dramatically alter our understanding of how the ocean's food web forms. Created in the northern part of the Barents Sea, as cooler and fresher water from the Arctic moves south and becomes trapped within the warmer and saltier water from the Atlantic, these eddies, circular patches of water that have broken off from an ocean current, measure roughly 30 kilometres across.

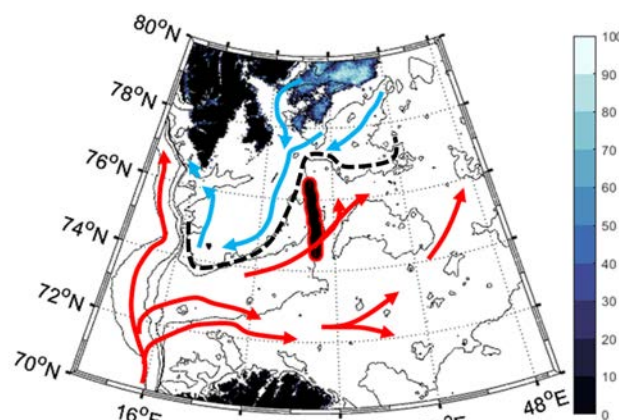


Dr Marie Porter of SAMS with Slocum gliders, one of which helped her uncover a hidden Arctic eddy. Photo: Dr Emily Venables, also SAMS.

Despite their size, the eddies are invisible to satellites and had gone unnoticed until oceanographers from the Scottish Association for Marine Science (SAMS), in Oban, picked up some unusual readings during a trial mission of an underwater glider. The autonomous glider vehicle travels across the ocean as it profiles to depths of 200 metres collecting data, including

heat and salinity, every kilometre. This allowed the SAMS team to measure one of these eddies in detail. While this particular eddy's surface temperature was similar to the surrounding water, masking it from satellites, its lower salt content made it stand out in the glider readings.

Dr Marie Porter, a SAMS oceanographer and lead author on a report about the discovery, published in *Geophysical Research Letters*, doi.org/10.1029/2019GL086281, said her findings had implications for understanding the distribution of nutrients that fuel the entire Arctic ecosystem. She said: "We get a pretty good idea about what's happening on the very surface of our ocean through satellites but eddies like this one have been hidden from view because they have warmed at the surface since leaving the Arctic. "This temperature masking means we have previously underestimated how much water moves within these patches in the Arctic Seas. It begs the question: how many more of these hidden eddies are occurring in the ocean today?"



A chart of the glider's two-week mission, showing the land masses of northern Norway and Svalbard, the pathways of Atlantic Water (red) and Arctic Water (blue), the location of the Polar Front where the Arctic and Atlantic waters meet (dashed black line), the glider path (red and black line) and the sea ice concentration during the glider mission (blue shading).

The water column of the Barents Sea has a seemingly simple structure where water from the Atlantic dominates in the south but in the north it is overlain by fresher, less dense water from the Arctic. This Arctic water is largely devoid of the nutrients required to fuel the growth of phytoplankton, which is key to maintaining life in the ocean. In contrast the Atlantic Water is one of the key pathways of nutrient rich water into the Arctic. Dr Porter added: "How these eddies affect this exchange is something we need to investigate if we are to truly understand the ocean ecosystem there."

Arctic oceanographer Prof Finlo Cottier of SAMS, a co-author on the paper, said: "SAMS has been working with ocean gliders for over a decade and we know that they are the ideal tool for measuring the detailed properties of the ocean. This work gives us precise measurements of important structures in the Arctic that we couldn't previously obtain." The discovery was made during a two-week trial of the glider 'Zephyr' in July 2017, ahead of a longer mission as part of the Arctic PRIZE project, funded by the Natural Environment Research Council's Changing Arctic Ocean programme.

Challenger Travel Awards

In these difficult times for everyone, we thank all the applicants for the April round of the Challenger Travel Awards. It doesn't look as though any of the applications are still valid or definite. As a result the Challenger Society council will put off applications until the October round, and current applicants will be contacted individually.

I hope everyone is keeping up with history of oceanography things during the shutdown.

A report on the 100th anniversary of the Liverpool Tidal Institute meeting, last year, can be found in the last Ocean Challenge: https://www.challenger-society.org.uk/Ocean_Challenge. All the talks can be found as pdfs through the link mentioned in that article (unfortunately although all the talks were filmed they are still not available, long story). Meanwhile a paper on the tide prediction machines at the LTI has been published with the reference below. It is open access. All the best again. - **Phil Woodworth**

Woodworth, P.L. 2020. Tide prediction machines at the Liverpool Tidal Institute. History of Geo- and Space Sciences, 11, 15–29, <https://doi.org/>

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10.5194/hgss-11-15-2020.

