September 2021

Challenger Wave

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

NEWS

Marine robotics to help uncover hidden link in glacier melting

Last month, marine scientists deployed robotic vehicles on a dangerous mission to the face of a glacier in Svalbard as they attempt to expose the hidden link in how rapidly melting Arctic ice is changing our ocean. The mission to Ny Ålesund, the world's most northerly settlement, is a collaboration between the Scottish Association for Marine Science (SAMS), UiT The Arctic University of Norway, the Norwegian Polar Institute, and the University Centre on Svalbard. The team will examine the Kronebreen glacier in Kongsfjorden, measuring the freshwater run-off as it melts, and assessing how it interacts with the saltier sea water coming into the fjord from the North Atlantic.

The team will examine fresh water flow from the Kronebreen glacier

Humans are unable to sample at the glacier face because of the risk of huge chunks of ice collapsing into the sea below, a process known as glacier calving. Instead, the team will use an autonomous surface vehicle (ASV) built by Norwegian company Maritime Robotics, to record various oceanographic measurements at the face of the glacier, while an autonomous underwater vehicle, known as an ecoSUB, will take temperature, salinity and oxygen readings below the surface. Meanwhile, aerial drones will survey the so-called freshwater 'plumes' that run off from the glacier.

PhD student James Coogan will pilot the ecoSUB during the mission

Lead scientist Prof Finlo Cottier of SAMS said: "Fjords are the connection between the changing ocean and our rapidly melting northern glaciers. The transfer of heat and water at these points, often just a few kilometres wide, are therefore extremely important in understanding how climate change is impacting our ocean. However, as these areas are too dangerous to survey fully and too small to be picked up on global ocean models, the interactions between fjords and glaciers have not been sufficiently represented in ocean and climate predictions. We need to know much more about the fresh water coming into the ocean: How much is there ? Where does it end up ? How does it move ?"

However, Finlo continued "It would simply be too dangerous to go into such a hostile and remote environment with a boat. Not only is there a risk of falling ice, but large-scale calving causes huge

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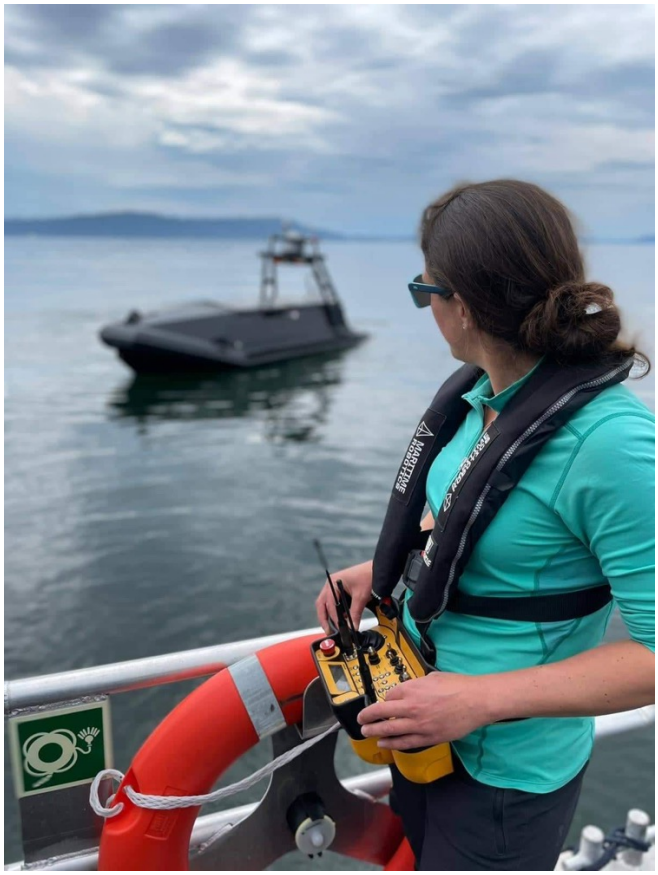
waves, so it is a dangerous place. That is where the robotic systems come into their own, working at the front line of Arctic science."

While rising global temperatures increase glacial melt, glaciers are also breaking up below the surface of the water. In a process known as sub-glacial discharge, melt water flows down through the glacier and out into the ocean. This water is fresher than the surrounding seawater, so starts to rise in the water column, creating a plume that pulls in warmer Atlantic water which increases the melt rate at the face of the glacier. This process undermines the wall of ice, causing huge chunks to collapse into the sea.

The marine robotics deployed by the team will collect crucial data to improve our understanding of this process. The mission is scheduled to last seven days and the team, which includes SAMS Prof Mark Inall and University of the Highlands and Islands PhD student James Coogan, will be based in Ny Ålesund, making daily visits to the glacier.



Dr Emily Venables, UiT The Arctic University of Norway 's chief technician, was previously part of the SAMS robotics team and will pilot the ASV during the mission. Credit: UiT The Arctic University of Norway

SAMS has close links with project partner UiT The Arctic University of Norway: Prof Cottier has an adjunct professorship at the Norwegian institute, while UiT's chief technician for the ASV, Dr Emily Venables, was previously part of the SAMS robotics team.

Human activities are the main driver of ocean warming and acidification

On the 9th August, the Intergovernmental Panel on Climate Change (IPCC) released its next report; the Working Group I contribution to the Sixth Assessment Report (AR6). NOC scientists Prof Stephanie Henson and Dr Catia Domingues were lead authors on the report, which assesses the physical science basis of climate change, providing the latest assessment of scientific knowledge about the warming of the planet, the impacts on climate systems and projections for future warming.

