January 2025

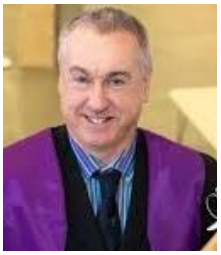
Challenger Wave

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

NEWS

In memory of Dr Ian Napier 1966-2024

All at University of Highlands and Islands (UHI) Shetland are devastated to hear the news about our colleague Ian. Ian had been at UHI Shetland and the former North Atlantic Fisheries College (NAFC) since 1995, and as our Senior fisheries policy advisor was a well-respected scientist in his field and a valued member of the marine science team. Moreover, Ian was a kind and sincere colleague, and will be missed by all at UHI Shetland. We send our condolences to his family and friends at this time.



Marine robotics student makes a splash with ocean clean-up plan

An undergraduate student at SAMS (Scottish Association for Marine Science), a partner of UHI (the University of the Highlands and Islands), has charted a course to clean up the ocean after designing a semi-autonomous robotic surface vehicle to capture plastic waste. Logan Andrick has been developing his technology after winning a UHI Business Competition award this year and has now partnered with Interface, Techscaler and the Catalyst programme from UHI. He is working on the project alongside his studies at SAMS, where he is undertaking a BSc in Marine Science with Oceanography and Robotics.

His idea is to deploy semi-autonomous and carbon-neutral surface vehicles that can clean up litter from any body of water, down to three metres. His primary focus will be on tackling the five oceanic garbage patches, beginning with the North Atlantic garbage patch. In doing so, Logan hopes his technology can not only remove the macroplastic waste already in the oceans but also identify the entry points of the litter. Logan said: “Marine plastic waste is a global issue. Not only have we detected notable marine plastic waste in every ocean basin globally, but it is a target issue in many rivers, lakes, streams, and estuaries. Our systematic approach is designed to be deployable in any body of water of sufficient depth, is carbon neutral, and will present no threat to local marine or terrestrial life.”

The American student began his fascination with technology during an internship at a marine engineering firm in his home state of Maine at the age of 17. Then, in his final year of high school, he set about trying to tackle the problem of marine waste. “I had to prove that my idea would work and my school wanted me to come up with a plan to prove its real-world applicability and efficacy,” said Logan. “I only had three days to develop reasonable proof, but I managed to work it out and handed it into the school. They were satisfied the plan could work and told me that I could pursue the idea.”

Logan Andrick, receives UHI Business Competition award in 2024

The 21-year-old came to SAMS in 2021 to join the BSc Marine Science programme but suffered bad health in his first two years, forcing him to shelve his business idea. However, he revisited the plans when he became aware of the UHI

ISSN 0306-7335

Business Competition and, with the deadline looming, he pulled together all his research and models to present.

At the UHI Business Competition, Logan presented a ten-minute pitch to a panel of judges, followed by a Q&A session, and was awarded Best Tech Idea. Since the competition, he has partnered with Interface and was approached to become part of Impact 30, an all-expenses-paid business development course completed in collaboration with UHI Inverness to help advise and develop burgeoning young business owners' entrepreneurial endeavours. Logan also headed home to Maine to redesign, construct, and test a new proof of concept prototype to be used to further his progress on the project.

"All my childhood I had wanted to be a marine biologist," Logan said. "I remember at the age of five seeing my first Beluga whale, then at 17 I was leaning towards marine engineering because I wanted to come up with solutions to protect the oceans, for both the life therein and for future marine biologists to be able to have oceans to study. The course at SAMS made sense because it had the biology and the robotics elements."

While Logan admits the past few months have been a bit of a whirlwind, he still has a dissertation to complete for his final year studies at SAMS. "Everything has happened quite quickly." he added. "I'm grateful for all the support I've received from my personal academic tutor and lecturers at SAMS, UHI and colleagues of mine both here and back home. I'm intrigued to see what my team and I can produce."

Entries to the 2025 UHI Business Competition are now open to all UHI students and anyone over 16 living in Argyll and Bute, Highlands and Islands, Moray, or Perthshire. This annual competition, now in its 19th year, seeks to discover and support innovative business ideas, giving participants a strong start on their own entrepreneurial journeys. Run by CREATE, the Highlands and Islands Hub for Enterprise and Innovation, the competition equips participants with essential entrepreneurial skills for work, life and self-employment. This year, a total prize fund of £8,500 is available, alongside support packages in accountancy, legal advice and information technology. Finalists will also receive invaluable feedback from leading regional business experts. The UHI Business Competition webpage can found here: https://www.uhi.ac.uk/en/business/uhi-business-competition/

NOC scientist Dr Elizabeth Kent recognised with MBE

The National Oceanography Centre (NOC) proudly congratulates Dr Elizabeth Kent on the award of an MBE, for services to tracking global temperatures, recognising her decades of research into improving historical sea surface temperature records. The award was announced in King Charles III's New Year Honours list, which recognises the outstanding achievements of British citizens, recommended by the prime minister following an independent assessment process.

For over three decades, Liz, who is Associate Head of the Marine Physics and Ocean Climate group at NOC, has performed research that underpins development of long-term global surface temperature records, helping to make them more accurate and consistent; crucial to the ability of the international science community to detect and describe human-induced climate change. Liz has spent years studying the details of the observations, how they were made, recorded and stored. This insight helps reveal the true variations in marine surface temperature by reducing the impact of spurious effects such as changing measurement methods over time. The research, and the datasets built upon it, underpin climate assessments such as the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports, used by every policymaker, campaigner or researcher who wants to know or to show how the ocean and climate is changing.

Commenting on her award, Liz said: "I am honoured that my contribution to improving historical marine data has been recognised in this way. This wouldn't have been possible without the long-term support that the National Oceanography Centre provides for this work." The award of an MBE furthers Liz's national and global reputation as an innovative and world-leading researcher, which has previously been

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recognised by the award of the Royal Meteorological Society's Adrian Gill Prize for 2013. Read about some of Liz's recent work on global temperature records.

