March 2021

Challenger Wave

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

NEWS

The Chris Daniels Early Career Grant

Chris Daniels was an extremely passionate marine scientist, who was well known and respected in the scientific community. Chris had an outstanding publication record for an Early Career Researcher (ECR), and in his short career he worked as part of several large projects and participated in multiple research cruises. Chris consistently advocated for ECRs through his contributions to the Challenger Society. He was involved in setting up the first 'Diversity in Marine Science' event at a Challenger meeting that aimed to tackle some of the issues around early career and diversity issues in marine science. He was a very active member of the Challenger Society, attending every biennial and relevant special interest meeting that occurred during his career. His main academic passion and scientific legacy was studying *coccolithophores* and calcite production, particularly *Coccolithus pelagicus*, a species of which he was very fond. After his PhD Chris worked at the British Oceanographic Data Centre on the GEOTRACES program whilst he sought post-doctoral opportunities. Early in this post he was diagnosed with terminal cancer and sadly passed away in November 2018 aged just 31.

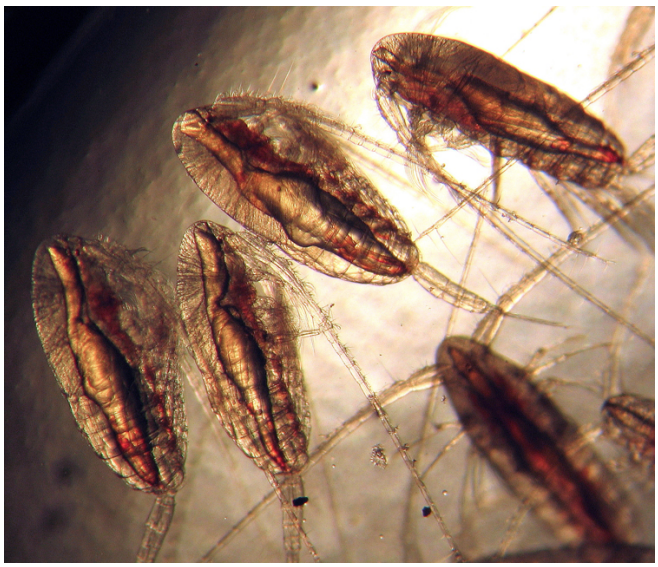
This award is dedicated to the memory of an incredible scientist and dedicated ECR, whose career never reached full potential but his legacy shall live on through this award. The Chris Daniels Early Career Grant aims to provide an opportunity for motivated ECRs to create or establish a forum to discuss specific challenges and resources relevant to ECRs in the field of marine science. The award will fund to up to £1,000 to the successful applicant to organise a stand-alone early career workshop or to attach an event to an already existing conference. The funding can go towards covering the costs of the space and/or catering services and/or travel support. It is expected that the successful applicant will advertise the Challenger Society at the event, and provide a report of the event to be published and publicized on the Challenger Society blog and social media within 2 months of the event. This opportunity will open to Challenger Society members inside and outside the UK. The closing date for applications is the **31st May 2021**, with the decision to be made on the 15th June and given public recognition during the Challenger Society Conference 2020, SAMS, Oban (6th-10th Sep 2021). For more information, please visit www.challenger-society.org/Chris_Daniels_Early_Career_Grant.

Fear of the light may help tiny ocean creatures survive a brighter future

An aversion to light has long been a survival tactic used by the smallest creatures in our ocean, but scientists have discovered this photophobia may already be protecting them against impacts of environmental changes in the Arctic. Known as zooplankton, these microscopic creatures swim hundreds of metres every day, up and down the water column in response to the changing light. By staying deep below the surface during the daytime, they can avoid predators. Only during the relative safety of night can they come nearer the surface to feed on tiny marine plants known as phytoplankton.

The sun rises over Kongsfjorden, Svalbard, where much of the research took place.

The underwater light in the Arctic is changing in various ways. As sea ice in the Arctic melts at an increasing rate because of climate change, more light penetrates the water. Added to an increase in light from infrastructure and shipping, these changes are potentially making zooplankton, a crucial part of the ocean food web, more vulnerable to predators. But an international group of Arctic scientists led by the Scottish Association for Marine Science (SAMS) in Oban and the University of Strathclyde has discovered that zooplankton have an established threshold of light tolerance, regardless of the time of day, season or year, suggesting they are capable of adapting to dramatic changes in light. As the depth at which this light level is found moves up and down the water column between day and night, and across seasons, zooplankton are seen to remain below it, avoiding the shallow depths where it is light.