Professor Stephanie Henson (left) and Dr Catia Domingues (right)

The headline findings of the report show that there is no longer any doubt that human activities are causing climate change with recent changes in the climate being widespread, rapid, intensifying and unprecedented in thousands of years. In fact, human-driven changes occurring in the ocean now, such as melting ice sheets, sea level rise, ocean warming and acidification are likely irreversible for thousands of years, even if emissions were stopped tomorrow.

Prof Stephanie Henson, Principal Scientist in Marine Biogeochemistry at the National Oceanography Centre, said: "I was privileged to be a lead author on the chapter dealing with the carbon cycle and climate feedbacks. This assessed the evidence of how human activities are altering the ways the oceans absorb and store CO_2 from the atmosphere, particularly from

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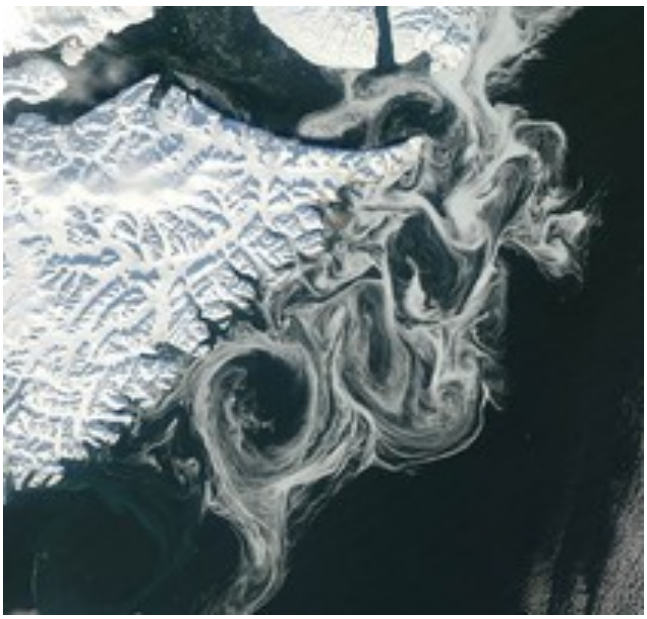
a biological perspective. The evidence suggests that the biological carbon pump is an important component of the ocean carbon cycle, but there is really large uncertainty around how it will respond to ongoing climate change and how that will feed back to atmospheric CO_2 levels. The observational and modelling work we're doing at the NOC will hopefully start to fill some of these knowledge gaps over the coming years." Visit www.ipcc.ch/report/ar6/wg1/ for the full report.

New study uncovers hidden behaviour of the Arctic Ocean's currents

A new study has discovered that the Transpolar Drift, a strong surface current in the Arctic Ocean, is more variable than was previously known. With the Arctic currently changing at unprecedented rates, this discovery could impact future predictions for climate change and the world's rising surface temperatures.



Satellite image of fine-scale currents with drifting sea-ice near eastern Greenland. Image Credit: NASA

Scientists from the NOC and Alfred Wegener Institute (AWI), collaborating within the APEAR project (Advective Pathways of nutrients and key Ecological substances in the Arctic), www.changing-arctic-ocean.ac.uk/project/apear/, used high resolution, realistic ocean and ice model simulation, alongside satellite observations to compare the flow of two sets of particles starting from the same location. A key observation indicated that there were differences in terms of the length of time the particles took to drift across the Arctic and how quickly they spread out from the Transpolar Drift. These key differences were due to the resolution of the flow that was used.

Call for Early Career Scientists to join new ICES Strategic Initiative

ICES has announced a new a Strategic Initiative on Integration of Early Career Scientists (SIIECS). This Strategic Initiative is intended for all marine scientists (and other marine experts) who identify themselves as being in the early stages of their career and who wish to be involved in ICES activities. SIIECS is an inclusive group and there are no strict age-related restrictions on participation. In addition, SIIECS aims to encourage interdisciplinary work between early-career scientists and contribute to the discussion on diversity, equity, and inclusion within ICES. SIIECS is looking to build an interdisciplinary team of early-career scientists including social and natural scientists and other marine experts affiliated with ICES. Moreover, we are interested in extending our reach to those who are yet to be connected to ICES. More information on this new Strategic Initiative can be found here www.ices.dk/community/groups/Pages/SIIECS.aspx and here www.ices.dk/news-and-events/news-archive/news/Pages/TakingInitiative.aspx.

We are looking for two types of members:

1 A wide group of members who will be on the mailing list for SIIECS-related activities (e.g. SIIECS annual meetings, ICES ECS Day, networking events, ECS workshops)
2 A smaller group of ToR leaders who will join the monthly SIIECS meetings and actively lead one or more of the ToRs outlined in the Resolution (which can be found on pages 9-12 here: https://www.ices.dk/about-ICES/Documents/Resolutions/2020%20Resolutions/Strategic%20Initiative%20Resolutions%202020.pdf).

Anyone interested in joining in either capacity can sign up using the following link: https://mws.onlinesurveys.ac.uk/siiecs-core-member-application. Applications for ToR leaders will close on Friday, September 24th and we will contact applicants sometime before the end of October.