Updated MASTS webinar schedule below for your information.

Every Wednesday at 1pm (GMT+1). They are free to attend and each session includes a live Q&A. Register to attend here, <https://t.co/p2oZneNteO>. Please feel free to circulate around your networks. All Wednesday dates in July are looking for speakers so please get in touch if you would like to deliver a talk; Best wishes, Emma.

Find out more here: www.masts.ac.uk/research/masts-webinar-information/

- 29th April
 - Dr Meadhbh Moriarty (Marine Scotland Science) - Evaluation of multiple coupled biological-physical models in Loch Linnhe
- 6th May
 - Dr Bee Berx (Marine Scotland Science) - The Great Interactive Climate Change Quiz!
- 13th May
 - Dr Georgios Kazanidis (Edinburgh University) - Implementing European marine policies in the deep waters of the North Atlantic
- 20th May
 - Dr Clive Fox (SAMS) – Title TBA
- 27th May
 - Dr Kara Layton (Aberdeen University) - Using genomics to investigate climate change response in marine species
- 3rd June – could this be you? Email us!
- 10th June
 - Dr William Sanderson & Hannah Lee (Heriot Watt University) – Title TBA
- 17th June
 - Dr Tania Mendo (University of St Andrews) - Understanding potential impacts and assessing possible mitigation of bycatch in an artisanal shrimp trawl fishery in Peru
- 24th June
 - Dr Declan Tobin (JNCC) – Title TBA



#MASTSwebinar
@masts Scot

Would you like to present? Email us: masts@st-andrews.ac.uk

All webinars are recorded and are uploaded onto the MASTS YouTube

EMODnet Coordinators and Technical experts meet remotely to discuss progress, challenges and opportunities

For the very first time in its history, EMODnet organized its Steering Committee (21-22 April) and Technical Working Group (23-24 April) meetings remotely. These meetings provide the opportunity to exchange information and opinions on the progress of the various EMODnet projects and initiatives, European and Global developments, identify strategic and technical challenges which may affect EMODnet, as well as to discuss opportunities and solutions for future improvements.

Both meetings also provided an opportunity to look ahead following the recent announcement by DGMARE that, webgate.ec.europa.eu/maritimeforum/en/node/4494, in the next phase of EMODnet, all data and data products should be findable, visible and downloadable directly through the EMODnet Central portal, www.emodnet.eu/. This move forward responds

to feedback received from users and stakeholders, including through the recent OpenSeaLab hackathon, www.emodnet.eu/conference/opensealab/, and constitutes a natural evolution of EMODnet to become ever more service oriented. At the meetings, experts recognized the need for EMODnet to undergo continual development to ensure that, as an essential tool for scientists, engineers, managers and policy-makers analysing the state and dynamics of Europe's seas, it can continue to meet these users needs. The meeting documents, presentations and minutes will be made available on the Maritime Forum.

VIEWS

NORTEK webinar series

Following unprecedented participation, the full Spring 2020 Webinar Series is posted. Last week we kicked off a series of interactive, online webinars to fill the void from all the missed conferences, workshops, Nortek Days, and training sessions at which we would normally see you all this time of year.

We are covering a broad range of topics in five tracks, which include:

- Introduction to the basic types of ADCP measurements
- Vessel-mounted system data collection
- Tech Tips including deployment, software, and troubleshooting
- Ocean navigation sensors including the DVL and Speed Log
- Advanced ADCP applications such as sediments and turbulence

These are short presentations followed by the opportunity to ask questions and engage with the community. See the full schedule and register at www.nortekgroup.com/seminars/nortek-2020-webinars.

Pioneering seabed-to-shore data delivery operation completed for A/S Norske Shell offshore Norway

Sonardyne International Ltd. and XOCEAN have successfully completed a live seabed-to-shore data harvesting mission using an unmanned surface vessel (USV) for A/S Norske Shell, as part of a seabed monitoring campaign at the giant

Ormen Lange field offshore Norway. The project, completed early Monday morning (April 20th), without a single person having to travel offshore or from their home office, was achieved with significantly less emissions, health and safety risk, and cost than could be done with a manned vessel.



XOCEAN's Sonardyne-equipped XO-450 leaving Kristiansund to harvest data from Sonardyne's Fetch pressure monitoring transponders at Ormen Lange. Photo courtesy of SafePath.

By using an XOCEAN XO-450 USV to harvest data from an array of Sonardyne's long-endurance Fetch pressure monitoring transponders (PMTs), an estimated 5.4 tonnes of CO₂ per day was prevented from being emitted into the atmosphere, had a manned vessel been used. XOCEAN's USVs have a negligible carbon footprint, around one thousandth of the emissions of a conventional vessel, and all other emissions are offset, resulting in a fully carbon neutral operation.