The copepod Calanus finmarchicus *is one of the zooplankton species affected by changes in light in the Arctic.*

The findings are published in Biology Letters doi.org/10.1098/rsbl.2020.0810. Research partners on the publication include University of Bergen, Norwegian Institute for Nature Research, UiT, The Arctic University of Norway, The University Centre in Svalbard (UNIS), The University of Delaware, and the Norwegian University of Science and Technology.

Lead author of the report Dr Laura Hobbs said: "As the Arctic lightscape changes, and more light enters the ocean, it would be reasonable to think that fish and other predators would become more proficient at feeding on zooplankton. However, we've seen that zooplankton might already be adapted to these changes by swimming deeper to avoid high light levels. More light also means larger blooms of phytoplankton, so there's potentially more food available to them. Whether they are able to reach that food, given the higher levels of light at shallower depths, is another question."

Zooplankton sit in the centre of the Arctic marine food web. They are responsible for transferring energy from phytoplankton to larger species like fish, seabirds, and whales. Their vertical migrations in the water are also important climatically: as they eat at the surface but excrete at depth, and may play a vital part in removing carbon from the surface layers and taking it to deeper waters.

A marine geologist from St John's college, Cambridge, has been made a Fellow of the American Geophysical Union (AGU)

A rare honour from a leading international organisation that promotes discovery in Earth and space science for the benefit of humanity. Professor Nick McCave is an expert in deep sea sedimentation and the geological record of climate change in the deep ocean, and is one of 62 new AGU Fellows elected for 'exceptional' contributions to Earth science. (https://www.joh.cam.ac.uk/exceptional-climate-change-academic-st-johns-awarded-rare-honour).

AGU is a non-profit scientific organisation, based in Washington DC, which studies the causes and impacts of climate change and finds ways to mitigate and adapt to them to try to preserve the health of our planet. Professor McCave is College Supervisor in Geological Sciences, Emeritus Woodwardian Professor of Geology and Fellow of St John's. His own research involves finding out how modern deep circulation shapes the sea bed and controls the distribution of sediment types, grain-sizes and bedforms, with the deeper objective of understanding the impact of climate change on the deep sea, and vice-versa.

An AGU member for about 30 years, one of his first research papers was published in an AGU journal 50 years ago. In his early career through to the 1990s, Professor McCave worked on the interactions between deep ocean currents and the seabed, which produces clouds of sediment that are swept downstream and deposited in great piles, called drifts. He said: "I went on to

study the historical record of the ocean circulation in those drifts and devised a method using particle size properties of the sediments to determine changes in the vigour of the deep sea circulation that are intimately related to changes in climate."

Professor McCave obtained his PhD from Brown University and in the 1980s spent 10 years as an Adjunct Scientist at the Woods Hole Oceanographic Institution in Massachusetts, and took sabbaticals at Oregon State University, Massachusetts Institute of Technology and Columbia University. He added: "So this is something of the icing on the cake. I owe a great deal to my friends and colleagues in the USA."

Professor McCave cutting up a deep sea sediment core on the RV Endeavor south of Iceland in 2014.

Robin Bell, President of the AGU, and LaToya Myles, Chair of the Honours and Recognition Committee, said in an official statement: "The members of this year's class of Fellows have made exceptional contributions in our Earth and space sciences community through breakthrough, discovery, or innovation in their disciplines. Since 1962, AGU has elected fewer than 0.1 per cent of members to join this prestigious group of individuals. Thanks to their dedication and sacrifice, AGU Fellows serve as global leaders and experts who have propelled our understanding of geosciences. We are confident that they will remain curious and relentlessly focused on answers as they continue to advance their research, which pushes our boundaries of knowledge to create a healthy planet and beyond."