Ocean Business 2021, registration is open

The much-awaited Ocean Business, www.oceanbusiness.com/, - returns to the National Oceanography Centre, Southampton UK on 12th-

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14th October. After 18 months, Ocean Business will be the first opportunity for the ocean science and technology community to reconnect, rediscover and reunite. And with registration numbers already exceeding 2019's numbers at this stage it's one not to be missed.

Meet with over 300 exhibitors, to discover the latest products, technologies and techniques that will transform your business. See marine autonomous systems, biological and chemical sensors, survey tools and so much more in action. Test-drive the newest products in the dockside waters, in the test tank, and in classrooms. See the full programme here, www.oceanbusiness.com/programme/.

Ocean Business will be a safe environment for you to discover, share ideas and define your future business roadmap. It's completely free to attend so don't miss out and register today, eventdata.uk/Forms/Form.aspx?FormRef=Oce71Visitor&TrackingCode=OB111. The Ocean Business Team can't wait to welcome you to Southampton in October.

VIEWS

Ocean and climate experts gather to discuss critical point in planet's future

The Institute of Marine Engineering, Science & Technology (IMarEST) will provide a forum for experts, practitioners and ocean users to discuss climate change and the oceans, the theme of its 4th biennial Oceans of Knowledge conference, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean. Organised by the Institute's Special Interest Group (SIG) on Operational Oceanography, the 2-day conference, over the 26th-27th October, will address three key themes: firstly, the sustainable use of the ocean and its resources, secondly, its role in natural and engineered climate mitigation and thirdly, rising sea levels and coastal vulnerability.

The conference is endorsed by the United Nations Decade of Ocean Science for Sustainable Development and the busy programme includes talks by world-class speakers from leading organisations, including the US National Oceanic and Atmospheric Administration, the Schmidt Ocean Institute and the International Energy Agency. The discussions will focus attention on how better understanding the ocean will help ensure its future use as a source of energy and food is balanced with the need to protect ocean ecosystem services upon which we all ultimately depend.

"This is an opportunity to hear from leading climate change specialists and to gain an understanding of how mitigating and adapting to climate change will impact the use of the ocean and ocean resources. The day dedicated to rising sea levels will then explore impacts where the ocean meets the land, seeking to better predict and respond to the challenges of protecting coastal communities, infrastructure and the environment."; said Ralph Rayner, Co-Chair, IMarEST Operational Oceanography SIG.

Scene-setting keynotes will highlight current scientific understanding of the ocean-related aspects of climate change. Policy responses at a national and international level will be placed into the context of the UN Decade of Ocean Science for Sustainable Development and the 2030 Sustainable Development Goals.

"The next ten years are now widely accepted as critical for climate action. This high profile event, leading directly into COP26, makes a key contribution to the UN Ocean Decade. We are very also excited by the collaboration with other learned societies and professional bodies that are supporting this conference."; said Gus Jeans, Co-Chair, IMarEST Operational Oceanography SIG.

Key outcomes of the conference are planned to be conveyed at a COP26 side event and exhibition, and to inform further publications on the subject. Register now for Oceans of

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Knowledge 2021, where early bird tickets are available, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean.

Sonardyne adds flagship Navigator model to SPRINT-Nav Mini family

Energy, defence and science marine technology company, Sonardyne, has introduced a range-topping model of its hybrid, underwater and surface vehicle navigation platform, SPRINT-Nav Mini. The new Navigator version extends the capability of the Guidance model introduced last year, by calculating and providing the position of a remote, autonomous or piloted underwater vehicle, or uncrewed surface vessel, in addition to its velocity, depth and attitude.

Expanding the horizons for underwater robotics – Sonardyne's SPRINT-Nav Mini.

Small in size and low in power, SPRINT-Nav Mini is engineered to provide accurate, precise and robust guidance, and also survey and inspection capabilities, for vehicle platforms that would normally not be able to host high-end navigation systems. These include observation-class ROVs, low-logistic AUVs, manned submersibles, swimmer delivery vehicles and USVs operating in shallow waters. With field-proven technology transferred from Sonardyne's popular SPRINT-Nav product line, the Mini family combines an INS, AHRS, pressure sensor and 500 kHz DVL in a single subsea housing that is just 215 mm high, 149 mm in diameter and as little as 0.7 kg in water; smaller, lighter and lower power than any other competing technology in the same class, and lower in cost than the individual vehicle sensors it replaces.

SPRINT-Nav Mini continues to work even in challenging environments, such as around surface structures and GNSS denied environments, providing a continuous stream of latitude and longitudes, orientation, velocities, depth and altitude at up to 200 updates per second to a vehicle's primary control system. Available in 300 m and 4,000 m depth options, with a class leading maximum DVL altitude of up to 200 m, all SPRINT-Navs are supplied pre-calibrated from the factory, enabling users to install it and get to work easily and quickly. Existing owners of SPRINT-Nav Minis can upgrade their Guidance units to the new Navigator version, remotely in the field.

Business Development Manager, Marine Robotics, at Sonardyne, Aidan Thorn, said: "It's an incredibly exciting time for developers and operators of small ROVs, AUVs and USVs with transformational technologies like our SPRINT-Nav Mini Navigator being a true enabler for safer, more efficient and cleaner operations across the maritime space." He added: "The technology platform is low risk and field proven. This new flagship model will enable vehicle manufacturers and operators to enjoy all the benefits of Doppler inertial navigation from a single instrument. What I like is the simplicity, one unit that's simple to integrate and easy to operate, leaving more space and power for other data collection payloads. And that ultimately means a more capable vehicle for the user."