The project, which saw the USV transit a total of 300 km from Kristiansund out to the Ormen Lange field and back, over just three days, is also thought to be one of the largest data harvesting missions, using a USV, to date. In addition, it proved the ability to support this type of operation remotely without anyone involved having to travel, safely meeting current Covid-19 movement restrictions. The vessel was 'posted' to Norway and then launched by local marine operations service provider, SafePath AS. All other team members, including Sonardyne's remote operations specialists in the UK, XOCEAN's USV pilots in Ireland and Shell's geophysicists in Norway and the US, remained working from their home offices.

The Fetch PMTs were deployed in 800 - 1,100 m water depth at the Ormen Lange field last September to support a long-term seabed monitoring campaign. The Fetch PMTs accurately collect pressure, temperature and inclination data at the seafloor, at pre-programmed intervals. Using this data, any vertical displacement of the seabed can be calculated. The data will help Norske Shell to proactively inform its reservoir management strategy. Sonardyne's long-life Fetch PMTs incorporate a high-speed acoustic modem, which allows stored data to be extracted at any time, wirelessly through the water, on demand. On this mission, the XO-450 was equipped with a compatible Sonardyne acoustic transceiver attached beneath its hull.

Shaun Dunn, Sonardyne's Global Business Manager for Exploration and Surveillance said, "We have always been big advocates of collecting data from our subsea instruments remotely using autonomous platforms. This technology is now coming of age and makes complete sense when thinking about the environment, the safety of offshore personnel and minimising cost. What's more, thanks to the low hull and propulsion noise USVs can achieve, the data gathering is also faster, adding further to the efficiencies of this approach."

James Ives, CEO of XOCEAN said, "Our USV platform has demonstrated itself to be a safe, reliable and ultra-low carbon solution for the collection of ocean data. We are delighted to be working with A/S Norske Shell and Sonardyne International on this ground-breaking project."

Planet Ocean Ltd is pleased to announce the signing of a global partnership agreement with Pharos Marine Automatic Power Ltd.

Planet Ocean and Pharos Marine have teamed to provide data buoy solutions World Wide. Pharos Marine can trace their origins back to 1904, and have been producing world class navigation buoys throughout the World. Planet Ocean are experts in the field of sensors and systems and have been producing data buoy solutions since 2004.

The partnership will see Pharos Marine responsible for manufacturing the buoy hulls and mooring designs whilst Planet Ocean will provide the sensors, loggers and telemetry solutions along with data visualisation systems via their delivery partner OceanWise www.oceanwise.eu.

The new systems will also be able to take advantage of the conservation mooring capabilities of the Safe-Moor compliant mooring system from another of the Planet Ocean partners www.safemoor.com.



The DB range covers 1.25 m to 3.60 m diameter buoys specifically designed for data buoy applications incorporating a number of features which make them ideally suited to this application.

The systems offer a growing range of MetOcean parameters and telemetry options including radio, cell and satellite. Pharos Marine, based in the UK also have offices in Houston USA and Singapore, allowing the pairing to address a far wider market for data buoy systems.

Planet Ocean Ltd is pleased to announce the signing of an exclusive distribution agreement with -4H-JENA engineering GmbH, Germany for the UK and Ireland.

Following the purchase of the CONTROS range of instruments by -4H-JENA we are delighted to announce that as well as continuing to offer the world class range of CONTROS dissolved gas technology for CH₄, CO₂, PCO₂, pH and Total Alkalinity; Planet Ocean will now be introducing

the other -4H-JENA range of marine technology products.



-4H-JENA produce custom FerryBox systems, like the one above, for installation in vessels, designed to suit each individual application with sensors, processing telemetry and mechanical configuration to meet the specific application. In addition, the Underwater Node systems provide the necessary infrastructure in terms of electrical power and data connections to continuously operate complex sensor systems having high power consumption on the seafloor and are eminently suitable for the CONTROS dissolved gas systems. Often deployed in shallow water, (< 300 m) the underwater node can be installed with a cable connection to shore up to 30 km offshore (3 nodes connected in series, each 10 km distance to shore) for year-round operation. Thus, providing the opportunity for a continuous observation of processes in the oceans and coastal areas. For more details about the -4H-JENA Marine Systems contact sales@planet-ocean.co.uk or visit www.4h-jena.de.

SALTS

No news from sea this month I'm afraid

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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, Glasgow. We will look back at the significant 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



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.

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,

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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.

30th November – 2nd December 2020: Evolving and Sustaining Ocean Best Practices Workshop IV

Maryland, USA

We are pleased to inform you that this annual OBP event will be held in suburban Maryland. The agenda and more details will be circulated next month. We look forward to you joining us for another productive workshop. Please mark the dates on your calendar.