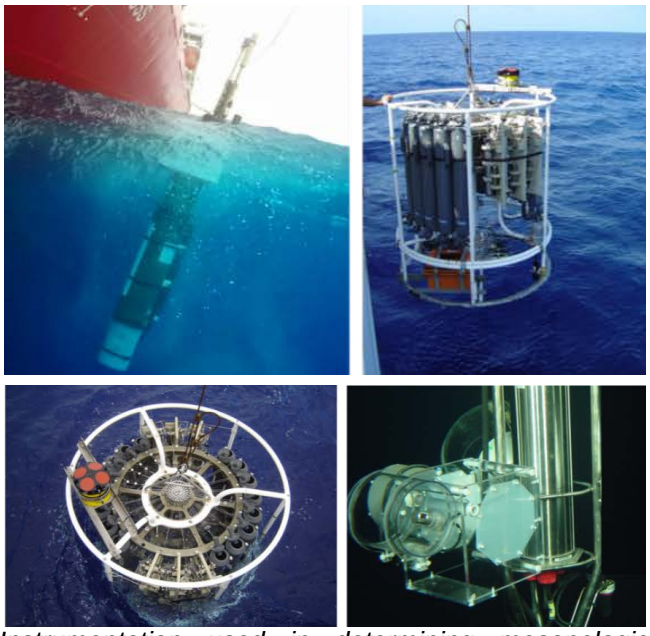
Respiration in the Mesopelagic Ocean (ReMO): Reconciling ecological, biogeochemical and model estimates

The Scientific Committee on Oceanic Research (SCOR), at their annual general meeting in October 2020, funded three new working groups to tackle timely, novel activities which will enhance global co-operation and produce fundamental scientific knowledge. Working Group 161 on respiration in the mesopelagic ocean https://scor-int.org/group/respiration-in-the-mesopelagic-ocean-reconciling-ecological-biogeochemical-and-model-estimates-remo/ was one of those funded, and has the ultimate aim to improve projections of the effects of global change on the decline of oxygen in the world's oceans.

To achieve this, the working group will bring together experts in observation, experimentation, data analysis, and modelling to systematically compile and compare data sets of mesopelagic microbial respiration in order to constrain uncertainties and so improve quantifications of organic matter flux and remineralisation rates. The working group is co-chaired by Carol Robinson (UEA, UK), Iris Kriest (GEOMAR, Germany) and Javier Arístegui (University Las Palmas de Gran Canaria, Spain) and the 20 members include Giorgio Dall'Olmo from Plymouth Marine Laboratory.

Together with organic matter export from the surface ocean, microbial respiration in the mesopelagic realm (~200m – 1000m) determines the long-term storage of carbon in the ocean, the extent of mesopelagic deoxygenation and, ultimately, the levels of carbon dioxide in the atmosphere. Yet, microbial respiration remains one of the least constrained metabolic rates in the Earth System, with mismatches between inverse model predictions, in situ budgets and in vitro observations of up to an order of magnitude. These mismatches stem from the difficulties in quantifying microbial respiration rates in the dark ocean. However, with the dawn of novel

technologies such as optodes, pressure-retaining samplers, in situ incubators, gliders, and profiling floats, we are now able to determine mesopelagic microbial respiration with unprecedented spatial and temporal coverage. However, whilst technologies have advanced substantially, efforts to bring all the data together across depth-, size-, and time-scales are still lacking.



Instrumentation used in determining mesopelagic respiration, from left to right, and top to bottom, (with photo credits): Biogeochemical Argo float (Giorgio Dall'Olmo), two images of a CTD rosette with Niskin and pressure retaining samplers attached (Christian Tamburini), IODA6000 (In Situ Oxygen Dynamic Autosampler, rated to 6000m) deployed at 2000m since July 2009 (Dominique Lefevre)

Over the next four years, through virtual meetings, face to face workshops, a training course and method intercomparison workshop, the working group will produce an action plan and position paper identifying the gaps in knowledge and suggesting priority research areas, collate an open access dataset and best practice methods manual, and build capacity in this vital research area. For full terms of reference, list of deliverables and timetable, and If anyone is interested in finding out more, or getting involved in the activities, please contact carol.robinson@uea.ac.uk

Does anyone remember scientists, including Dr Sheina Marshall, from the Millport Marine Station.