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

9th September - 9th December 2021: The Challenger Society Virtual Conference 2021
Online
Let's talk about the Oceans !

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Instead of our usual biennial meeting, the Challenger Society kindly invites all UK marine scientists to a series of discussion sessions to explore current topics in marine science. The format will be short talks, guided discussions and networking breaks. The Society welcomes members and non-members, with early career researchers especially encouraged to attend and contribute. Attendance to the sessions is free but a suggested donation of £5 per session can be made via the donate button on our membership page found here, www.challenger-society.org.uk/Members, (please note that members must be logged out to see the button). All sessions will be run on Zoom with links sent to those who have registered. Further details and calls for the sessions will be circulated in due course.

Save the Dates:

9th September 2021 - 12:00-13:30 and 10th September 2021 16:00-17:00
Welcome, Fellowship Award talks and the Annual General Meeting
The welcome and fellowship award talks will precede the Ocean Modelling SIG meeting. The AGM will precede day two of the SIG meeting. Follow the Welcome and Fellowship Awards Registration Link at www.eventbrite.co.uk/e/conference-welcome-fellows-presentations-registration-160738714823 and the AGM Registration Link at www.eventbrite.co.uk/e/challenger-society-agm-tickets-160746971519.

5th and 6th October 2021 - 13:00-14:30
Equality, Diversity and Inclusivity sessions, co-hosted with MASTS
Follow the 5th October Registration Link at www.eventbrite.co.uk/e/equality-diversity-inclusitivity-panel-discussion-registration-160748648535 and the 6th October Registration Link at www.eventbrite.co.uk/e/equality-diversity-inclusitivity-case-studies-best-practice-registration-160749398779.

18th November 2021 - 13:00-14:30
Science for the UN Decade of the Ocean
Further information including abstract submission guidelines can be found at challenger-society.org.uk/Decade_of_the_Ocean_Event. Abstract submission deadline 18th September 2021 and the Registration Link is www.eventbrite.co.uk/e/science-for-the-un-decade-of-the-oceans-registration-160752124933.

9th December 2021 - 13:00-14:30
Defining Challenger Society's Role in Marine Science
The Registration Link is www.eventbrite.co.uk/e/defining-the-challenger-societys-role-in-marine-science-registration-160750648517.

20th-24th September 2021: Fifth OBPS Community Workshop, An Ocean of Values
All members of the ocean community, including educators, scientists, citizens, artists, conservationists, cultural ambassadors, policy makers, and ocean explorers, were invited to co-develop this workshop.

Ocean best practices

As an overarching theme, participants will be asked to help understand how to better represent and safely archive the methods, policies, guides, or standard specifications that bring value to their communities. The workshop will be facilitating value mapping activities across all groups, so we can better connect "how" things are done to "why" they are done as well as why they matter: workshop5.oceanbestpractices.org/mapping-value.

For more information, stay tuned to the OBPS newsletter and Twitter channel (@OceanPractices) for updates.

5th-7th October 2021: 11th MASTS Annual Science Meeting: Working To Reverse The Tide On Climate And Global Change
Online and Glasgow, Scotland
We can't wait for you to join us as we celebrate our eleventh annual conference. This cross-disciplinary online meeting brings together members of the global marine science community, with the aim of promoting and communicating research excellence and forging new scientific collaborations: don't forget to register, page-builder.hopin.com/events/masts-11th-annual-science-meeting/registration.

The first two days will be online and will bring together expert plenary speakers and contributed talks and e-posters outlining the latest research and management practices that address key

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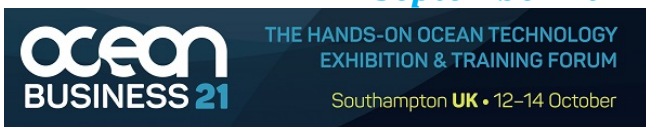
topics related to marine science and management in the face of global climate change. You will also be able to enjoy networking with your peers and making new contacts, and connecting with a global and inclusive audience. Last year we welcomed over 500 attendees from 28 countries.

Plenary talks will include: Jeff Ardron (Adviser, Ocean Governance, The Commonwealth Secretariat) – The climate crisis is also an ocean crisis; Antony Firth (MCIfA, Co-Chair Ocean Decade Heritage Network) - Cultural Heritage and the UN Ocean Decade: applying human time-depth to Ocean Science, Policy and Sustainable Development; Michael Begg (Award winning composer, sound and recording artist) - Light Water is Black Water: OCEAN ARTic partnership's creative innovation for public engagement in climate science; Susan Davies (Member of First Minister's Environmental Council, Scottish Seabird Centre CEO) title TBA; David Pratt & Drew Milne (Marine Scotland) & Prof Tavis Potts (University of Aberdeen): Tackling climate change with offshore renewables, ambitions in Scotland.

Sessions featuring live Q&A on: Seagrass Special Session 2, Innovation & Ambition; Seagrass Special Session, Experiences & Adaptations; the Social Side, Human Dimensions to Ocean Challenges; Aquaculture as a critical pathway to future Net Zero food production in Scotland, net Zero and Food Production; Aquaculture as a critical pathway to future Net Zero food production in Scotland, Industry Innovations for Net Zero production; fisheries science; multiple marine stressors; and 5 General Marine Science sessions.

Lunch time discussions on Equality, Diversity and Inclusivity in Marine Science: hosted by MASTS and co-ordinated by the Challenger Society. Both sessions will run from 13:00 – 14:30 via Zoom. More information and guidance can be found at masts.ac.uk/annual-science-meeting/.