GEORGE annual meeting in Rome highlights progress and prepares for 2025 milestones

GEORGE, Next Generation Multiplatform Ocean Observing Technologies for Research Infrastructures, is a Horizon Europe-funded project that develops novel technologies to improve ocean observations. The technologies developed will represent the next level in systematic long-term autonomous ocean observations. The GEORGE consortium gathered in Rome, Italy, between the 19th and 21st November 2024 for its second annual meeting and general assembly, bringing together partners from across Europe to reflect on achievements and plan future actions in autonomous ocean observing technologies, integrated data flow and training.

The *annual meeting was organised jointly by GEORGE coordinator ICOS ERIC and EMSO ERIC. Thank you to EMSO ERIC for hosting the consortium in Rome*

The agenda included progress updates from work package leaders, presentations and discussions on novel technologies, as well as interactive workshops joint data flow, training, dissemination and exploitation of project results. The meeting served as a valuable platform for partners to exchange information, strengthen collaboration, and foster innovation. Looking ahead, the consortium is preparing to achieve significant milestones in 2025. A key highlight will be the forthcoming field campaign at the Porcupine Abyssal Plain (PAP) observatory in the North Atlantic. During this campaign, scheduled for the spring/summer of 2025, the integrated multi-platform observing system progressed in the GEORGE project will be tested for the first time. This deployment will utilise sensors developed within the project to conduct a comprehensive characterisation of the carbonate system using multiple platforms operated by European Research Infrastructures (RIs) ICOS, Euro-Argo and EMSO.

Another major milestone in 2025 will be the second Technical Forum, a training concept that connects technology manufacturers and scientists to co-develop ideas, exchange views, and provide feedback. The first Technical Forum, held in May 2024, focused on platform technologies. The second forum, scheduled for autumn 2025 in Oostende, Belgium, will concentrate on sensors. Further details will be announced closer to the date.

The annual meeting also included a visit to WSense, a GEORGE partner and a deep-tech company specialised in underwater monitoring and communication systems

Currently the consortium is prioritising the completion of three forthcoming deliverables:

- **D4.1**: Interim report on how a central data service will benefit all RIs
- **D4.3**: Interim report on pathways from different platforms
- **D7.3**: Updated dissemination, communication, and exploitation plan

These deliverables will be published on the project website in January 2025.

Scientists investigate underwater tsunamis around Antarctica

SAMS has joined an international collaboration of Antarctic researchers in an effort to discover how underwater tsunamis are triggered by glacier calving around Antarctica. The £3.7 million research project, called POLOMINTS, is led by British Antarctic Survey (BAS) and will analyse

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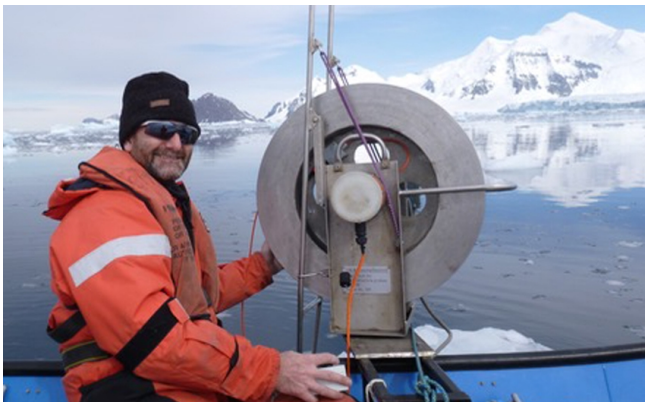
how these underwater tsunamis contribute to the mixing of ocean waters, a process that plays a critical role in shaping global climate systems, the Antarctic Ice Sheet, and marine ecosystems.

In November, POLOMINTS scientists met at the BAS headquarters in Cambridge to finalise plans for the project, which promises to shed light on this newly discovered phenomenon. SAMS has undertaken similar work on these underwater tsunamis in the Arctic regions of Greenland and Svalbard, using a combination of underwater robotic vehicles and modelling. The team hopes to carry out similar work, this time in the southern hemisphere. As part of the research effort, a SAMS scientist will be based in Antarctica for a field season.

The project builds on recent findings that challenge traditional beliefs about the forces driving mixing in Antarctic waters. Historically, winds, tides, and heat loss were thought to be the primary drivers of oceanic mixing around the continent. However, the team recently identified that calving glaciers can initiate underwater tsunamis, multi-metre waves that travel rapidly from the ice, breaking and generating powerful bursts of ocean mixing. Initial calculations suggest these tsunamis could rival the impact of wind-driven mixing and play a larger role than tides in redistributing ocean heat.



Prof Mark Inall of SAMS in Antarctica

SAMS oceanographer Prof Mark Inall, who is part of the research team, said: "Whilst we have many images of icebergs calving from glaciers, and have studied internal waves within the ocean interior, we know next to nothing about how calving generates these large waves hidden from sight below ocean's surface. POLOMINTS will break new ground in our knowledge of how crumbling ice sheets stir the coastal oceans of polar regions."

To investigate the extent and effects of these underwater tsunamis, the team will deploy advanced technology, including robotic underwater vehicles and remotely piloted aircraft, to gather data near calving glaciers. They will also employ deep-learning algorithms to analyse satellite data, and computer simulations to model the generation and spread of these tsunamis. These cutting-edge methods will allow the researchers to assess the impacts of intense mixing on factors critical to climate and ecosystems, such as ocean temperature, nutrients, and marine productivity.

Professor Mike Meredith from BAS, who leads the project, said: "We're excited to explore this uncharted scientific territory. By learning more about underwater tsunamis and their influence on ocean mixing, we can refine ocean models, which in turn will help project future climate scenarios more accurately. This knowledge is crucial for the global community as we all grapple with the complex impacts of climate change."

POLOMINTS is a collaboration led by British Antarctic Survey, and includes SAMS, the University of Southampton, the University of Leeds, the National Oceanography Centre, the University of Exeter, and Bangor University. International partners are from the Scripps Institution of Oceanography, the Institute of Geophysics of the Polish Academy of Sciences, the University of Delaware, and Rutgers University. POLOMINTS is funded by the Natural Environment Research Council (nerc.ac.uk).