If you have any questions, please email jay.pearlman@ieee.org. On behalf of the Steering Group for the Ocean Best Practices System, Jay Pearlman and Johannes Karstensen, SG Co-Chairs. Submit your Best Practices in Ocean Observing for peer-review: www.frontiersin.org/research-topics/7173/best-practices-in-ocean-observing

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.

Oi oceanology
international
2020
17-19 MARCH 2020, LONDON, EXCEL



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 m² 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

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/>.

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).



Important Dates

January 1, 2020: Call for Session/Workshop Proposals Begins
April 30, 2020: Call for Session/Workshop Proposals Ends
May 15, 2020: Decision of Proposals Sent
June 1, 2020: Abstract Submission Begins
August 31, 2020: Abstract Submission Closes
September 30, 2020: Authors Notified of Acceptation
October 1-31, 2020: Registration
November 15, 2020: Scientific Program Posted

Organizers

State Key Laboratory of Marine Environmental Science, Xiamen University
 Department of Earth Sciences, National Natural Science Foundation of China

Chair of XMAS-V

Minhan Dai, Xiamen University

Local Organizing Committee

Yawei Luo
 Zhimian Cao, Yongxiang Huang, Xing Jian, Xin Lin, Jian Ma,
 Dalin Shi, Shanlin Wang, Siqi Wu and Wei Zhuang

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New EcoSummit dates announced

EcoSummit 2020 postponed to 14-18 June 2021

As the spread of COVID-19 continues and the situation is still uncertain, Elsevier and the EcoSummit 2020 Chairs have taken the decision to postpone the **6th International EcoSummit Congress** to 14-18 June 2021, in the same venue at The Gold Coast Convention Centre, Australia.

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.

Due to the rescheduling of the EcoSummit Congress, 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**.

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 and we look forward to seeing you at EcoSummit 2021.

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



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14th-18th June 2021: the postponed EcoSummit 2020

Gold Coast, Australia

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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.

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Robert Costanza, Crawford School of Public Policy at Australian National University, Australia

B. Larry Li, University of California, Riverside, USA

9th – 13th August 2021: IMBeR ClimEco7 summer school

Vancouver, Canada



ClimEco7 Vancouver Canada
9-13 August 2021

Interdisciplinary ocean science for sustainable development

IMBeR ClimEco7 summer school postponed to 2021

Unfortunately, due to the restrictions that we are currently all dealing with, and the uncertainty as to how things will be in August when we were planning to hold ClimEco7, IMBeR has taken the decision to postpone the summer school for a year.

All the applications that we received for ClimEco7 this year will be carried over to 2021. Results of the selection process will be made known during March 2021.

New dates for ClimEco7 are 9-13 August 2021
UBC, Vancouver, Canada

imber@dal.ca

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 Biology and 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

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

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 29th May.

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>



Integrated Marine Biosphere Research

Jobs and opportunities

- Postdoc: Coastal and Estuarine Ecology, The South African Institute for Aquatic Biodiversity. Port Elizabeth, South Africa. No deadline specified
- South African Programme Manager, One Ocean Hub. Port Elizabeth, South Africa. Open until position is filled
- Postdoc: Earth systems; Climate change and sustainability; Energy transition; Societal challenges of environmental issues. LOV, Villefranche-sur-mer, France. First phase applications by **15 May**
- Three postdocs: Southern Ocean CO₂ and heat uptake; Southern Ocean emerging feedbacks in carbon cycle; Southern Ocean biogeochemical model development. Council for Scientific and Industrial Research, Rosebank, South Africa. Apply by **15 May**
- PhD: Coastal Ocean Turbulence. Institute of Coastal Research, Helmholtz-Zentrum Geesthacht, Germany. Apply by **31 May**
- PhD: Gender, equity and inclusion towards ocean sustainability. ANU, Canberra, Australia. Applications assessed as received
- Positions for Profs, Associate Profs and Postdocs: Ecology, environmental sciences and geosciences, Institute of Eco-Chongming, ECNU, Shanghai, China. Open until filled
- Two Research Scientists: Ecology and conservation of sea turtles, sharks or deep-sea ecosystems, CEI, Eleuthera, Bahamas. Open until filled
- Senior Manager: Climate Program, Ocean Conservancy, Washington DC. No deadline given
- Senior Associate: Pew's Lenfest Ocean Program, Washington, DC. Open until filled
- Simons Postdoc Fellowships: Marine Microbial Ecology. Apply by **15 May**
- MSc: Fisheries science (2 years funding), MUN, St John's, Canada. Apply by **15 May**
- PhD: Fisheries science (4 years funding), MUN, St John's, Canada. Apply by **15 May**
- EuroMarine call for Foresight Workshops and Working Group proposals. Apply by **1 June**

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