12th-14th October 2021: Ocean Business 21
Southampton, UK
Be at the forefront of ground-breaking innovation as Ocean Business returns to the National Oceanography Centre this October. Meet over 360 exhibitors to discover the latest products, technologies and techniques that will transform your business.



See marine autonomous systems, biological and chemical sensors, survey tools and so much more in action. Test-drive the newest products in the dockside waters, onboard vessels, in the test tank, or in classrooms. See the full programme here, www.oceanbusiness.com/programme/.

Ocean Business, www.oceanbusiness.com/, will be a safe environment for you to discover, share ideas and define your future business roadmap. It's completely free to attend so register today for your ticket, eventdata.uk/Forms/Form.aspx?FormRef=Oce71Visitor&TrackingCode=OB112. We look forward to seeing you in person this October.

14th-17th October 2021: The Arctic Circle Assembly
Reykjavik, Iceland
The 2021 Arctic Circle Assembly will be held in the traditional way as an in-person event. Registration will open in August. More information will be published soon, www.arcticcircle.org. You can also follow Arctic Circle on social media to stay updated.

18th - 22nd October 2021: IMBeR sixth IMBIZO (the Zulu word for a gathering) virtual meeting
IMBeR aims to promote and enable interdisciplinary marine research and governance to achieve improved prediction of, adaptation to and mitigation of global change towards ocean sustainability. Topics addressed during IMBIZO6 will showcase positive, 'buoyant' solutions for ocean sustainability currently being discussed and implemented around the world.

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We will follow the usual IMBIZO format of three distinct but interacting workshops. To optimize discussions, the number of IMBIZO6 participants will be limited to about 120 people (around 40 per workshop). The workshop topics are:

1. Exploring potential marine options for climate intervention
2. Lighting the 'grey zone': how can we integrate human dimensions in decadal-scale prediction systems ?
3. Ocean governance and climate adaptation: comparing responses, charting future courses.

Plenary keynote presentations and poster sessions will enable you to learn about the work of participants in other workshops. More informaton about IMBIZO6 and each of the workshops is available here, imber.info/events/imbizo/. There will also be an opportunity to attend a bonus workshop on 14th and 15th October. This is organised by the Interdisciplinary Marine Early Career Network (IMECaN) and will look at Equity, Diversity and Inclusion in Marine Science.

26th-27th October 2021: 4th biennial IMarEST Oceans of Knowledge conference
London, UK
The Institute of Marine Engineering, Science & Technology (IMarEST) will provide a forum for experts, practitioners and ocean users to discuss climate change and the oceans, the theme of its 4th biennial Oceans of Knowledge conference, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean. Organised by the Institute's Special Interest Group (SIG) on Operational Oceanography, the 2-day conference, will address three key themes: firstly, the sustainable use of the ocean and its resources, secondly, its role in natural and engineered climate mitigation and thirdly, rising sea levels and coastal vulnerability.

The conference is endorsed by the United Nations Decade of Ocean Science for Sustainable Development and the busy programme includes talks by world-class speakers from leading organisations, including the US National Oceanic and Atmospheric Administration, the Schmidt Ocean Institute and the International Energy Agency. The discussions will focus attention on how better understanding the ocean will help ensure its future use as a source of energy and food is balanced with the need to protect ocean ecosystem services upon which we all ultimately depend.

Scene-setting keynotes will highlight current scientific understanding of the ocean-related aspects of climate change. Policy responses at a national and international level will be placed into the context of the UN Decade of Ocean Science for Sustainable Development and the 2030 Sustainable Development Goals.

Key outcomes of the conference are planned to be conveyed at a COP26 side event and exhibition, and to inform further publications on the subject. Register now for Oceans of Knowledge 2021, where early bird tickets are available, www.imarest.org/events/category/categories/imarest-conference/oceans-of-knowledge-2021-climate-change-and-the-ocean.

26th-28th October 2021: The annual MONGOOS General Assembly and Workshop
The Mediterranean Sea is being impacted by several acute stressors such as frequent extreme events and geo-hazards, the vulnerability of the ecosystems, the over-exploitation of biological resources and of seabed, the severe pollution events and limited remediation actions and the uneven protection of coastal infrastructures and populations, all amplified by the ongoing climate changes. A strong knowledge base and predictive capacities are therefore required to achieve an economic, environmental and societal sustainability of Blue Growth in the Mediterranean area and to advance the knowledge about its role in the Earth system, its impact in our well-being and in the ecosystems. To achieve this goal, ocean science relies on an increasing amount of data from disparate sources (i.e. multi-platform, interdisciplinary in-situ data, satellite and

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modelling products), where their integration is crucial for improving the knowledge and for an ultimate deliver of the science-based solutions for different stakeholders.

It is now ten years since the Mediterranean Oceanographic Network for the Global Ocean Observing System (MONGOOS) was established to further develop operational oceanography in the Mediterranean Sea. This workshop has the aim to capitalize on these ten-years of achievements to meet challenges of the UN Decade of Ocean Science for Sustainable Development that will contribute in shaping the future of the oceans.

The Objective of the workshop is to integrate science-based knowledge and to promote solution-oriented research in the Mediterranean Sea. Established in 2012, this year's workshop marks the 10th anniversary of MONGOOS. The workshop is a 2-day online event, organised around oral presentations, poster exhibitions and informal discussions. The workshop language is English.