Declining Antarctic sea ice generating more ocean heat loss and storms

Declining Antarctic sea ice cover is generating unprecedented ocean heat loss to the atmosphere and more storms, according to a new study led by the UK's National Oceanography Centre (NOC). The study, published in the journal *Nature*, focused on the record low Antarctic winter sea ice cover in 2023 and provides the first clear picture of the impacts of the disappearing sea ice.

ISSN 0306-7335

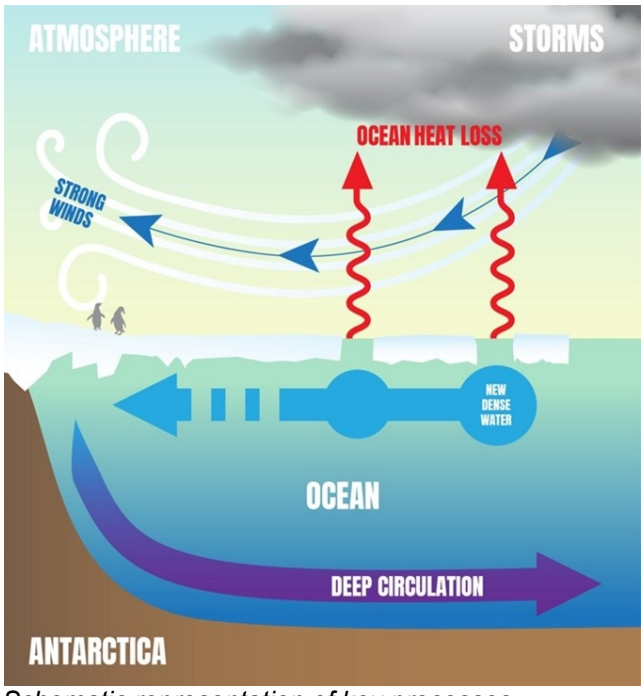
Antarctic sea-ice. Photo by Dr. Andrew Meijers

Using data from the atmospheric layer just above the ocean surface, the study found a doubling of heat loss to the atmosphere, matched by higher numbers of storms around much of the high latitude Southern Ocean. The study also warns of potentially far-reaching impacts on the deeper ocean circulation, due to the heat loss making Antarctic surface waters denser than previously seen. Lead author Professor Simon Josey says the results point to an urgent need to use state-of-the-art ocean and climate simulations, such as those currently undertaken by NOC, to better understand the broader impacts of Antarctic sea ice loss, which could ultimately extend to the Northern Hemisphere.

"It is too early to state whether 2023 and its record-breaking sea-ice decline marks the onset of a fundamental shift in the amount of Antarctic sea ice," says Professor Josey, an expert on ocean-atmosphere interaction at NOC, which is a leader in ocean and climate research. "However, our study does reveal the extreme conditions to be expected in future years of low ice regrowth, with 2024 looking like it is continuing the sharp change seen in 2023. Based on our study, years of low sea ice like this will continue to have more storms and greater changes to ocean properties that could impact the wider ocean circulation. Repeated low ice cover conditions in subsequent winters will strengthen these impacts and may result in profound changes further afield, including the Tropics and Northern Hemisphere."

Sea ice cover provides a winter blanket over the high latitude Southern Ocean, which stops it from cooling through exposure to the atmosphere. With the blanket removed, heat is lost into the atmosphere and surface waters become cooler and denser. Sea ice cover around Antarctica hit a record low in 2023, with ice reductions in strong loss regions 50 to 80 % below the 1991 to 2020 winter average. Ocean heat loss to the atmosphere at some locations has more than doubled and an increase in storms has been observed around much of the high latitude Southern Ocean by up to seven days a month.

Previous analysis of the long-term impacts of declining Antarctic sea ice by co-author Dr Holly Ayres, formerly at the University of Reading and now at NOC, shows that enhanced ocean heat loss can also affect the climate as far away as the Tropics and the Northern Hemisphere. She says, "My work analysed a climate model experiment where the amount of ice was artificially reduced. However, I didn't expect to see a real-world ice decline as large as that observed in 2023 with such strong consequences for the ocean heat loss."



Schematic representation of key processes

The study also found that the disappearing sea ice is allowing the ocean surface waters to change their properties particularly density. Co-author Dr Andrew Meijers, from the British

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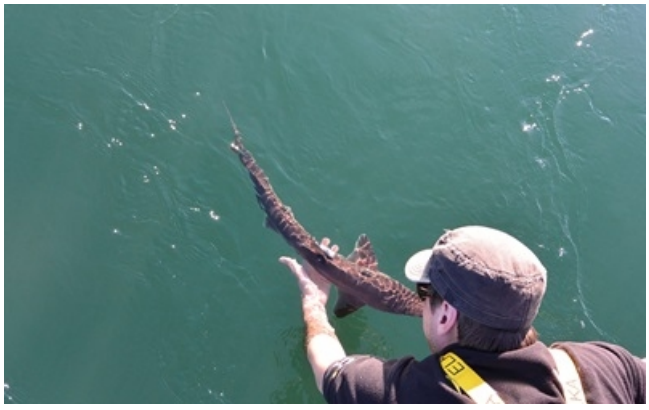
Antarctic Survey, explains, “The location of this new denser surface water is relatively far from the sites at the Antarctic shelf where the densest and deepest waters of the global ocean are formed. However, this cooling and subsequent sinking of waters previously covered by sea ice has the potential to release deeper warm waters that would normally be kept away from ice by an insulating surface layer. In turn this has the potential for increasing sea ice melt in future years. Further analysis is urgently needed to understand these processes and their complex feedbacks, and determine how the massive decline of winter sea ice in 2023, and again this year, will impact the Southern Ocean circulation. This is key to understanding the climatically critical ocean uptake of atmospheric heat and carbon, and the rate of melt of the Antarctic continent.”