The following photograph taken of a Challenger Meeting at Lowestoft seems to be undated, found in a suitcase of documents, and which we would like to date and identify if possible. Steve Dye (as Lowestoft's longest surviving librarian) and John Gould as History SIG owner, are on the case, but any information would be appreciated.

VIEWS

Sonardyne's SPRINT-Nav reaches new heights of capability

Marine technology specialist Sonardyne has released a new high altitude variant of its market leading hybrid navigator SPRINT-Nav to allow uncrewed surface vessels (USVs) and underwater vehicles to extend their operational envelope. SPRINT-Nav tightly integrates a Sonardyne SPRINT INS, Syrinx DVL and a highly accurate pressure sensor into a single high-performance solution providing navigation and optional acoustic Doppler current profile (ADCP) functionality.

Sonardyne's new variant takes this capability to an even higher level; increasing the altitude at which vehicle platforms can work when they don't have an external position reference, without compromising accuracy. Operating at 400 kHz, the high altitude variant achieves reliable bottom lock at up to 230 m altitude above the seabed, providing USVs with a highly accurate and robust navigation source, which is critical for, as an example, station keeping applications in coastal surveys where GNSS could be denied or subject to interference.

Installation of the new SPRINT-Nav variant on autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROVs) allows inspections and surveys to be performed at even higher altitudes than previously possible. In addition, the instrument's optional ADCP functionality has been extended to 120 m, adding oceanographic data gathering and increased operational capability. This can be especially beneficial in highly dynamic environments and/or where remote vehicles are being deployed from a USV and robust current profile data is required.

The new SPRINT-Nav high altitude variant has already been delivered into the USV market, including as part of a package of Sonardyne technologies being installed on the first wave of Ocean Infinity's new Armada fleet of robotic vessels.

Sonardyne's SPRINT-Nav high altitude variant reaches new heights of capability. Image from Sonardyne.

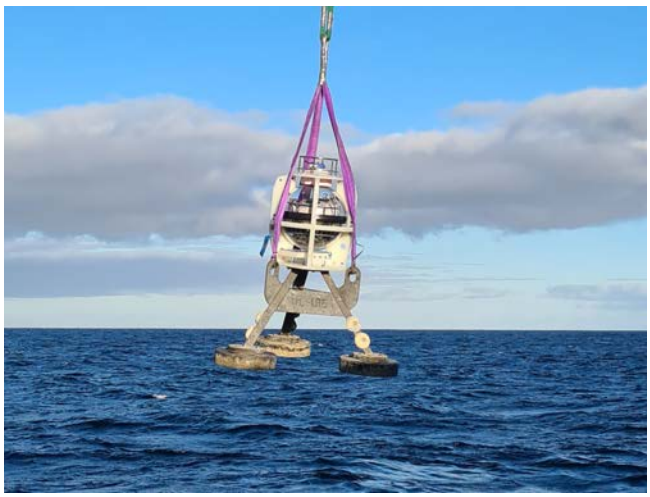
"Our new 400 kHz SPRINT-Nav high altitude variant provides the optimal performance blend, with comparable accuracy but 30% greater altitude to our 600 kHz standard SPRINT-Nav," says Malik Chibah, Sonardyne's Engineering Director. "With higher altitude performance, this new variant of SPRINT-Nav allows USVs to operate in a wider range of maritime environments. UUVs can also operate at higher altitudes above the seabed, across a wide range of operational scenarios in the defence, energy and science sectors. This comes without the loss of accuracy expected of instruments offering the equivalent altitude. For example, you can increase your multibeam coverage rates or also reduce navigation drift during descent and ascent."

In addition to releasing the SPRINT-Nav high altitude variant, the 400 kHz capability it contains is also now available as a standalone 400 kHz variant of Sonardyne's Syrinx DVL, which also comes with optional ADCP functionality.

First at-scale deployment for Sonardyne self-calibrating Fetch AZA subsidence monitoring sensors

A new breed of underwater sensor that is able to self-calibrate, enabling precise, long-duration subsidence monitoring at all depths, has been deployed at scale for the first time. The 20-plus Fetch Ambient-Zero-Ambient (AZA) pressure monitoring transponders (PMTs), developed by underwater technology specialist Sonardyne, will support an ongoing long-term, large-scale seabed monitoring project at Ormen Lange, Norway's second largest gas field, for A/S Norske Shell.