Dates: 26-27 October 2021
Times: CET (Paris): 09:00 - 13.30

Registration and further information will be available from the 1st of September. The General Assembly will take place on 28 October 2021 (CET (Paris): 9.00-13.30H | 14.30-16.30 H). The Organizing Committee: Ruđer Bošković Institute, SOCIB, Puertos del Estado, OGS, IMEDEA (CSIC-UIB). If you have any questions related to the workshop please do not hesitate to contact us at mongoos_workshop2021@inogs.it.

9th-11th November 2021: Marine Autonomy Technology Showcase (MATS 2021)
Southampton, UK
MATS 2021 will welcome guests and exhibitors for a packed three days of insightful presentations and networking opportunities. This year's showcase will primarily focus on new developments and innovations, and will also look forward to where marine autonomous technology and ocean exploration is heading in the next five years. For more information, visit noc-events.co.uk/mats-2021.

22nd-25th November 2021: IMBER West Pacific Symposium
China–Japan-Korea (CJK) online
IMBeR will hold its West Pacific Symposium 2021 "Changing West Pacific Ocean: Science and Sustainability" as a virtual event. Call for abstracts for oral presentations and virtual posters is now open, imber.info/event/wps2021/.

The China-Japan-Korea IMBeR Symposium on the marine ecosystem has been held eight times over the period from 2002 to 2018 to review the achievements and to set the future directions of international ecosystem research in the western North Pacific as a part of the past GLOBEC and the IMBeR regional activities. Responding to the growing needs, the CJK IMBeR community changed its name to the West Pacific Symposium to better represent the entire West Pacific Ocean, as outlined in the *IMBeR Science Plan and Implementation Strategy 2016-2025*. This kick-off symposium centres around the marine biosphere and its biogeochemistry in the West Pacific Ocean from the Subarctic in the North to the Pacific sector of the Southern Ocean and its connectivity with the Arctic, Southern Ocean, and the Indian Ocean to deepen a holistic hemispheric view. All marine habitats including coastal areas (estuaries, salt marshes, coral reefs, etc.), continental shelf to the deep ocean and their seafloors are of interests. Participants in the IMBeR Regional Programmes, Working Groups, Endorsed Projects, and others are welcome to the symposium.

The symposium is organized into the following thematic sessions:

- Session 1: Coastal Blue Carbon: Measurements, Modeling, and Assessment
- Session 2: Strengthening Coral Reef Resilience to Climate Change and Human Impacts
- Session 3: Dried Small Fish: Ecology, Value Chains and Nutrition
- Session 4: Ecosystem-Social Interactions in the Coastal Sea
- Session 5: Towards the Sustainable Indo-Pacific Region (IPR): Marine Biogeochemistry and Biodiversity

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- Session 6: Marine Extreme Events: Impacts, Forecasting, and Risk Management
- Session 7: Connectivity of the West Pacific and Southern Ocean: The Importance of Oceanic Top Predators
- Session 8: Ecosystem, Biogeochemistry, and Interventions in the Western Pacific and its Marginal Seas: Beyond the Disciplinary Borders

The outcome of the symposium will be published as a special volume of a renowned peer-reviewed international journal. The submission Deadline is the **15th September 2021.** *Please note, there is no charge for this online event.*

25th-26th November 2021: UN Ocean Decade Kickoff Conference for the Western Pacific and its Adjacent Areas

Online

The UN Decade of Ocean Science for Sustainable Development (2021-2030), is upon us. The UN Ocean Decade provides a once-in-a-lifetime opportunity to strengthen international cooperation needed to develop scientific research and innovative technologies that can connect ocean science with the needs of society.

CALL FOR VIDEO SUBMISSION: EXPRESSION OF HOPE

Are you a young person and passionate about the ocean? **Voice out your expectation on the** UN Ocean Decade, by sending us before 30 September 2021 a 60-second video record of yourself (in English or mother tongue) talking about one or two of the following:

- What are you excited to see happen as a result of the UN Ocean Decade (2021-2030)?
- What is your message to the world in terms of supporting the Ocean Decade campaign?

Your messages, once selected, will be shown at the Conference. Find out more here!

You are cordially invited to join the UN Ocean Decade Kickoff Conference for the Western Pacific and its Adjacent Areas. The Conference will mark the launch of the UN Ocean Decade in the Western Pacific and its adjacent areas, and represent the beginning of the region-wide efforts in a substantive development and implementation of Decade Actions. It aims to catalyze partnerships among various ocean stakeholder communities in the region, and initiate co-design of transformative ocean science solutions to the Ocean Decade Challenges in order to achieve the Ocean Decade Outcomes.

The two-day conference will be composed of: a high-level segment featuring commitments from UN agencies, governments, business and private sectors, and other stakeholder groups; and a series of interactive side events entitled "Decade Action Incubator" aiming to facilitate the development of potential Decade Actions such as Decade Programmes and Projects, and key cross-cutting issues including capacity development and Early Career Ocean Professionals (ECOPs). For more information please visit www.ioc-westpac.org/decade-kickoff-conference/.

14th–16th February 2022: International Ocean Data Conference 2022 - The Data We Need for the Ocean We Want

Sopot, Poland

Since IODE-XXII (2013) every Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) has been preceded by a Scientific Workshop or Conference. This was also planned for IODE-XXVI in 2021 but due to the Covid19 pandemic this was not possible: the IODE-XXVI Session was held as a fully online event.