“We now need a more detailed understanding of the strengthening ocean heat loss in the regions of declining Antarctic sea ice and its wider impacts,” adds Professor Josey. “This is vital to understand how the increased number of storms are linked to the extra heat supply into the atmosphere and for determining long term societal risks, including potential changes to weather conditions in the decades ahead in locations far removed from Antarctica. Critically, we need to use our ocean and climate simulations to understand how the major increase in heat loss and increased surface water density impacts the wider ocean circulation.”

Groundbreaking project to study sharks and skates in Scottish waters

The Marine Alliance for Science and Technology for Scotland (MASTS) has secured funding for a groundbreaking project studying sharks and skates in Scottish waters, the SharkScape project. Sharks and skates play a crucial role in marine ecosystems around Scotland but are often misunderstood. Edinburgh Napier University will lead the ambitious study which aims to enhance our understanding of these species. The project team includes researchers from the University of Edinburgh, the Scottish Association of Marine Science, the University of the Highlands and Islands, the Orkney Skate Trust, the University of Aberdeen, Marine Directorate Science, and NatureScot.

The first project stage will bring together existing data on sharks and skates and identify knowledge gaps. The second stage will use advanced and innovative methods, such as tagging technology, environmental DNA, and underwater video, to map distribution, migratory patterns, population dynamics, and interactions of these fish with their environment. The findings are expected to provide valuable insights into the conservation needs of the species, helping to inform sustainable management practices and nature-positive solutions that will help protect and enhance the delicate balance of our marine ecosystems. This initiative underscores the commitment of MASTS members to understanding the marine environment and informing decision making that positively affects the sustainability of our seas and oceans.



Lead researcher Dr James Thorburn, Associate Professor of Marine Ecology at Edinburgh Napier University’s Centre for Conservation and Restoration Science said: “The impact of this research extends far beyond scientific curiosity.

As apex predators, sharks and skates are essential for maintaining the health and diversity of marine life. By shedding light on the behaviour and health of these species in Scottish waters, we hope to enhance our ecological knowledge and strengthen efforts to safeguard marine biodiversity. Securing this funding marks a pivotal moment in our quest to understand and protect these fish in Scottish waters. They are among the most threatened vertebrates on the planet because of factors

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such as historic overfishing, habitat removal, and climate change. Our research will provide the data needed to develop effective conservation strategies, ensuring the overall stability of oceanic ecosystems. We are excited to embark on this crucial journey and look forward to our findings having a positive impact on marine biodiversity and sustainability efforts."

The funding for this project has been provided by Shell U.K. Limited to support research related to species and habitat conservation in the marine environment under its ambition to have a positive impact on biodiversity. The funding agreement is for £1 million over three years.

Coastal Resilience in a Changing Climate: Challenges and Opportunities

You are invited to join Dr Bahareh Kamranzad for a MASTS webinar on Wednesday 22nd January (1300-1400). Approximately 40% of the world's population resides within 100 km of coastlines, with over 10% living in low-lying coastal areas less than 10 meters above sea level. These regions face increasing vulnerability to the intensifying impacts of climate change, including flooding, erosion, and the loss of land and vital ecosystems. These challenges are driven by sea level rise (SLR), more frequent and severe extreme events (storms, hurricanes, typhoons), and shifts in meteorological conditions that alter ocean dynamics. The rapid expansion of ocean renewable energy technologies, particularly offshore wind and wave energy farms, introduces additional complexities, with both potential benefits and challenges for coastal protection and stability. This presentation will explore the multifaceted impacts of climate change on ocean dynamics and coastal disasters. It will also highlight innovative approaches to coastal protection, including nature-based solutions and adaptive strategies, aimed at mitigating the risks and enhancing the resilience of coastal regions in a changing climate.

Fitting tribute for Andy

A bay in the Antarctic has been named after Professor Andy Brierley, who died in February 2024. The newly named Brierley Bay is located on the southern coast of Coronation Island, South Orkney Islands, at the western end of Orwell Bight. Andy, who worked in the School of Biology's Scottish Oceans Institute, was a pioneer in using autonomous platforms to investigate the distribution of Antarctic krill. This included using moored echosounders and leading the first deployment under sea ice in the Southern Ocean of one of the world's first autonomous underwater vehicles (Autosub), specifically in the northwestern Weddell Sea. Read more about this tribute here.

Publication of EMB Policy Brief No. 12 Requirements for Coastal Resilience in Europe

The EMB (European Marine Board) IVZW has published Policy Brief No. 12 'Requirements for Coastal Resilience in Europe'. The document presents key policy, scientific and community recommendations for building coastal resilience and enhancing the capacity to cope with impacts from coastal pressures, summarising the main messages and recommendations from the EMB Position Paper No. 27 "Building Coastal Resilience in Europe". EMB Policy Brief No. 12 provides an overview of approaches for the governance and management of coasts and their human communities towards resilience, and the knowledge required to build coastal resilience, with a specific focus on coastal protection and Nature-based Solutions. Download the document here and find out more about the Coastal Resilience working group here. The recommendations from this document will be further discussed at the 9th EMB Forum on 'Addressing coastal and water resilience on the land-sea interface' to be held on 2 April 2025.

Call for new Forum Steering Group members and Convenors

MASTS Research Forums are looking for new members, a great opportunity to dive into and experience our Forums up close and benefit from networking activities and collaborations. Everyone is welcome, from academia to industry, PhD, or Professor. Steering Group meetings take place online 2-3 times a year and serve as a vibrant platform to exchange news on current research, future projects, and ideas for joint activities. Outputs can include reports and papers, virtual Story Maps, Workshops or Science-Policy days and are supported through the MASTS Directorate.