Unlike traditional pressure sensors, which suffer from drift over time, Sonardyne's AZA technology autonomously re-calibrates in situ. A unique control system periodically cycles the pressure sensor from ambient seabed pressure to near-zero, enabling comparison to a highly accurate low-pressure reference sensor for calibration. The reference sensor is never subjected to ambient pressure and is accurate to changes of less than a millibar, or about 1 cm head of water. In-situ calibration unlocks the ability to be able to monitor seafloor subsidence with centimetre accuracy for up to 10 years, without a loss of precision or any need for retrieval and recalibration of the sensors.



Sonardyne's Fetch Ambient-Zero-Ambient pressure monitoring transponders.

This is the latest deployment of Fetch PMTs at the Ormen Lange field, 120 km offshore, in 800 – 1,100 m water depth. Each sensor accurately

collects pressure, temperature and inclination data at the seafloor, at pre-programmed intervals. The data is then periodically harvested, from an integrated high speed acoustic modem contained within each Fetch PMT or Fetch AZA PMT, using a choice of Sonardyne's acoustic systems deployed from an unmanned surface vehicle (USV) or conventional ship. The data is then used to calculate any vertical displacement of the seabed at the Ormen Lange field.

Shaun Dunn, Vice President of Projects at Sonardyne, says, "Many years ago, geophysicists at Shell set Sonardyne the challenge of creating instruments that were sensitive enough to measure 1 cm/year of vertical movement. With this latest generation of Fetch AZA, we have achieved that goal and unlocked the benefits of using this technology to detect extremely low levels of seafloor subsidence as part of proactive reservoir management programmes."

Sonardyne's Fetch AZA sensors are low power, allowing for long endurance deployments, and provide time-stamped data, which is often critical to commercial and scientific objectives. With their in-built data storage and high-speed modem capacity, they can support data collection and harvesting using a wide range of other Sonardyne and third-party sensors and are compatible with all Sonardyne 6G equipment, including Ultra-Short Base Line (USBL) systems and modems.

SALTS

ORCHESTRA at sea

Dr Alice Marzocchi, National Oceanography Centre (NOC) Research Scientist, on board the *RRS James Cook* reported in February that: "We've completed the acoustic surveys for the Western Core Box timeseries and done acoustic calibrations in Stromness Harbour (South Georgia) yesterday. Amazing scenery whilst we carry out this critical time-series work that really gives us insight into ongoing climate-relevant changes in the Southern Ocean."

The time-series Alice mentioned are the two repeat hydrographic sections A23 (in the Scotia Sea and Weddell Sea; BAS-led by Dr Povl Abrahamsen) and SR1b (across Drake Passage; NOC-led by Dr Yvonne Firing), which are currently funded under the ORCHESTRA program.

Elephant Island and Cornwallis Island (the smaller one in the photo above)

Now the team have completed the repeat SR1b hydrographic section in Drake Passage. Early in March they reported that they had finished the section with CTD number 95 of the trip. Congratulations to all the crew, technicians and science team.

Collecting water samples to calibrate the CTD salinity (photo: A. Marzocchi)

You can follow Yvonne, Alice, Bjørg and the other crew, as they continued their mission into this month, on the JC211 expedition via @ORCHESTRAPROJ on or @allygully on Twitter or through the Drake Passage blog, drakepassageblog.wordpress.com/category/jc211/. For a virtual tour of *RRS James*

Cook, visit www.noc.ac.uk/facilities/ships/rrs-james-cook/rrs-james-cook-virtual-tour.

Robotic gliders launched as part of an expedition to investigate huge South Atlantic iceberg

New images released last month show the UK's National Oceanography Centre (NOC) launching a robotic underwater glider from the *RRS James Cook*. The first images released of the glider launch mark the start of a four-month mission to investigate the massive A68a iceberg in the South Atlantic, one of the largest icebergs ever identified by scientists.