The original host of IODE-XXVI (Poland) has kindly offered to host instead the "**International Ocean Data Conference 2022 - *The Data We Need for the Ocean We Want***". The Conference will be held as a hybrid event with a number of participants on-site while others will participate through video conference.

The first call for abstracts will be opened end of July 2021/early August 2021. A reminder will be sent early-mid September 2021. Based upon the selection made by the Scientific Committee authors will be contacted to either submit a paper or poster. All presentations, papers and posters should be made available by the authors by mid

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to end of December 2021. For more information visit www.iode.org/index.php?option=com_content&view=article&id=645:first-international-ocean-data-conference&catid=74&Itemid=100407.

27th February – 4th March 2022: Ocean Sciences Meeting 2022
Honolulu, Hawaii, USA
The session list for the Ocean Sciences Meeting 2022 scientific program is now available, www.aslo.org/osm2022/scientific-sessions/. The abstract submission system will open soon. View the session list to prepare your contribution to the scientific program by the 15 September 2021, 11:59 PM EDT.

Submissions for town halls, workshops, and auxiliary events will also open soon, with a deadline of 22 September, 2021, 11:59 PM EDT.

The Ocean Sciences Meeting 2022 will be held in Honolulu, but with virtual components. Attendees will have the option of participating in-person or remotely.

9th–12th May 2022: Fourth ICES PICES Early Career Scientist Conference
St. John's, Newfoundland, Canada
Hosted by Fisheries and Oceans Canada (DFO), www.dfo-mpo.gc.ca/index-eng.html, The International Council for the Exploration of the Sea (ICES), www.ices.dk/about-ICES/Pages/default.aspx, and North Pacific Marine Science Organization (PICES), meetings.pices.int, welcome you the fourth conference of this series, where early career scientists will have the opportunity to meet colleagues from around the globe who share similar interests and an enthusiasm to improve equality and diversity in marine science. The conference aims to foster the development of contacts, collaborations, and associations among early career scientists that will persist for decades and to establish personal and institutional networks that will help to advance our understanding of the marine environment.

The scientific sessions will be organized around the following themes:

Ecosystem and ocean processes
1. Biodiversity and ecosystem functions
2. Understanding food webs and biogeochemical cycles
3. Developments in taxonomy and systematics
4. Connecting biological, oceanic, and atmospheric processes of different scales

Inclusive, interdisciplinary, and transparent ocean sciences
1. Human–ocean interactions
2. Science, management, and policy for a sustainable and productive Blue Economy
3. Science communication, inspiration, and engagement

Emerging technologies and techniques for ocean science
1. Using remote and *in situ* technologies to inform marine science
2. Advances in techniques and technologies: from 'omics to gear modifications to data analysis
3. Towards open-source science: freely available methods and data in the marine research

Visit the ECSC4 website, www.ices.dk/events/symposia/ecsc4/Pages/default.aspx, to read more about the conference and the theme sessions and stay up-to-date by following us on Twitter @ECSC_4 for announcements of keynote speakers, the programme, and important dates. Registration and call for abstracts will open in October 2021.

16th–20th May 2022: 53rd International Liège colloquium on Ocean Dynamics, and GO2NE oxygen conference
Liège, Belgium
Oxygen is critical to the health of the planet. It affects the cycles of carbon, nitrogen and other key elements, and is a fundamental requirement for marine life from the seashore to the greatest depths of the ocean. Nevertheless, de-oxygenation is increasing in the coastal and open ocean. This is mainly the result of human activities that are increasing global temperatures (CO2-induced warming) and increasing loads of nutrients from agriculture, sewage, and industrial waste, including pollution stemming from power generation using fossil fuels and biomass.

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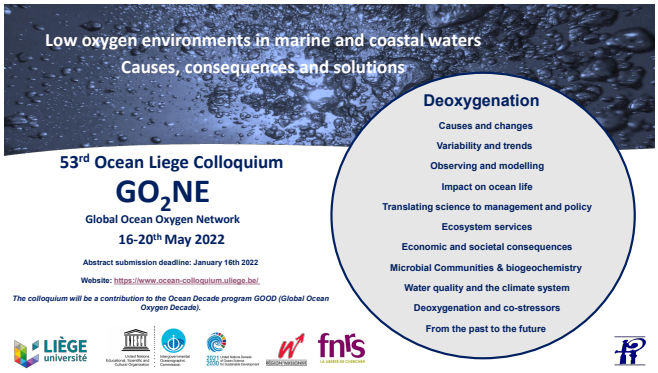
The 53rd Liege colloquium will investigate new developments and insights related to de-oxygenation in open and coastal waters. It is jointly organized with the Global Ocean Oxygen Network (GO2NE) and is a contribution to the Global Ocean Oxygen Decade (GOOD) program endorsed by IOC-UNESCO. The following sessions are considered:

- De-oxygenation: understanding causes and attributing changes
- Assessing open ocean and coastal de-oxygenation variability and trends
- De-oxygenation: observing and modelling
- De-oxygenation and ocean life
- De-oxygenation and co-stressors: understanding, monitoring and mitigating deoxygenation in the context of multiple stressors
- Ocean De-oxygenation - how the past can inform the future?
- Microbial Communities and their controls on biogeochemical feedbacks and interactions
- De-oxygenation, water quality and the climate system: understanding processes and feedbacks and developing actionable indicators
- De-oxygenation: ecosystem services, economic and societal consequences.
- Confronting de-oxygenation and its impacts: translating science to management and policy



Deadline for Abstract submission: January 16th 2022. Further details (scientific committee, submission, registration, deadlines, venue etc...) are available on the web site https://www.ocean-colloquium.uliege.be/.