Aquatic Stressors Forum - Call for new members
Sustainable Aquaculture Forum - Call for a new Co-Convenor
Coastal Forum - Call for new members and Co-Convenors

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Biogeochemistry Forum – Call for new members, especially Early Career Researchers (ECRs)

VIEWS

APAC region gaining local access to ScanFish ROTV rental and support

With a rapid increase in the offshore wind market, the Asia-Pacific (APAC) region has seen an increasing demand for ScanFish Remotely Operated Towed Vehicles (ROTVs), one of the most commonly used sensor platforms for Unexploded Ordnance (UXO) surveys around the world, developed by Danish maritime engineering company, EIVA. To meet this need efficiently and at lower cost to survey companies, EIVA has shipped a fleet of new ScanFish ROTVs and other rental equipment to their offices in Singapore, where their APAC team operates. EIVA's rental equipment is therefore ready to be delivered more easily to customers within the APAC region, sent out from Singapore.

"Our customers operating in Asia have emphasised the importance of making ScanFish ROTVs more accessible in this region. We have therefore been working over the past years to ensure our Singapore offices have the rental equipment and man-power needed to support them together with our representatives in Japan, Indonesia, China and Malaysia." said Julie Rydberg Sørensen, Technical Sales Manager, Rental Team Lead, EIVA, who runs the rental activities worldwide, including in the APAC region.

EIVA's team based in Singapore: Nge Aik Moh (left) and David Thomson (right) with a ScanFish ROTV

For seabed survey companies operating in the APAC region, shipping times will be reduced by several weeks compared to when shipping out of EIVA offices in Denmark. In addition, heavy equipment can be shipped via sea-freight rather than air-freight for a more cost-effective solution, while keeping shipping times reasonable.

Not only will rental equipment ship out of Singapore, but EIVA's team there will be able to offer servicing for the ongoing rental jobs. The Singapore-based team, which provides local support for EIVA's customers in the region, includes Asia-Pac Area Sales Manager, Nge Aik Moh, and customer support engineer, David Thomson, both of whom have a wealth of experience to understand the needs of surveyors in this region. This team shares offices with sister company Sonardyne, whose positioning sensors are used on EIVA solutions such as ScanFish Equinox, providing a centralised location for survey equipment support and services in this region.

SALTS

What happens to biodegradable plastics if they enter the sea?

When the first full synthetic plastic was invented in 1906, over 100 years ago, widespread use of the material for consumer products soon arose in the post-war period. Plastic was cheaper to produce than the more expensive paper, glass and metal materials used in throwaway items, such as consumer packaging, and was also stronger, lighter, safer and more durable, and it shifted the way that we use materials forever.

However, the properties of plastic that make it such an attractive material, such as durability and strength, also make it a lasting problem once it reaches the end of its useful life. Some types of plastic can take thousands of years to degrade, and it is estimated that a truckload of plastic enters the ocean every minute.

In response to such concerns, biodegradable plastics, that is, plastics that can break down or "biodegrade', have been in development since the end of the last century, to achieve similar usage and convenience of traditional plastics, but with the goal of breaking down quickly and harmlessly. But, as the global production of biodegradable plastics increases, from 1.5 million metric tons in 2023 to almost 5.3 million in 2028, it is critical that we understand the impacts of these materials on the environment.

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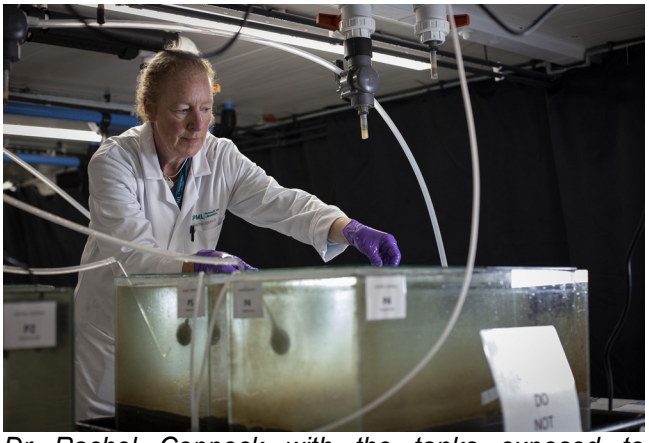
A study has been underway in the Plymouth Marine Laboratory (PML) Mesocosm, a facility that enables scientists to conduct research in a controlled aquatic environment, which closely simulates natural conditions. The experiment aims to understand the impact of biodegradable plastic on marine coastal ecosystem processes, and to determine what exactly happens to the plastic once it enters the marine system. It is a collaboration between PML, the University of Plymouth, and the University of Bath, and funded with thanks to a NERC Highlight Topic grant.

Dr Rachel Coppock, who has been overseeing the experiment in the Mesocosm, said: "Our understanding about the impacts of biodegradable plastics is really in its infancy. Whilst biodegradable plastics pose the potential to reduce the longevity of plastic pollution in the environment, any additives in the plastic may leach out during degradation; and we don't fully understand what impact that may have on fauna or ecosystems. Many biodegradable plastics are not designed to break down in the natural environment, but rather under specific conditions, like industrial composters. So, when these types of biodegradable plastics end up in the sea, they may take a long time to degrade. In fact, one study by colleagues at University of Plymouth found that a biodegradable carrier bag could still hold a full bag of shopping after being submerged in the sea for 3 years."



Dr Rachel Coppock with the tanks exposed to particles of traditional plastics and biodegradable plastics

"Our experiment in the Mesocosm began by collecting seawater, sediment and animals from the Plymouth Sound on our research vessel the Quest. We then divided these into separate tanks, which have controlled conditions to closely resemble the real conditions in the water column. And then, we began exposing each tank to particles of either biodegradable plastics or traditional plastics."

So, what will the experiment be measuring? Dr Coppock explains: "There are three key ecosystem processes that we will be evaluating. The first is the microbial community, which is hugely important in determining biodiversity and ecosystem health. Secondly, we will be evaluating the downward flux of carbon, from the water column to the ocean depths and seabed. This is known as the biological carbon pump, evaluated here by measuring sinking rates of zooplankton faeces after exposure to each plastic type. And lastly, we'll be evaluating bioturbation, or the mixing of sediment by burrowing animals, which is important for oxygenating sediments, nutrient cycling, sediment stability and carbon sequestration. All of these are critical ecological processes that contribute to the health and functioning of ocean ecosystems."