For more images and all credits please visit www.noc.ac.uk/news/first-look-images-robotic-gliders-launched-today-part-expedition-investigate-huge-south

Scientists on board the *RRS James Cook* commented, "We deployed the two gliders and did several CTD sections on different sides of A68a. And we've been carefully and often slowly navigating through a lot of ice from all the various fragments that a68a and its siblings are shedding around. Definitely very scenic, when it's not all foggy !! ...we even had some snow a couple days ago. Yesterday we started the first hydrographic repeat section, WOCE (World Ocean Circulation Experiment) A23, in the Scotia and Weddell Sea. We started at the northern end and so there is still quite a bit of ice around, sometimes right on top of the stations, so we've made some small detours. Seven stations done and 24 more to go ! Then we head to Drake Passage for SR1b." Follow our Dr Alice Marzocchi on Twitter @allygully for more great images and updates live from the RRS James Cook.

CALENDAR

29th-30th March 2021: Young Coastal Scientists and Engineers Conference

Liverpool, UK

Registration is open for Young Coastal Scientists and Engineers Conference (YCSEC) hosted virtually by the National Oceanography Centre (NOC).

The event is free to attend and there will be prizes for the best presentations sponsored by our friends at Marlan Maritime Technologies, marlan-tech.co.uk. Get all the details and register here, noc-events.co.uk/young-coastal-scientists-and-engineers-conference-ycsec-2021.

7th-10th May 2021: Arctic Circle Japan Forum

Tokyo, Japan

POSTPONED: New dates will be announced in the coming months. Proposal deadline extended to the **1st April**. Arctic Circle is collaborating with the Sasakawa Peace Foundation, www.spf.org/en/. Governments, universities, companies, research institutions, organizations, associations and other partners are invited to submit proposals for Sessions to the Arctic Circle Secretariat at: www.arcticcircle.org/forums/japan/ proposals.

30th May - 4th June 2021: 2021 ESSAS Annual Science Meeting:Linking past and present marine ecosystems to inform future fisheries and aquaculture

Ecosystem Studies of Subarctic and Arctic Seas (ESSAS) is a regional programme of the Integrated Marine Biosphere Research project (IMBeR). Its goal is to compare, quantify and predict the impact of climate variability on the productivity and sustainability of Subarctic and Arctic marine ecosystems.

The 2020 ESSAS Annual Science Meeting (ASM) that was originally scheduled to be held in Japan last July will now be held online. The aims of the ASM are to improve understanding of how climate change will affect aquaculture and capture fisheries, and how in turn these changes will affect resource-dependent communities. Management strategies to foster resilience in these systems will also be considered. Registration is open until 30 April: essas.arc.hokudai.ac.jp/what_s_new/2021-essas-annual-science-meeting/.

10th–13th June 2021: 3rd Euro-Mediterranean Conference for Environmental Integration
Sousse, Tunisia
The editorial office of the Euro-Mediterranean Journal for Environmental Integration in collaboration with Springer organizes the 3rd EMCEI conference, www.emcei.net. On this occasion, we are pleased to invite you to take part in the conference (in-person or virtually) and share/discuss your latest research findings. The abstract submission deadline is the 25th March.

14th-18th June 2021: EMODnet Open Conference and jamboree
Ostend, Belgium
The pre-registration for the EMODnet Open Conference on 14th-16th June 2021 is now open. This event will gather EMODnet partners and wider stakeholders and is open to all. It provides a unique opportunity to set goals for the future of EMODnet to 2030 and beyond, to recognise and further develop existing and emerging partnerships, and to listen to marine data providers and users experiences and appreciation of the value of EMODnet data, data products and services, and what can be done further to optimise the user experience.

As well as plenary presentations, panels and breakout discussions, participants are invited to submit an abstract for an online poster, to be presented as a 1-minute pitch presentation in plenary sessions. A related EMODnet Jamboree for EMODnet partner meetings of the 7 thematics and data ingestion will take place on the 17th and 18th June 2021, on invitation.

The conference will include an online component with the full format (i.e. hybrid or fully online) to be confirmed in April 2021, when full registration will also open. In the context of the EMODnet Open Conference 2021, EMODnet welcomes the EMOD-network and wider community to submit abstracts for posters relating directly to EMODnet open access data, data products, applications and interoperability across data services, across the following themes:

- EMODnet contributors
- EMODnet for users
- EMODnet for innovation
- EMODnet partnerships

All approved abstracts will produce an electronic poster which will be made available fully online for participants. Submit your abstract by the 6 April 2021, find out more, www.emodnet.eu/en/call-posters.