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', stay 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 30th September.

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 and OPPORTUNITIES

POSTDOC POSITION Physical Oceanography, Woods Hole Oceanographic Institution

The department of Physical Oceanography at the Woods Hole Oceanographic Institution is seeking a **Postdoctoral Investigator**. This is a full-time position and is eligible for benefits. The initial appointment will be for one year with the possibility of an extension for an additional year based on satisfactory performance.

JOB SUMMARY:
Research will involve studying three-dimensional Lagrangian motion in eddies and fronts and its biogeochemical implications. The postdoc will be expected to participate in ship-based fieldwork, in analyzing observations, and using three-dimensional modeling for process understanding. The project offers scope to explore ocean submesoscale dynamics, microbial planktonic distributions, and will further understanding of pathways for subduction from the upper ocean, It is funded by ONR, is an international collaboration and involves several PIs. The postdoc will play a key role in the design and execution of research and the interpretation of scientific results.

The institution has a top-rated postdoctoral program (www.whoi.edu/postdoctoral/) that supports a thriving postdoctoral community with formal mentoring and career guidance programs. While the primary focus is research, the postdoctoral investigator will have an opportunity to participate in educational and outreach activities associated with the project.

EDUCATION & EXPERIENCE DESIRED:

- PhD
- Knowledge of physical oceanography
- Strong computer and programming skills, numerical modeling, data analysis and visualization. Demonstrated ability to communicate effectively and work collaboratively.
- Interest in making measurements at sea is a plus
- Interest in physical-biological interactions is a plus

APPLICATION INSTRUCTIONS:
Please apply online, https://careers-whoi.icims.com/jobs/1530/postdoctoral-investigator---physical-oceanography/job, by uploading the following documents: a cover letter, cv (resume) that includes the names and contacts of at least 3 references, statement describing research interests and career goals, up to three relevant publications (or preprints).

Applications will be reviewed as received until the position is filled. To be eligible for this position, applicants should not have previously held a postdoc position for more than three years. Please contact Amala Mahadevan (amala@whoi.edu) with any questions about the position.

WHOI is an Affirmative Action/Equal Opportunity Employer/Disabled/Veterans/M/F. We encourage Veterans and those with Disabilities to apply. Applications are reviewed confidentially. Applicants that require accommodation in the job application process are encouraged to contact us at +1 (508) 289-2253 or email eeo@whoi.edu for assistance.

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There are jobs on the IMBER web site

http://www.imber.info

IMBeR Integrated Marine Biosphere Research

Jobs and opportunities

New

- Remote externship: Marine and community conservation (National Geographic and Nature Conservancy). **Apply now**
- Marine and Coastal Science Program - non-tenure track instructor, University of Western Washington, Bellingham, WA, USA. Open continuously, **apply now**
- Fisheries Policy/Program Analyst, Lynker Technologies, Seattle WA, Portland OR, Long Beach CA, USA. No deadline given; apply now
- PhD: Examining climate change and human wellbeing in Puget Sound, Oregon State University, Oregon, USA. Apply by **15 September**
- Blue Climate Initiative Ocean Innovation Prize: $1million for ocean strategies to mitigate climate change. Apply by **15 September**
- ECORD Research grants: merit-based awards for outstanding young scientists. Apply by **15 September**
- Postdoc: Plankton imaging and machine learning, Laboratoire D'Oceanographie de Villefranche, Nice, France. Apply by **15 September**
- Postdoc: Fisheries science, Ecoscope. Apply by **15 September**
- BES Policy Fellowship: British Ecological Society. Apply by **17 September**
- Research Project Manager, FutureMARES, Texel, The Netherlands. Apply by **17 September**
- Assistant/Associate Professor: Ecological, Environmental and Evolutional Genomics, KU Leuven, Belgium. Apply by **17 September**
- South Western Indian Ocean (SWIO) Seascape Leader. WWF Madagascar, Antananarivo, Madagascar. Apply by **21 September**
- Ocean Visions today opened applications for its “Launchpad” to support competitors to the $100 million XPRIZE Carbon Removal who are pursuing ocean-based carbon dioxide removal (CDR) pathways. Apply by **24 September**
- PhD: Social licence in Onshore lobster aquaculture, University of Tasmania, Hobart, Australia. Apply by **29 October**
- 18 SEAS postdoctoral research fellow positions, University of Bergen, Norway. Apply by **31 October**
- SEAS postdoctoral research fellow: Marine biogeochemical hazards, University of Bergen, Norway. Apply by **31 October**

In case you missed it...

- Marine Biologist: Cardno GS, Inc., Honolulu, HI. No deadline given; **apply now**
- Aquaculture Marine Policy Specialist: A.I.S.. Inc., Lacey, WA. No deadline given; **apply now**
- PhD/postdoc positions: Ocean Fertilization by Dust, HUJI, Israel. No deadline give; **apply now**
- Postdoc: Mixing and the meridional overturning circulation in the modern and glacial ocean, Oregon State University. Open until filled but apply by **30 September**
- Postdoc: Investigating Antarctic ice sheet-ocean-carbon cycle interactions during the last deglaciation, Oregon State University. Open until filled but apply by **30 September**
- Editor-in-Chief for BioFactors, International Union of Biochemistry and Molecular Biology. Apply by **31 October**

Visit the IMBeR Website

imber@imr.no

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