A brittlestar from the experiment. Brittlestars can be found in the sediment where they play an important role in the food web. They are known as 'seafloor ecosystem engineers', as they can occur in huge aggregations, oxygenating and reshaping the sediment on the seafloor, which in turn influences the distribution of other seafloor species

"We will also be investigating the fate of the plastics. Once the plastics enter the marine system, where do they end up? To answer this, we will be analysing the animals, water and sediment with our colleagues from the University of Plymouth to work out where the plastic particles end up. The experiment concluded in December, and now we will be evaluating the findings. We hypothesize that both biodegradable and conventional plastic particles will be found in all compartments of the system,

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including buried in the sediment, within the animals, and in the water. We may see altered sinking rates of copepod faeces (biological carbon pump) and a shift in microbial community composition."

This experiment has taken place thanks to a NERC Highlight Topic grant. The overall Principal Investigator is Richard Thompson at the University of Plymouth, and the Project lead at PML is Pennie Lindeque. Other key staff involved from PML are Rachel Coppock, Matt Cole and Karen Tait, with essential support from Christine Pascoe, Louise McNeill, Elaine Fileman Tom Mesher and Andrea McEvoy. The project will be sharing updates on this study at a later date, please stay tuned.

CALENDAR

29th-30th January 2025, Royal Geographical Society, Coastal Futures Conference
London, UK
Coastal Futures is the UK's largest annual gathering of coastal and marine practitioners. The 2025 programme will include six sessions across two-days, covering the big issues and shining a light on future trends.

Speakers include:
Giles Bristow, CEO of Surfers Against Sewage
Mike Cohen, CEO of National Federation of Fishermen's Organisations
Sarah Fowler, CEO of Wildfowl and Wetland Trust

Keynotes:
Nick Hounsfield, Founder of The Wave
Melanie Austen, Professor of Ocean and Society, University of Plymouth

Panel debates led by:
Aisling Lannin, Head of Evidence at the Marine Management Organisation
Rachel Solomon Williams, Executive Director, Aldersgate Group

Poster announcement coming soon.

Sessions:
1. Land-Sea Interactions: How do we improve the quality of place-based decision-making?
2. Sustainable Seas: Can we meet the 2030 targets whilst growing a sustainable blue economy?
3. Across the Water: What insights can we gain from international best practice to help us reach the 2030 targets?
4. Ocean Stewardship: Are we doing enough to understand and promote the value of our seas?
5. Future Fishing: How will future fishing needs be balanced with restoration efforts and space for renewable energy?
6. Restoring Nature: Can we achieve well-managed and restored marine and coastal seascapes by 2030?

26th-27th February 2025: The first OCEAN DECADE International Coastal Cities Conference
Qingdao, China
Coastal cities are among the fastest-growing human settlements in the world. They are on the frontline to benefit from the growth of a sustainable ocean economy, but also to face escalating threats from climate change, ocean pollution, and other environmental risks. The Ocean Decade presents a unique opportunity to harness ocean science and knowledge to address these challenges, enhance the resilience of coastal cities to global change, and improve the living conditions and well-being of their inhabitants. Happening ahead of the 2025 United Nations Ocean Conference, this event will accelerate the co-design of ocean science for the sustainable development of coastal cities. Join us to build a better ocean for better cities.

26th-28th February 2025: 4th annual Socio-oceanography Workshop
Southampton, UK
The National Oceanography Centre (NOC) is calling on scientists and researchers to participate in its fourth annual Socio-Oceanography Workshop, hosted in collaboration with the Marine Social Science Network. This international event will gather experts across natural and social sciences to tackle the pressing issues linking people and the changing ocean.

This year's workshop will focus on four key themes, including the impact of climate change-driven shifts in marine species distribution and how these changes will affect the way the UK marine environment is perceived, valued, and

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managed. Other topics include integrating digital humans into environmental digital twins, addressing biases in research related to marine carbon dioxide removal, and exploring how local communities can engage in participatory environmental monitoring.

The workshop is limited to 50 people, with social sciences participants, in particular, being encouraged to apply, to help grow the number of specialists from this discipline engaging with socio-oceanography. Outputs from the workshop include research papers and funding proposals to help address the learnings, identified gaps and further knowledge.

Outputs from this year's workshop, held in March, continue with a recent publication addressing marine heatwaves, particularly in the UK where there is currently little awareness of their potential impacts, ecologically and societally. Find out more here.

25th-27th March 2025: The 4th Ocean Visions Biennial Summit.
Vancouver, Canada
We're thrilled to announce that the 4th Ocean Visions Biennial Summit 2025 will be held in March in Vancouver, Canada. This action-oriented event will bring together scientists, policymakers, innovators, funders, students, and others to explore solutions and strengthen partnerships to help restore our ocean and stabilize the climate. We invite you to be part of the movement. Join a multidisciplinary community focused on advancing solutions to the ocean's most pressing challenge, climate disruption.

Programming will be highly interactive and include ample opportunities for collaboration. Participants can look forward to:

- ***Sharing & Learning****:* Gain insights from inspiring keynote speakers and panel discussions on the forefront of ocean-climate research and innovation.
- ***Workshops****:* Dive deeper with fellow attendees on challenges and issues of mutual concern.
- ***Networking****:* Connect with leading experts, industry pioneers, and decision-makers shaping the future of ocean-climate health through time devoted to building and strengthening relationships.
- ***Collaborating****:* Forge partnerships and collaborations to accelerate the impact of your work in ocean-based climate solutions through interactive, action-oriented sessions and activities.

We're excited to announce that registration for the Ocean Visions Biennial Summit 2025 is now open. The Summit is designed to be highly interactive. A diverse set of session types and events will engage scientists, policymakers, innovators, funders, students, and others around innovative approaches and solutions to restore our ocean and stabilize the climate. The Summit will also help build and strengthen the multisector partnerships that are needed to make complex solutions real**.** Register Now and contribute to the Program.