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.

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 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

17th - 18th June 2021: Structures in the Marine Environment (SIME2021)

MASTS are delighted to be working with the INSITE programme again. In 2019 we held the inaugural and successful SIME conference. This was followed up by the session at the MASTS ASM in 2020, and now we are pleased to invite abstracts for the 2021 SIME conference. SIME2021 will be held online via HopIn and split over two half day sessions (afternoon of 17th June and morning of 18th June 2021).

In response to our societal need to generate energy, man-made structures (MMS) have been built into our coastal and marine environments. The structures range from oil and gas installations, associated pipelines and seabed infrastructure, and now we also look towards a replacement for carbon-fuelled electricity via offshore wind farms. Inevitably, these structures host communities by providing habitat and shelter, and potentially serve as stepping-stones for the spread of some species (some of whom will be non-indigenous). In addition to deliberately placed structures, shipwrecks can also serve a similar function. In turn, the biodiversity that develops on MMS can affect biological, hydrodynamic and biogeochemical processes from the water column to the seafloor, either directly (e.g. scouring, organic matter export from piles) or indirectly (e.g. population dynamics or closure/displacement of fisheries) and, hence, ecosystem functioning is also affected at various spatial and temporal scales. When flow effects in surrounding areas are included, the footprint of these structures is much larger than just the physical area. Science has an important role to play in both development decision-making as well as decommissioning, and we need a robust evidence base for informed environmental management decision-making. We need to be clear about what how future MMS that are put into the marine environment will affect the marine biological ecosystems, what should happen to these structures when they have been decommissioned and what the ecological best practice is in relation to decommissioning and rigs/renewables-to-reefs.

Academics, stakeholders, industry and government representatives and interested parties are invited to come together for talks, e-posters, networking and discussion about man-made structures already within the marine ecosystem, and any new infrastructures that may be put in place over the coming decades. Let's talk about the impacts, benefits and implications of these structures, and discuss how we can accelerate our understanding to support policy and regulatory decisions. Within an international context, and taking MMS in its widest definition, the "Structures in the Marine Environment" (SIME2021) conference will focus on the impact that the presence or removal of these structures may have on biological marine ecosystems. We would particularly welcome abstracts in the areas of Biodiversity and MMS; Restoration and MMS;

Natural vs. artificial substrata; Connectivity of structures; and the social and political implications of MMS.

You are invited to submit abstracts for 7 minute presentation slots or an e-poster. Presenters are encouraged to not solely focus on past and current research but reflect on gaps of knowledge and future research directions. Talks and posters should be accessible to other disciplines, by avoiding jargon and keeping technical details simple. Presentations will be submitted as pre-recorded videos, but presenters should expect to be present for live Q&A sessions following the talks. Please submit your abstract on the abstract template, www.masts.ac.uk/media/37080/sime_2021_abstract_template.docx, and submit to masts@st-andrews.ac.uk before 16.00 on 16/4/21. Registration is also open, hopin.com/events/sime-2021.

22nd-27th June 2021: ASLO 2021 virtual Meeting

Hoping that the virtual meeting can reach participants from farther places who normally cannot attend in-person meetings, and this platform can also be used as a "teaser" for the in-person meeting in Palma in 2023. The time zone of the meeting will be GMT European time to mirror the original June schedule (and will be held on the same days). ASLO 2021 goes virtual: https://www.aslo.org/2021-virtual-meeting/.

29th - 30th June 2021: The 8th PRIMaRE marine renewable energy conference

Menai Bridge, Wales

The conference represents the latest in the annual scientific conference series of the marine renewable energy community. The conference will be held **online**, and run by Bangor University, School of Ocean Sciences, www.bangor.ac.uk/oceansciences/primare.php.en.

The conference includes universities, industry and research centres active in all aspects of marine renewable energy with presentations ranging from industrial developers, university researchers, marine environmentalists and policy makers. The aim of the event is to cover a wide range of topics in marine renewable energy, including: technology, policy, environment, hydrodynamics, resource characterisation, materials, operation and management, etc.

The 8th PRIMaRE conference will provide a platform for both industrial and university speakers to present their up to date activities and on-going research programmes through posters.