The Summit is designed to welcome and engage a multidisciplinary community. The event will feature a mix of session types as well as ample opportunities to collaborate. Summit participants will share and discuss cutting-edge advancements in ocean sciences, engineering, policy, governance, and economics, and coordinate action on key priorities to advance innovative solutions for ocean-climate restoration. We invite you to be part of the movement. Help us advance solutions to the ocean's most pressing challenge, climate disruption.

8th-10th April 2025: Ocean Business 2025.
Southampton, UK
Countdown for Ocean Business as registration opens. The global ocean technology community will gather again at the National Oceanography Centre in Southampton. Over 5,000 visitors are expected from around the world for the must attend Ocean Business 2025. Discover the newest innovations in marine autonomous systems and find solutions to transform your business in 2025. Connect with thousands of the industry's brightest minds and share ideas to help define the future of ocean technology.

27th April - 2nd May 2025: European Geophysical Union General Assembly.
Vienna, Austria
The EGU General Assembly 2025 brings together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary, and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and

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discuss their ideas with experts in all fields of geoscience.

The Provisional Programme is online. Prepare your calendar with all the EGU25 important dates by checking our Deadlines and Milestones page. Curious about who organizes the EGU25 General Assembly? Meet the Programme Committee.

28th-29th May 2025: The MARTECH Workshop 2025
Pasaia, Spain
The Martech Workshop 2025 is an excellent platform for showcasing innovations and collaborating with marine technology experts. MARTECH 2025 is organized by the Marine Technologies team of AZTI located at the Pasaia AZTI Headquarters and the Universitat Politècnica de Catalunya (UPC – SARTI). Further details about the workshop are available on their website: http://www.martech-workshop.org/.

4th-6th June 2025: The One Ocean Science Congress
Nice, France
The One Ocean Science Congress will feature a mix of plenary sessions, including opening and keynote speeches, alongside parallel oral and poster presentations. The One Ocean Science Congress is organised by CNRS and IFREMER and it is a special event of the 3rd United Nations Conference on the Ocean Endorsed by the United Nations Decade of Ocean Science for Sustainable Development. Please see more information on their website: https://one-ocean-science-2025.org/home.html

23rd-25th June 2025: Turbulence Grey Zone Workshop
Exeter, UK
Highlighting the opportunity to attend or participate in a workshop about advances in turbulence modelling/parametrisations, which is taking place at the University of Exeter next summer. Turbulence parametrisation is a common challenge in the modelling of fluids, including Earth's ocean and atmosphere, so the conference aims to take an interdisciplinary approach.

1st-3rd July 2025: 2nd UK Coastal Research Conference
Liverpool, UK
Coastal zones are of high ecological and societal value, but as the dynamic interface between land, sea, and air, they are heavily impacted by a combination of climate-driven environmental change and human interventions. Approaches to sustainably manage the coastal zone increasingly seek to provide co-benefits such as risk mitigation, climate regulation, biodiversity gain, and supporting coastal community resilience. These require working across sectors and disciplines to better manage the UK coast in a changing climate.

The second UK Coastal Research Conference welcomes all those with an interest in UK coastal science, including academia, policy makers, practitioners and industry professionals. Our aim is for the conference to promote conversations around national coastal research strategies and coastal knowledge, connecting researchers with those involved in managing our coasts, and thereby inform sustainable future management of our coast.

Following on the first UK Coastal Research Conference, the programme will include one day with optional site visit / training course / workshops and two days for the conference including keynote, oral and poster presentations. Social activities are planned to include an icebreaker drink reception and a conference dinner. Abstract submission now open. For further information and submission form click HERE.

15th-16th July 2025: Deep-Sea Ecosystems Special Interest Group meeting
Newcastle, UK
The 2025 meeting of the Deep-Sea Ecosystems SIG will be in person (remote attendance TBC), hosted by Will Reid at Dove Marine Lab on the outskirts of Newcastle. More information about the meeting will be circulated in the New Year.

9th October 2025: 6th Maritime Transport Efficiency Conference (MTE Conference)
Geneva, Switzerland
To take place at the Hotel President Wilson, Geneva. Held annually, the MTE Conference uniquely bridges the maritime and commodity trading sectors, addressing the shared challenges and opportunities of decarbonising the global shipping industry. Focusing on the commercial and operational aspects of

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decarbonisation and offering actionable strategies to reduce emissions across the maritime value chain, the event caters to shipowners, cargo owners, charterers, operators, fuel suppliers, regulatory bodies, and technology innovators.

This diverse mix of stakeholders ensures comprehensive discussions on navigating the evolving regulatory landscape, adopting sustainable procurement practices, and embracing emerging technologies, while promoting cross-industry collaborative efforts to decarbonise. Take advantage of the Early-Bird rate, register by April 1st and save 300 CHF.

16th-18th October 2025: Arctic Circle Assembly 2025
Reykjavik, Iceland
The Arctic Circle Assembly will be held in the Harpa Concert Hall and Conference Centre, and registration will open in early June. The annual Arctic Circle Assembly brings together governments, organizations, corporations, universities, think tanks, environmental associations, Indigenous communities, citizens and others for a comprehensive and democratic Arctic dialogue. The Assembly is the largest gathering on Arctic affairs. It is a place for international engagement, cooperation, and celebration.

Governments, universities, companies, research institutions, organizations, associations and others are invited to submit Session proposals for the 2025 Arctic Circle Assembly. The deadline for submitting proposals is 23:59 on May 1st, 2025, Alaska Standard Time (AKST).

The Polar Dialogue will return in October. It consists of a series of sessions, consultative meetings, workshops and high-level Plenary Sessions taking place during the Assembly. The initiative aims to facilitate science and research cooperation in the Arctic, Antarctic and Himalaya-Third Pole region, as well as other ice-covered areas of the world. Chaired by H.E. Katrín Jakobsdóttir, Prime Minister of Iceland 2017-2024, the Polar Dialogue unites global experts and policymakers to address scientific challenges and foster collaboration.

The Business Forum will take place again during the 2025 Assembly at the Reykjavik Edition Hotel (located within the Assembly Area). It consists of a series of Sessions, consultative meetings, workshops and high-level Plenary Sessions. The Business Forum will delve further into areas of interest including tourism, the blue economy, infrastructure, innovation and more. Additionally, the assembly program has Business Forum Sessions that are open to all participants.

In addition, the Frederik Paulsen Arctic Academic Action Awards will be awarded for the fifth time at the 2025 Arctic Circle Assembly.

The CSMS email address is challenger.society@gmail.com. Contributions for next month's edition of Challenger Wave should be sent to: john@myocean.co.uk by the 31st January.

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JOBS and OPPORTUNITIES

PhD Position in Carbon Cycling and Climate Change in Coastal Environments; University of Helsinki

The Centre for Coastal Ecosystem and Climate Change Research (CoastClim), established at the Tvärminne Zoological Station (TZS), Faculty of Biological and Environmental Sciences at the University of Helsinki (Finland), is seeking an enthusiastic PhD candidate with an interest in global change and more specifically in marine (pelagic) biogeochemistry.

Deadline for applications is **31 January 2025**

Chair of the Governing Board - SAMS

The Scottish Association for Marine Science (SAMS) is one of the most respected marine science organisations internationally. We undertake world-leading marine research; disseminate the knowledge gained through inspirational educational and outreach programmes; and deploy our knowledge and know-how through relevant commercial activities.

We are seeking an inspirational leader to be Chair of the SAMS Governing Council, we are currently engaged in a large change programme which is exciting and challenging. If you are passionate about the marine environment then we would like to hear from you.

Closing Date: Monday 20th January

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There are jobs in the IMBeR newsletter

- Tenure-Track Position in Climate Science, Department of Earth and Environmental Science, University of Pennsylvania. Applicants will continue until the position is filled.

- Postdoctoral Fellowship: Climate Change Impacts on Northwest Atlantic Marine Ecosystems & Fisheries, Memorial University, St. John's, Canada. Position will remain open until filled.

- Postdoctoral Fellowship: Transforming Climate Action - Uncertain Seas, Memorial University, St. John's, Canada.

- ICES Journal of Marine Science is offering a mentorship program to support early career researchers who are interested in learning more about scientific publishing and journal editing. The program is for a period of 12-24 months. This is an unpaid, part time (a few hours per month), remote-work educational opportunity.

- Anthropocene Coasts Recruiting Position: Associate Editors. Applications will continue until the position is filled. Anthropocene Coasts is a Golden Open Access journal hosted by East China Normal University, and published by Springer. The journal publishes multidisciplinary research addressing the interaction of human activities with our estuaries and coasts. To help build on the success of Anthropocene Coasts and to expand the opportunities for international collaboration and contributions to the work of the journal, the journal is seeking more international Associate Editors.

- "La Caixa" Foundation INPhINIT call for incoming Doctoral Fellowships – Supporting young research talents pursuing doctoral studies in Spain or Portugal. Apply by **23 January 2025**.
-
- New EMFAF call for proposals for smart specialisation and regenerative ocean farming. Submit by **18 February 2025**.

More jobs and opportunities for ECRs, please sign up for IMECaN newsletter

If you would like to put some recruitment information in the IMBeR monthly newsletter, please contact us through imber@ecnu.edu.cn**.**

IMBeR monthly newsletter archive - Find more

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There are jobs in the MASTS newsletter

New vacancies:

We have officially changed the way we advertise jobs in the Newsletter and on our Webpage. From now on we will be using the vacancy landing page in all the links that we provide across our platforms. This means that from now on, whether you're in our newsletter or on a webpage, you will be able to read and apply for all vacancies in fewer clicks.

- Scientific Advisory Committee and Expert Panel – NatureScot – 20/01/25
- Environmental Data Specialist – JNCC – 02/02/25

Still open vacancies:

- Principal Consultant – HMC – 20/01/25
- NERC BAS Director of Science – UK Research and Innovation – 20/01/25
- Chair of the Governing Board – SAMS – 20/01/25

PhD Opportunities:

- Exciting PhD project opportunity on "Bio-engineering of biochar for enhanced remediation of contaminated environments" at Heriot-Watt University. More here.
- Blue Carbon accumulation, transformation and storage: Quantifying biogeochemical processes in saltmarsh ecosystems. University of St Andrews. More here.
- Addressing the Place of Microorganisms in the Nagoya Protocol: Microbial Biogeography, Genomics and Taxonomy (University of Essex). Closes 07/02/25. More here.
- Biodiversity Conservation. An Empirical Analysis of the Ways that Developers in England are Working to Achieve Biodiversity Net Gain (BNG) (University of Essex). Closes 07/02/25. More here.
- Nature-based Solutions (NbS) to Mitigate the Effects of Sea-level rise (University of Essex). Closes 07/02/25. More here.
- Transitions to Sustainable Wildlife Harvest: Evidence Based Management and The Social Licence to Hunt (University of Essex). Closes 07/02/25. More here.
- The Role of Directors' Duties and Their Relationship With Non-financial Reporting in Achieving Environmental Sustainability (University of Essex). Closes 07/02/25. More here.
- Exploring the Legal and Social Emergence of Rights of Nature as a Form of Environmental Protection (University of Essex). Closes 07/02/25. More here.
- Unilateralism v Multilateralism: Harnessing International Economic Policy for Sustainable Transitions (University of Essex). Closes 07/02/25. More here.
- Towards a Praxis of a Just Transition in Developing Economies: Beyond Counter Accounts and Regulatory Frameworks to Action (University of Essex). Closes 07/02/25. More here.
- Nature Protection Versus Nature Restoration: Who Benefits and Who Loses Out? (University of Essex). Closes 07/02/24. More here.
- Co-Production, Climate Resilience, and Accountability: A Pathway to Localising Sustainable Agendas (University of Essex). Closes 07/02/25. More here.
- Digital Technologies of Farming: Analysing and Communicating Its Impact on Farmers and The Environment (University of Essex). Closes 07/02/25. More here.
- From Global Promise to Local Impact: Evaluating Climate Funding at the Local Level (University of Essex). Closes 07/02/25. More here.

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