Conference Themes within Marine Renewable Energy:

- Materials
- Fluid Dynamics and Hydrodynamics
- Survivability and Reliability
- Environmental Impacts
- Power Conversion and Control
- Infrastructure and Grid Connection
- Marine Operations and Safety
- Marine Planning and Governance

We hope to build on the hugely successful online conference of last year, with over 210 delegates from all over the world. There is no conference fee; however please register to ensure a place by 29th May 2021. Please also consider submitting an abstract of less than 500 words by the 30th April 2021. Instructions for submitting the abstract and conference registration details can be found on the PRIMaRE website, https://primare.events/.

Abstracts will be accepted as oral or poster presentations. The abstract should summarise the context of the presentation or poster, and include aims and objectives, a description of the methodology and summary of the findings. You can also sign up to the PRIMaRE network here: www.primare.org/?q=content/primare-network.

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

Vancouver, Canada

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

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.

6th - 9th September 2021: Estuaries and coastal seas in the Anthropocene
Hull, England

Same great content will now take place online as a live-streamed and interactive event. The conference will bring together our expert invited speakers, contributed talks and e-posters showcasing the latest research and addressing key topics from our cancelled in-person meeting. You will be able to participate in a live interactive conference experience direct from your desktop or mobile device.

Live-stream presentations, ask questions to the speakers and poster presenters and chat with other attendees via a dedicated conference platform. Plus, enjoy more flexibility with on-demand access to recorded sessions for 12 months after the event.


Engage with speakers


Participate in poster sessions

Remember that the abstract submission deadline is 9 April 2021. We invite contributions within a broad range of topics, covering the diversity of threats and opportunities facing estuarine, coastal and marine ecosystems and the people they support. The list of conference topics is below and to view the full list of topics and special sessions please visit the website.

We do hope that you will be able to participate in this exciting event, Conference Chairs:
Mike Elliott, University of Hull, and International Estuarine & Coastal Specialists Ltd
Tim Jennerjahn, Leibniz Centre for Tropical Marine Research, Bremen, Germany
Masataka Watanabe, Chuo University, Japan

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 March.

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

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JOBS

There are jobs on the IMBER web site

http://www.imber.info

IMBeR Integrated Marine Biosphere Research

Jobs and opportunities

New

- IMBeR, DFO and OGEN at the Ocean Frontier Institute launch call for expressions of interest for supervisors/projects in ocean sustainability. Eligible supervisors at Dal, MUN, UPEI, UNB should submit their EOI by **31 March**
- Coastal Wetland Strategy Analyst: The Nature Conservancy. Work place negotiable. No deadline given, **apply now**
- Postdoc:Development of selectivity models to infer on fish escapement processes in a trawl, Ifremer, Lorient, France. Apply by **29 March**
- PhD: Southern Right Whale Foraging Ecology, MRI Whale Unit, Pretoria, South Africa. Apply by **31 March**
- Coordinator: New Scientific Diving Academy, University of Helsinki, Finland. Apply by **31 March**
- PhD: Benthic Geopolitics, Helmholtz Institute for Functional Marine Biodiversity. Apply by **23 April**
- Senior Lecturer: Marine chemistry in a changing world. University of Gothenburg, Sweden. Apply by **11 April**
- Postdoc: Ocean acidification effects on marine fishes, NOAA-NMFS Alaska Fisheries Science Center, Newport OR, USA. Apply by **1 May**

In case you missed it...

- Postdoc: Interaction of waves, vegetation and structures in coastal areas, East China Normal University, Shanghai, China. Apply by **22 March**
- Clean Technology and Innovation Manager: Port of New York and New Jersey, New York, USA. No deadline given. **Apply now**
- Postdoc: Closing the Circle Programme. World Maritime University, Malmö, Sweden. Apply by **21 March**
- Nippon Foundation-PGO Centre for Excellence intensive training course, AWI. Apply by **29 March**
- PhD: Evolutionary and socio-economic consequences of range shifts of commercially exploited marine fishes, University of Stellenbosch, South Africa. Apply by **31 March**
- Student Grants-in-Aid of Caribbean Marine Research. Apply by **1 April**
- Call for nominations: AGU Awards, medals and prizes. Submit nominations by **15 April**

Visit the IMBeR Website

imber@imr.no